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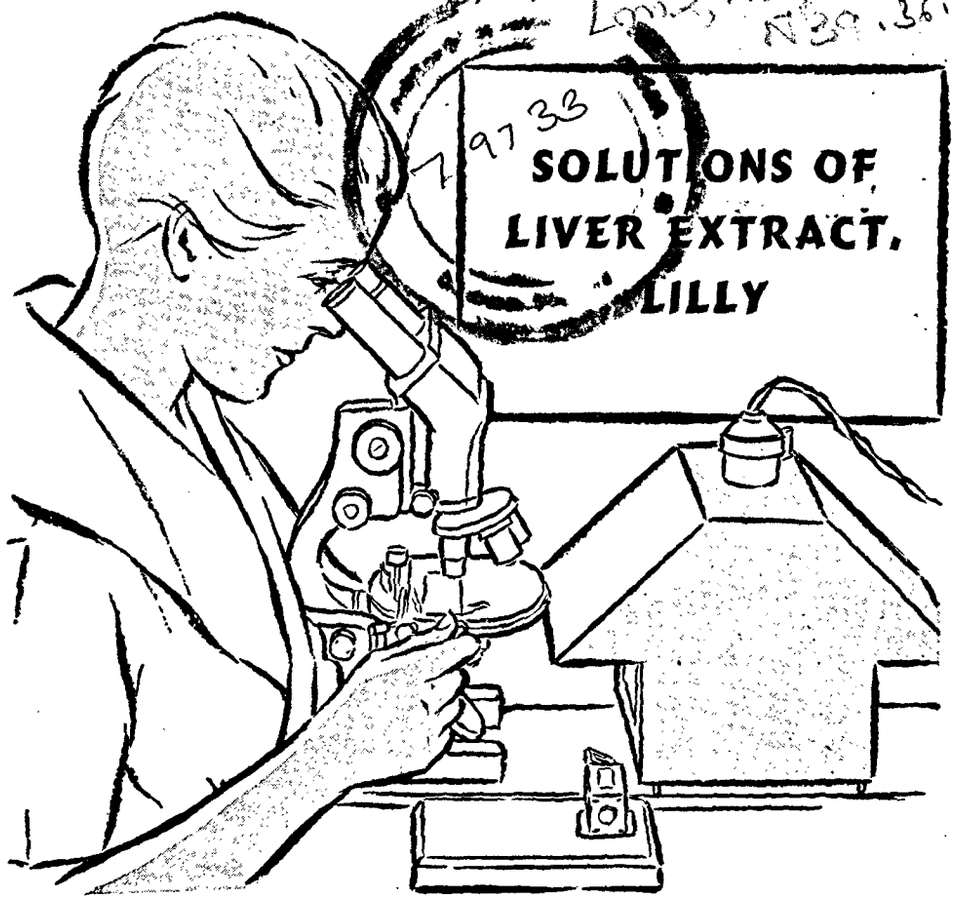

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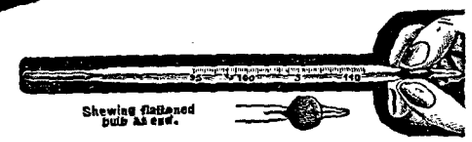

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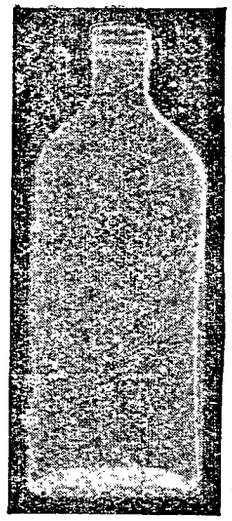

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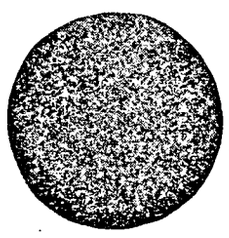

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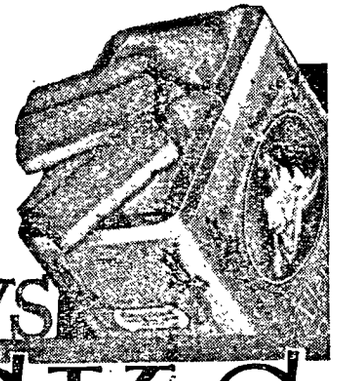

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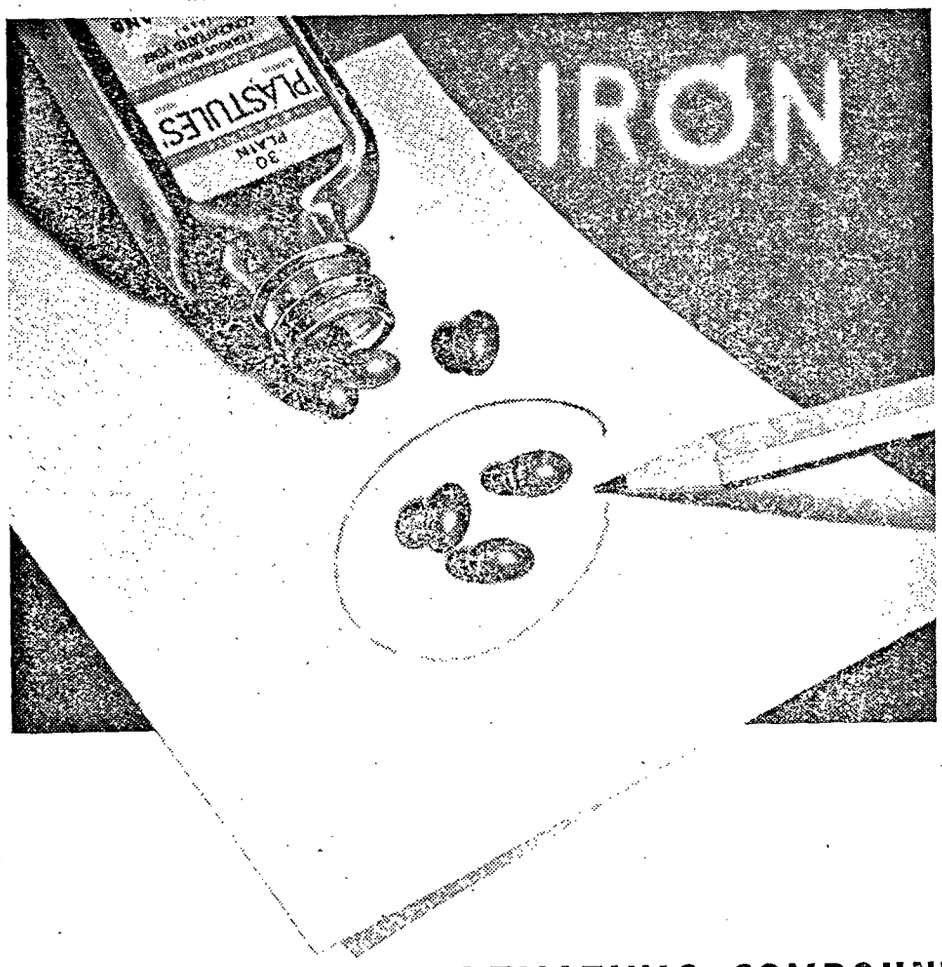

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Editors: Dr. U. RAMA RAU, M.L.C., & U. KRISHNA RAU, M.B., B.S.

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ORIGINAL ARTICLES

Coronary Occlusion*

BY

Jamiat Singh, M.D., F.R.C.P., (EDIN.), D.P.H.,

Medical College, Lahore.

THE first case of a thrombotic lesion of a coronary artery was successfully diagnosed during life by Adam Hammer and his diagnosis was confirmed at autopsy. Coronary Occlusion may be sudden or gradual. Sudden obstruction is produced by embolism or thrombosis and the latter is commoner of the two, while gradual obstruction is due to arteriosclerosis of the coronary arteries. This arterial degeneration may complete the process of obstruction later on by thrombosis.

The importance of coronary disease is great because the nutrition of the myocardium is adversely affected and coronary disease is one of the three important causes of heart disease, the other two being Rheumatism and Syphilis.

Ætiology and Patho!ogy.—This is a disease generally of a period in life when a man is passing from middle age to old age. Cases have been recorded at younger periods of life too. Although changes in the coronary arteries may be found very early, yet, clinical manifestations occur quite late in life.

* Specially contributed to 'The Antiseptic',

Sex.—The male sex predominates, the ratio being 60 males to 40 females.

Other ætiological factors such as social and economic state of the individual and heredity may play a part.

Morbid Anatomy.—The coronary artery occlusion leads to an anæmic necrosis of heart muscle. The branches of the coronary arteries, though they anastomose with each other, are physiologically end arteries and when there is slow obstruction the auxiliary systems develop and maintain the nutrition of the myocardium. The right coronary artery anastomoses with circumflex branch of the left coronary anteriorly.

There is also an anastomosis between the coronaries and the extra cardiac branches of the aorta.

Obstruction may be brought about by four causes:—

(1) Atherosclerotic condition of the coronary arteries with resultant narrowing.

(2) The mouths of the coronary arteries may be occluded from leutic aortitis. Syphilis does not involve the coronary arteries but occlusion of the mouths of the coronary arteries or actual strangling may occur.

(3) Thrombosis may lead to obstruction.

(4) Embolism may cause occlusion—Embolism may arise from vegetations in acute endocarditis, though it is quite rare.

The size of the infarct, the process of repair and its further progress depend on many factors. The size of the affected artery and rapidity of occlusion will play an important part. It will also depend on the degree of anastomosis of coronary circulation and with other blood channels including the Thebesian circulation etc.

The vessel most commonly affected is the descending branch of the left coronary artery and the lesions most often are found in the anterior wall of the left ventricle towards the apex and in the anterior part of the interventricular septum. If the occlusion is gradual, ischæmic fibrosis of the myocardium will occur.

The infarcted area will be white or yellowish in colour, and irregular in shape and surrounded by a red zone. The area may soften and break down with granular material and hæmorrhage may occur in the infarcted area which may appear deep red. The softening which results is called myomalacia cordis. Over

the endocardial surface of the infarcted area a thrombosis may occur and even embolism may occur from the thrombotic area.

Varying degrees of pericarditis may develop over the infarct. Sometimes lime salts may be deposited in the old necrotic area and calcification in papillar muscles or stony rings may form at the base of mitral and aortic valves.

The results of the infarction may be the following:—

(1) Sudden death may occur.

(2) The area may undergo softening and the condition is called myomalacia cordis.

(3) Rupture of the heart may occur.

(4) Over the infarcted area ventricular aneurysm may form. This is especially common at the apical region.

Microscopically:—The infarcted area is invaded by polymorphonuclear leucocytes, and the dead muscle is gradually replaced first by a loose, soft granulation tissue rich in small blood vessels and later on by dense fully formed scar tissue.

Symptoms.—Before the symptoms of coronary artery occlusion are understood, one must bear in mind the relation of angina pectoris to coronary occlusion with infarction. In about half the cases of coronary occlusion there is previous history of angina pectoris. The patient may get an attack of coronary occlusion at one time and of angina pectoris at another. In many cases angina pectoris follows coronary occlusion. The mode of termination in a case of angina pectoris is coronary occlusion.

The three cardinal features of the disease are pain,dyspnœa, and shock.

Pain.—The pain is sudden in its onset and the attack generally comes on when the patient is at rest generally during sleep or at the time of retiring to bed. It is not related to any exciting cause as in angina pectoris, though history of anginal pain may be available preceding the actual attack. The pain is situated in front of the chest or may be in the epigastrium where it is missed for any acute abdominal condition, because it is so many times accompanied by vomiting. The pain is generally localized and does not radiate so commonly as it does in a case of angina pectoris. Usually the pain is very severe but sometimes it may be only a mild discomfort or a sense of oppression. When the obstruction is gradual, the pain may not be very severe as this area becomes gradually desensitized by

the destruction of the nerves and muscle fibres. The pain usually persists and may be for hours and even days. Along with pain, there may be a sense of dissolution. The patient does not keep an immobile attitude as in a case of angina pectoris but on the other hand he is restless and may not be able to refrain from walking about. The pain is not relieved by rest, nor is it affected by vasodilator remedies as in a case of angina pectoris. When the pain is in the epigastric region, it may be associated with vomiting and distension.

Dyspnœa.—It is an important feature of the attack and may vary from a mild degree to that of cardiac asthma. It may be severe and acute œdema of the lung may occur. Sometimes, pain may be very mild or even absent, the only notable symptom being urgent dyspnœa.

Prostration, Shock and Collapse.—At the onset shock occurs, the patient sweats profusely and there is ashen pallor with a rapid feeble pulse. Vomiting and dyspnœa occur generally at the onset. The patient may collapse and may look gravely ill.

Pulse and Blood Pressure :—The pulse rate continues to increase and may be feeble. Tachycardia is a common feature though rarely even bradycardia may be present. Blood pressure falls and usually shows a considerable drop. Rarely, the pulse may be irregular.

Examination of the Heart will reveal that apex beat is usually diminished or may be absent. The heart sounds are weak and sometimes a tic-tic rhythm is present. Rarely, first sound may be reduplicated. A mitral or tricuspid murmur may be present due to relative incompetence. Localized pericardial friction may be made out which is diagnostic. Various irregularities in rhythm might appear. There may be extrasystole, auricular fibrillation, auricular flutter, paroxysmal tachycardia or even heart block may appear.

Pyrexia.—There is generally pyrexia for the first few days and is associated with leucocytosis. The temperature is not very high and generally varies between 100—101° F. Levine and Brown have remarked that rectal temperature is higher than the mouth temperature, probably because the patient is in a state of collapse from sweating with corresponding loss of heat, while the heat loss may not be felt in the pelvis.

Later on, signs of congestive heart failure may appear. There may be congestion in the lungs, orthopnœa, prominence of

neck veins, enlargement and tenderness of the liver with ascites and œdema in the lower extremity.

Rœntgenological study may not reveal anything. There may be cardiac enlargement. In extreme cases, on screening the cardiac action may be found to be feeble. The aorta may be tortuous and elongated from atheroma with prominence of the aortic knob and sometimes with visible calcification.

Electrocardiogram :—Is of very great importance in diagnosis of this condition. It may be normal in slight coronary disease but in advanced cases the changes occur in the Q and T waves and often in the S-T interval, sometimes it reveals an interventricular block. There is a change in the R-T or S-T interval. The curve may be a plateau shaped elevation or a plateau-shaped depression. The curve commences from the R or S deflection either above or below the zero level and afterwards ends in a more or less horizontal direction until the T deflection is reached resulting in the plateau. This is more marked in leads 1 and 111, and the curve in these leads point away from each other. This is called the Pardees curve. The characteristic changes are about T wave, which becomes inverted, is sharp and spiky and the amplitude is often large. The T deflection is in opposite direction to that of the R T or S T interval. After a few months, the T wave in all the 3 leads may become normal. Sometimes, a large Q in lead III may be a prominent feature. Notchings of the Q R S or widening of Q R S may occur.

Non-Occlusion Coronary insufficiency :—There may be conditions when symptoms of coronary insufficiency may appear even though the vessels are patent. The patient will suffer from præcordial distress whenever there is lack of blood flow. Such conditions are :—

(1) Such disorders in which heart is unable to raise the arterial pressure, *e. g.*, mitral stenosis,aortic incompetence, myocardial degeneration etc.

(2) Reduction in oxygen carrying power of the blood *e. g.* in severe anæmia, anoxemia, etc.

(3) Sclerosis of the coronary arteries without marked variation but loss of elasticity and failure to dilate when called upon.

(3) Spastic condition of the coronary arteries.

Diagnosis.—It is quite easy to make a correct diagnosis provided the history of the case is taken properly and possibility

of the condition is kept in view. The clinical findings and the history alone can help to make a successful diagnosis which can further be confirmed by means of an Electrocardiogram. Coronary occlusion can be differentiated from angina pectoris and for that one should bear in mind the points tabulated below :—

	ANGINA PECTORIS.	CARDIAC INFARCTION.
1. Onset.	During exertion.	Usually during rest or sleep.
2. Attitude.	Immobile.	Restive, may walk about.
3. Site of pain.	Sternum.	Sternum or lower in the epigastrium.
4. Duration of attack.	A few minutes.	Hours or days.
5. Dyspnoea.	Absent.	Severe.
6. Aspect.	Normal.	Ashen pallor.
7. Pulse.	Unchanged.	Feeble—often rapid.
8. Temperature.	Unchanged.	Subnormal at first, fever afterwards.
9. Blood pressure.	Unchanged or raised.	Lowered.
10. Leucocyte count.	Unchanged.	Leucocytosis.
11. Congestive heart failure.	Absent.	May often supervene.
12. Heart sounds.	Unchanged.	Gallop rhythm, pericardial friction, mitral first sound weak.
13. Electrocardiogram.	May be abnormal.	Often diagnostic.
14. Use of Nitrites.	Gives relief.	No relief.

Rupture of a saccular aneurysm of theracia aorta should be distinguished from Coronary Thrombosis.

Præcordial pain if due to neurocirculatory asthma should be differentiated from true coronary insufficiency. Pain in coronary insufficiency may be mild, moderate or severe, and may not show transmission. Substantial oppression when it lasts from a long time is generally due to coronary occlusion. In neurocirculatory asthma the pain is generally not substernal. It is under the left breast and associated with forcible action of the heart. Most commonly it is with tenderness. Tenderness over the sternum in cases of substernal oppression does not occur unless there is complication of neurocirculatory asthma.

Dyspnœa of coronary occlusion should be differentiated from cardiac asthma due to other causes of heart disease. Coronary occlusion should be differentiated from acute abdominal conditions like perforation of a gastric or duodenal ulcer, biliary colic, acute pancreatitis and other abdominal emergencies. The confusion is likely to arise when the pain is situated in the epigastrium and associated with vomiting. Severe dyspnœa and marked tachycardia go in favour of the condition being of cardiac origin. Previous history of anginal pains with exertion may be available.

The disease should also be differentiated from other causes of pain in front of the chest, of pain of pleurisy, intercostal neuralgia, and pain due to herpes zoster etc.

Besides, mistakes may be made due to acute pericarditis, luetic aortitis, dissecting aneurysm, pneumonia, massive collopse of the lung, pneumothorax, pulmonary infarction, tabetic crises etc.

Course and Prognosis.—One half of the patients in whom a definite diagnosis is made generally prove fatal. The patient may die instantaneously, a few days after or even after a few weeks, usually from congestive heart failure. When a patient dies immediately, the cause is either ventricular fibrillation or ventricular paroxysmal tachycardia or there may arise multifocal extrasystole from the ventricle.

If a patient recovers from an attack and gets proper rest and treatment, he may not get another attack for a long time, but generally subsequent attacks occur. Very often angina pectoris follows coronary occlusion. Some patients get very nervous about their cardiac condition and actual neurocirculatory asthenia may supervene, and the pain may then be of a spurious nature.

The following factors should be taken into consideration when forming a prognosis :—the recovery of the attack, amount of dyspnœa, duration of pain, condition of prostration and collapse, fall in blood pressure, tachycardia and change in the cardiac rhythm.

Treatment.—Rest is very essential and the patient should be treated under strict supervision, as slight exertion may work havoc with already damaged myocardium. Three months complete rest should be given in a genuine case. The rest should be physical as well as mental and afterwards a regime should be suggested to the patient that he may get periods of partial rest. The bowels should be opened by means of enemata and great care should be taken that the patient does not move about.

The patient had better be provided with a heart rest or, if in an institution, he may be treated in a special cardiac bed of the pattern of Lewis.

Diet:—The patient may be given only glucose, small amounts of milk for a day or two and later on stimulating liquid or semi-solid, light, nutritious diet may be given. Glucose may be administered intravenously if there is collapse.

For pain, no drug is more potent than morphine and it should be given in sufficient dose without fear if the pain is to be brought under control, because the patient is in severe agony. The dose given may be $\frac{1}{3}$ gr. or $\frac{1}{2}$ gr. or even more, hypodermically.

Nitrites are contra-indicated and actually may make the condition worse. Sedatives and hypnotcis are very useful. Morphine itself will act as a sedative but drugs of the barbiturate group like luminal etc., may be given. A combination of luminal with theobromine is theominal and it may be quite effective.

Later on, when congestive heart failure supervenes, digitalis may be given and auricular fibrillation and flutter are to be treated accordingly.

Experimentally, definite vasodilation has been achieved by drugs of the Xanthine group *i. e.*, theobromine, Euphyllin, and diuritin. If no improvement occurs within a week or so, this combination is not justifiable. These drugs will be of use only when the coronary arteries are liable to dilate and are not rigid. The dose given may be 10–15 grs. three times a day. When other medicines fail, Euphyllin may be given intravenously and has a dramatic effect. It is available in ampoules 0·24 grms. in 10 c.c. distilled water. The injection may be given two or three times a day. Iodocalcium diuretin may be given and may prove useful.

Recently, it has been suggested that these patients should be treated with insulin and glucose. The atheromatous condition of the coronary arteries leads to impairment of myocardial nutrition and glucose insulin therapy may be useful, 5 units of insulin hypodermically to be followed in fifteen minutes by 50 grms. of glucose given by mouth.

Surgical Treatment.—Several methods have been adopted in recent years and only a few selected cases may improve. The methods adopted are the following :—Paravertebral injection of alcohol and total thyroidectomy, for angina pectoris and congestive heart failure because, it lowers the basal metabolic rate and reduces the work of theheart.

The Hypertrophy of Heart among Goan Students*

BY

Prof. J. M. Pacheco de Figueiredo,

Medical College, Nova Goa.

GREAT is the enthusiasm, that is evoked throughout India, in favour of sports. The newspapers and the telegraph often flash to us, the news of triumphs of Indians in international matches of various kinds. If this fact does us great honour and causes us to be jubilant, it makes us also meditate and meditate well that the current of sports does not catch, in its snares, the adolescents without due preparation—irremediable victims, who will soon suffer for all life the consequences of their unreflecting act. It is then, up to the physician rather than to any one else to intervene actively demonstrating absolute necessity of medical examination, before the adolescent dedicates himself to any sports.

It is especially the cardio-vascular apparatus that demands special attention because in its examination, the doctor finds, times without number, surprises which he can hardly foresee during the simple and general examination of the adolescent, apparently of a heatlthy aspect. The study of cardiac lesions and especially of the hypertrophy of the heart among the adolescent is so highly interesting that it deserves to be revised in face of modern knowledge. It was Germano See that first described it under the name of *Hypertrophy of Growth*, since it was seen among children and the adolescent from 11 to 20 years—a period during which according to the author the heart underwent a rapid development characterised by the lowering of the apex, systolic murmur, dyspnœa, palpitations, cephalic disturbances and the absence of correspondence between the development of the thorax and of the heart *enlarged in volume*. The latest researches, however,far from confirming this rather tend to demonstrate that it *was never found among normal individuals*. Ollivier considers it was false hypertrophy and attributes the disturbances to the narrowness of the thorax. Comby and Huchard attribute it to anæmia, nervousness and mental strain. And, finally, the researches of Potain and Vaquez definitely declare that though the

* Specially contributed to 'The Antiseptic'.

growth favours the disturbances of the heart, they never prove the real idiopathic hypertrophy. Teissier and Lian write, " Many adolescents of a narrow and elongated chest, by an excessive obliquity of the intercostal spaces and the nervous patients have a palpitating heart and the lean having a movable heart (Barie) present a shock of the apex in a region which appears abnormally far from the nipple. That apparent seat and the intensity of pulsations make us to believe in the existence of a heart enlarged in volume, while in reality the palpitation and the percussion show that it beats on the fifth or even the fourth intercostal space ".

And then it is certain that the appearances are taken for realities and the so-called hypertrophies of growth are rather pseudo-hypertrophies in the thorax ill-matched or real hypertrophies associated with the exaggerated physical force or to the myocardiac lesions either congenital or acquired. When the heart is subjected to a work incompatible with its strength in reserve, the equilibrium of cardio-pulmonary gives way resulting in the clinical picture of *forced heart* of Lagrange. The observations of Seitz de Costa, among the soldiers of the war of Succession, of Chauffard and Ramon in a dead individual of acute cardiac insufficiency after a march of 30 quilometres in 4 hours, of Teissier and Lagrange, this last in the runners of Africa, precocious heart-patients retired at 40 years of age, of Myers and Peacock among miners, of Sportsmen fallen on the playground and finally of the famous soldier of Marathon, are examples of grave circulatory inequilibrium among individuals without previous preparation. To Boigey, that acute dilatation of the heart, cause of accidents, only appears in case when work is very intense and of long duration. The first phase of *Hypertonia* during which the organ, diminished in volume, functions with great energy, follows, when the exercise is very intense and prolonged, a second phase of *Hypotonia* characterised by gradual distension of the heart already exhausted. It is this last phase, in the opinion of Boigey which the adolescent should never attain to, before 18 years of age. The heart subjected to a slow and gradual progression of physical force, adapts itself to the new regimen of work and with the whole muscle it *hypertrophies* also. It is this *providential hypertrophy*, to Bellin du Cotteau that among individuals duly prepared allows the subject itself to exercises often violent, retarding the appearance of fatigue which among the others without previous preparation would cause the most serious accidents. Lazietzky succeeded in reproducing experimentally the cardiac

hypertrophy with the help of physical work. Henschen observed it for the first time, in matches of skating. Potain and Vaquez found it among monitors of the Faisanderie School; Bellin du Cotteau among sportsmen. All these facts are confirmed fully among the animal series in which the volume of heart according to Bergmann is in relation to the functional adaptation and the muscular strength. Thus, the savage animals have a myocardium more voluminous than that of the domestic animals. And among these, those of sedentary habits have it less than the others. But if this hypertrophy is providential and constitutes a real physiological necessity to those who dedicate to violent sports, it is dangerous among adolescents and among those who have a badly developed thorax. Because the hypertrophied heart enclosed in a narrow thorax with a slight enlargement of their perimeters and diameters especially of antero-posterior diameter and forced to a violent strain, works like a prisoner that beats tumultously the walls of his cells and tires himself out in vain efforts. The real danger, then, does not lie in hypertrophy but in this narrow thorax (Bellin du Cotteau).

Absolute necessity of respiratory gymnastic before sports, is thus justified, even among those that have hypertrophy of force, without functional insufficiency, with a badly developed thorax.

The Rules of Portuguese Physical Education is right in saying:

> " To free the lungs and hearts in narrow chests by anquiloses and such other causes, (acquired or hereditary), of emaciation should be the first step to give with benefit in physical education ".

In summarising, in the actual state of our knowledge the hypertrophies of the heart may therefore be grouped under :

(1) Pseudo-hypertropies in insufficient or ill-adjusted thorax.

(2) Providential hypertrophies of work among individuals with previous gymnastic of formation.

(3) Hypertrophies of work in insufficient thorax.

(4) Hypertrophies of pathological origin.

In 1935, I was entrusted, by the Portuguese Government, to conduct anthropo-physiological and medical inspection of the students of the Liceu Central of Nova Goa, the Establishment of secondary instruction. A complete examination of 517 students was made on this occasion, in 3 groups as under : (1) Hindus. (2) Indian-Christians. (3) Luso-descendents.

With regard to the cardio-vascular apparatus, my observation was directed to the examination of the pulse, of the heart and determination of blood-pressure, proof of the cardiac fitness according to the method of Professor C. Lian.

The examination of the heart consisted in auscultation and in determination to the touch of the shock of the apex. The examinees were observed on foot and on lying on the back.

The following table gives the results of our observations :

AGE.	HINDUS.	INDIAN CHRISTIANS.	LUSO-DESCENDENTS.
13	T. Ap. 6 ... 1	—	—
15	T. Ap. 6 Murmur 1 T. ... 1	Ap. 6 Murmur ... 1	—
16	T. Ap. 6 ... 1 Ap. 6 ... 1	Ap. 6 ... 2 T. Murmur ... 1	—
17	Ap. 6 ... 1 T. Ap. 6 ... 4 T. Ap. 6 Murmur 1 Murmur ... 1	Ap. 6 ... 2 T. Ap. 6 ... 2 T. Ap. 6 Extra systoles ... 1 Murmur ... 1	—
18	T. Ap. 6 Murmur 2	Ap. 6 ... 1	Ap. 6 ... 1 T. Ap. 6 ... 1 T. Ap. 6 ... 1
19	Ap. 6 Murmur .... 1 Murmur ... 1	—	Ap. 6 ... 2
20	Ap. 6 ... 3 T. Ap. 6 ... 2	—	—
21	Ap. 6 Murmur ... 2 T. Ap. 6 ... 1 Pericard Chronic? 1	Ap. 6 ... 2	—
22	Ap. 6 ... 1	—	—
23	Extra-systoles ... 1	—	—
Total.	... 27	... 13	... 5
Percentage.	13.3	5.79	5.68

Note : T—Tachycardia ; Ap. 6—Apex in the 6th intercostal space.

An interesting issue sprang up at this stage; it was to determine the probable causes of the lowering of the apex of the heart. Did this indicate the false hypertrophies or real? In the latter hypothesis, to which of the species formulated by us, they should belong? For further absolute selection, we will include in the group of pseudo-hypertrophies, 5 of the examinees,

4 Indian Christians and one Hindu, with ricketty thorax. To the bad formation of the thorax, may in part, be responsible, the wrong posititons of the apex.

Among the students examined, there did not exist providential hypertrophies for the simple reason that they have never practised the gymnastic of formation as the modern technology advises. In the meanwhile, there are some among them, however few, who dedicating themselves to sports and gymnastic more or less violent, presume to be athletes and are under constant fear of inequilibrium of cardio-pulmonary.

" The athletic strain without control, so characteristic of the actual moment", says the Portuguese Regulations of Physical Education, " has carried most of our young men, to that morbid condition which the French call in their sport language '*claquage*'. It is a big mistake which amounts to be a real crime, that the adolescent practicises out of ignorance without the least idea of the danger that threatens him in the long run.

Well, then it is to the third group to which belongs the greater part of hypertrophies, found by us.

This is the table, to appreciate better, the grade of thoracic insufficiency of some Hindu students with hypertrophies of myocardium.

Age.	Thoracic circumferences. m.m.	Dif.axillar circumferences max. & minm. m.m. m.m.	Dif. xyphoid circumferences max. & minm. m.m. m.m.	Dif. Ant. Post axillar diameters. max. & minm. m.m. m.m.	Dif. Ant. post. xyphoid diameters max. & minm. m.m. mm.
17	745 730	25 20	60 25	15 10	10 10
18	730 690	40 30	50 40	15 20	25 20
19	785	20	55	20	20
20	785 290	25 30	45 30	25 10	30 20
21	690 745 755	40 20 15	45 30 35	20 10 20	20 20 15
22	780	10	35	30	20

Diminished thoracic perimeters and weak respiratory amplitude, there does not exist then, a correspondence between the

development of container and the contents, an indispensable condition for the regular functioning of heart during the strain.

What more probable causes of the hypertrophies of work which according to Kaufmann, have for object, to adapt to the contracting power of the heart muscle to the circulatory necessities of the motor-system ? The reply is difficult, even extremely delicate,because in its determination, not only one,but a combination of factors intervene, at the given moment, in the organism of the adolescent. To try to attribute the enlargement of the volume of the heart of each student to a fixed attempt is a mistake which should not be committed under the complexity and the demands of modern school life. This does not impede, however, what passes in review the principal causes which seem to provoke hyper-functioning of the myocardia among students of the Lyceum of Nova Goa.

I. **Athletic Exercises and Sports without previous Physical Training.**—The necessity of movement is innate in man and among all other animals, write Bergeron and D'Heilly, and the forced immobility painful in the beginning is transformed, when prolonged, into a real torment. But the movement in itself is not enough, says Tissie. It requires to be guided and graduated and none better than the doctor, I repeat, is in a state of doing it. Hence the fundamental principle of George Rosental: *medical selection before the sports, medical vigilance during the sport and medical control after the sports*, a principle generalised by Diffre substituting the word *sport by strain*. It is necessary, then, to guide the adolescent on scientific basis of the physical education. The Somatic culture is not practicised as the prose of M. Jourdain, says Monin: It is necessary to establish it scientifically, *serious and solid knowledge*. Because it may be said, slightly modifying the phrase of Pelletan: *Le muscle n'est qu'une annexe cerebral*. Or the verse of Boileau. "*Le muscle est un esclave et ne doit qu'obeir.*"

The gymnastic, ill-directed with the sole object of having beautiful muscles is another mistake to which the youth is frequently subjected. It is principally the Hindu student, who cultivates it more and in him too is observed, the greater percentage of cardiac hypertrophy in manifest contrast with the development of the thorax and respiratory amplitude. This is the table of measurements of the thorax of some Hindu Students with cardiac hypertrophy .and who practised athletic gymnastics.

Age.	Thoracic circumferences. m.m.	Dif. axilar circumferences. max. & minm. m. m.	Dif. Xyphoid circumferences max. & minm. m. m.	Dif. Ant. Post. axilar diameters. max. & min. m. m.	Dif. Ant. Post Xyphoid diameters max. & minm. m. m.
17	740	20	45	20	15
	780	30	40	15	15
	770	30	40	15	20
	740	25	40	10	15
20	800	10	20	20	20

This table does not require any comment. Athletic gymnastic and sports are the two great dangers to the adolescent who do not know gymnastic of formation.

II. **Excessive Cycling.**—Among the games, very much in practice, cycle riding deserves a special mention. The cycling is an excellent exercise, write Bergeron and D'Heilly, on condition of making a moderate use of it and not to confound, use with abuse. Well, four students with cardiac hypertrophy had abused this exercise, and one of them, a European student, had the apex of the 7th intercostal space.

III. **The flight of stairs of the Lyceum.**—The Lyceum has a majestic stair-case of 140 steps. Many of the students were examined, of whom 7 with hypertrophy or murmur, complained to us of a sensation of oppression and fatigue on reaching the top of the stair-case. It was natural for me to doubt that this may be due to the stairs, causing the hypertrophy or increasing the same inthose in whom it existed already.

IV. **Mental Overstrain.**—It is not only the physical effort under the most varied modalities that is exclusively responsible in the genesis of hypertrophies of the heart. The excessive mental effort, the mental fatigue almost continuous in which a part of students live, without giving the nerve cells, the necessary repose in order to recover the lost energies, contribute to disturb the circulatory dynamics and increase the labour of the heart. We have referred chiefly to Hindu students who being mostly without any means, earn honestly while they study, giving private tuitions and generally in families. Of those ones, one could justly say as Duruy wrote in 1864 of French Students: "*Nos enfants ont une journee de travail plus longue que celle de l'ouvrier adulte ; c'est le contraire qui devrait exister*".

And every body knows how this work is exhausting for an adolescent who besides studying till late in the night, have to teach for continuous hours speaking and explaining loudly, living thus, in everlasting concentration of mind the responsibility of

which, if belonged to the Government, one would say surely-that it was a system of *homicidal education wholly condemnable.*

In the origin of *hypertrophies of pathological causes*, we have to consider first, the typho-paratyphical infections. Thirteen students with hypertrophy of heart had them in their past. We cannot also exclude though we have not found it in the individual antecedents the rheumatic etiology of the affections of the heart. In an enquiry made in the schools of New York, Goodin and Prescott came to the conclusion that half of the bears of Valvular rheumatic lesions, nothing particular showed in their antecedents, one third ignored their lesions and more than half was not under the supervision of the physician. The rheumatic affection was only manifested by localisation of heart, of light intensity, not compelling therefore the student to interrupt his studies.

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From all that I have just exposed it is clear how delicate and complicated is the study of the lesions of the heart in general and that of hypertrophy of heart in particular, which are noticed in adolescents. My statement, I confess, is a pallid image of the reality which should be very alarming. How many surprises would not bring us the systematic examination of every adolescent before and after the sports. And how many of those who devote themselves to sports would not receive the medical condemnation. A test in this sense and chiefly in the schools, made in such atmosphere so large and in so big resources as of British India, would be interesting and would render an important service to the youth, who is our hope, and at the same time, would serve as a guide in the organization of the Sportive Clubs.

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Blood Transfusion— Indications and Technique*

BY

Captain K. N. Rao, I.M.S.,
Indian Military Hospital, Lucknow.

I. Although Blood Transfusion is now comparatively a simple Technique, it is regrettable to see that this method of treatment is far too little used in our country. Blood Transfusion is not a new method of treatment which has been discovered in this century, but it is a revived one, for even as early as 1616 it had been suggested by Sir Cristopher Wren. The first operation on the human subject was performed in 1667 by Jean Denis, Physician to Louis XVI of France. The discovery of the circulation of blood by William Harvey in 1688, was of course the forerunner of the development of the idea of Blood Transfusion. At first experiments on transfusion of blood from one animal to another, from sheep to man, and man to man were described up to 1756. After that no progress was made till Shettock in 1901 discovered the incompatibility of bloods of one species with another due to the presence of certain substances called Agglutinins (Coagulators)—Precipitins (Separators)—Hæmolysins (Dissolvers) which resemble antibodies. In the old mothods of transfusion from animals to man violent reactions such as Collapse, Hæmaturia and death took place. Nor were these untoward effects confined to the differing species. These alarming symptoms and mortality were also found when blood was transfused between two human beings. It was Jansky in 1907 who gave an explanation of the incompatibility of the human blood and described four different groups in the human species. This was confirmed by Moss in 1910. Landsteiner not only confirmed the above but also showed that the four groups are characterised by different combinations of two antigens (agglutinogens) A & B in the red blood cells and their corresponding antibodies (agglutinus) a (anti A) and b (anti B), in the Serum, their distribution being such that only these Agglutinins are present in the Serum of any group for which there are no corresponding Agglutinogens in the Red Blood Cells.

* Specially contributed to "The Antiseptic"

Table 1.

Moss.	Jansky.	International Nomenclature.	Agglutinogens in R. B. C.	Agglutinins in the Serum.	% in adults.	Infants.
I	IV	A B	A B	— —	4 %	
II	II	A	A	— b	43 %	
III	III	B	— B	a —	8 %	
IV	I	O	— —	a b	45 %	

Note :—Group A has now been found to have two Sub-groups A—1 A—2 and they are qualitatively different a—1 and a—2 agglutinus. Thus, Group 1 has A—1 B and A—2 B.

This invaluable discovery together with the great improvement in the Technique and the simplification of the operation and the development of newer devices such as Drip Transfusion, use of stored blood, Cadaver blood or Placental blood, injection of Heparin to prevent clotting of blood, has re-established blood Transfusion as one of the most useful and striking developments in the modern treatment of diseases. The great war afforded numberless opportunities for the use of this method of treatment but it was brought to the forefront by the American Surgeons to whom all the credit is due.

II. **Indications.**—The indications of blood Transfusion may be classfied as follows :—

GROUP 1.—Blood Transfusion is universally used for the replacement of fluid in acute blood loss.

Surgical.—(*a*) Acute blood loss :—Injuries, accidents and in the course of operations.

(*b*) Preoperative measure :—In bleeding peptic ulcers. Cancer of stomach, cæcum, cervix etc. Spleenectomy, Fibroids and amputations. Gallbladder surgery.

(*c*) During operation particularly during lengthy operation *e.g.* extensive intracranial surgery.

(*d*) Post operative measure :—In combating acute post operative Hæmorrhages.

(*e*) Shock.

Obstetric and Gynœcological :—Acute loss of blood.

(*a*) Retained placenta.

(*b*) Placenta prævia.

(*c*) Accidental Hæmorrhage.

(*d*) Incomplete abortion.

(*e*) Ruptured ectopic gestation.

GROUP 2.—Blood Transfusion used for stimulating blood formation and for tiding over a surgical or obstetrical emergency. Mostly medical canditions :—

(*a*) Acute Leukæmia, Aplastic Anæmia.

(*b*) Macrocytic Anæmias :—Addisonian Anæmia, Sprue, Anæmia of Pregnancy.

(*c*) Severe Hypochrome Anæmias.

(*d*) Hæmolytic states :—Black water fever. Hæmolytic Anæmia.

(*e*) Hæmorrhagic states :—Purpura, Hæmophilia-essential Thrombocytopenia.

GROUP 3.—To stimulate body re-action :—

(*a*) In Septicæmia and Pyæmia.

(*b*) Streptococcal infections.

(*c*) Burns.

(*d*) In general infectious diseases.

(*e*) Acute—Sub-acute and chronic Peritonitis.

(*f*) Surgical Tuberculosis.

(*g*) Toxæmia. Acute or Chronic.

In the first group the general condition of the patient is fairly normal and the cardio vascular system is perfect.

In groups 2 and 3, the cardio vascular system is injured to a greater or less degree by deficient oxgen supply for a long period.

Except in the cases of acute blood loss where rapid replacement of blood is required it is better to use drip transfusion method.

III. **Technique.**—The Technique may be discussed under two headings :—

1. Technique of blood grouping.
2. Methods of Transfusion.

1. Blood Grouping.—The compatibility of blood of the donor and the recipient should be ensured before any transfusion is undertaken. Incompatibility of blood may be due to (1) Agglutinins in the recipient's Serum active against the Red Blood Cells of the Donor (2) Agglutinins in the Donor's Serum active against the recipient's cells. The former is more important than the latter as the Donor's Serum is diluted ten times in the

Recipient's body and the titre would be too low for any action. However the Donor and the recipient should be cross matched and then only Blood Transfusion should be given except in urgent cases where universal Donors (Group 4) can be used. Many minor reactions are due to the use of universal Donors without cross matching. The Donors and the recipients are grouped independently with the Stock Sera and if they are of the same group they are then cross matched.

On two slides a drop of Serum A (Group 2) is placed at one end and a drop of Serum B (Group 3) at the other end, of each slide, and drops of Corpuscle emulsion of the Donor on the 1st slide and the recipient's on the second slide are placed in each area alongside the Serums. With the platinum loop the two Serum corpuscle admixtures are made and spread out in their respective areas. The slide is examined by the naked eye or by 2/3 power Microscope after ten minutes. The slides must be warm. If Serum A (Group 2) agglutinates the Corpuscle emulsion, the person belongs to group B (3) and if Serum B (Group 3) agglutinates the Corpuscle emulsion the person belongs to Group A (2). If both A and B Sera agglutinate the cell emulsion the person belongs to group A-B *i.e.* group 1. And if there is no agglutination in either A or B the person belongs to group O. (4).

Table 2.

Group.	Serum of Group.	Agglutinin in Serum.	R. B. C. of Group.			
			A B	A	B	O
1	A B	— —	—	—	—	—
2	A	— b	+	—	+	—
3	B	a —	+	+	—	—
4	O	a b	+	+	+	—

The cross matching test forms an important check on the above preliminary grouping. Cell suspensions and Sera are matched against each other and if no agglutination is found they are considered to be compatible.

By incorrect grouping fatal result may ensue either during or after Transfusion. Pain in the loins, flushing of the skin, followed by pallor, perspiration, dysuria, cyanosis, failing pulse finally dilatation of pupils and death. If the patient survives

the initial shock, then Hæmoglobinuria and fatal Anuria occur. This error can be avoided by (1) using sterile stock sera of high titre which are periodically tested. (2) By cross matching.

2. Methods of Transfusion.—*Direct versus Indirect Transfusion*:—Direct Transfusion is almost obsolete. It is practically discarded.

Indirect Transfusion of blood is the most widely practised method today. It may be carried out by means of a number paraffined syringes in case whole blood or unmodified blood is used. The Kimpton Brown Tube may also be used for indirect Transfusion of whole blood.

Now-a-days either Citrated blood or Heparinised blood is used. The Technique of each is briefly outlined.

HEPARIN METHOD:—0-25 milligram per kilo body weight of Heparin is injected intravenously (Sterile 5% Solution containing 25% Tricresol) into the arm not used for Tranfusion. Ten minutes after the donor has been injected collection of blood may begin. The blood obtained by this method is called whole blood and there is no tendency to the formation of clots in the Canula, inserted either into the donor or recipient during transfusion and there are no extra difficulties.

CITRATE METHOD:—The blood from the donor is collected in a bottle containing 3.8% of Citrate solution to prevent clotting. The blood thus obtained is called Modified blood. Most of the reactions after the citrate method may be avoided by the use of triple distilled water, careful cleaning of all instruments, tubing and glass ware so that no trace of blood remains thereon and by the use of the fresh citrate powder from sterilized ampoules.

Blood Transfusion Apparatus.—There are over a score of rival instruments on the market *e.g.*, Robertson's, A. Bate's simplified, B. T. appartus etc. But it is better to use the simpler apparatus. If the technique is simple and if the apparatus is cheap and easily handled, the more widely blood transfusion will be used. The method used for collecting the blood from the Donors should be a closed one to prevent infection.

Collection of Blood:—The usual precautions for selecting a donor should be taken. The Donor should be in a recumbent position and the arm chosen should be thoroughly sterilised from the shoulder to the tip of the fingers. The Sphygmomanometer is applied to the arm and inflated to 70 m.m. Hg. when the veins are seen prominently at the bend of the elbow. About 60 c.c. of

3.8% citrate solutions is sucked through the needle into the collecting bottle by creating a vacuum in it with the aid of a Higginson Syringe. A pair of artery forceps is then clipped on the tubing between the needle and the bottle and a partial vacuum is developed further in the bottle for half a minute. One c.c. of novocaine is injected at the bend of the elbow. The needle is thrust into the vein. The pinch cock or the artery forceps is unclipped and the blood shoots through the glass connection and a little later into the bottle. The donor is asked to clench and unclench his hand about 12 times a minute to enable the veins to fill up. The bottle is frequently shaken to mix the blood and the citrate solution. By this means a pint of blood can be drawn in 5 minutes. The total quantity of blood drawn from a donor must not exceed 50 c.c. per stone body of weight.

In case Heparin injection is given to the donor, the blood is directly collected in the bottle under aseptic conditions and transfused into the recipient.

Infusion of Blood into the Patient.—The blood may be injected either rapidly or slowly. The slow method is also called the Drip Method. The rapid method is required where the loss of blood volume has to be made up quickly. On such occasions one cannot give more than 500—600 c.c. at a time. The administration is done just like intra-venous saline infusion by open method.

The Drip Transfusion.—It is indicated in both medical and surgical conditions. It is essentially for large transfusions, one to 5 litres. One litre in an adult of 11 stones is roughly paralleled by a transfusion of 46 c.c. into a baby of 7 lbs. If a transfusion exceeds 5 c.c. per lb of the recipient's body weight it is called a slow transfusion *e.g.* a person weighing 140 lbs. 700 c.c.

The slow controlled transfusion enables the blood to be introduced over many hours or several days. Normal blood volume is about 1/11 body weight or 5 or 6 litres in the adult. In anæmic states the amounts to be transfused can be calculated as follows : 500 c.c. of blood for each 9% of Hb. deficiency. In acute bleeding drip transfusion is not indicated. It calls relatively for a rapid transfusion except in extensive cranial operation. Drip transfusion in sub-acute or chronic bleeding cases, is a very good pre-operative measure. The principal difficulty in the use of citrated blood for drip infusion as compared with the saline is that the corpuscles tend to sediment in the reservoir. Continuous stirring of the blood is therefore necessary and this can be done

by bubbling a continuous stream of Oxygen through the blood. The blood is collected from several donors of the same group of the cross matching.

The Selection of a Vein.—Generally the vein of distal third of the fore arm along the radial border is chosen. The same apparatus that is used for the drip Saline infusion is used for the purpose with the additions of the Oxygen connection.

By means of strapping and splinting, the drip transfusion can continuously work. Blood is poured into the reservoir and its rate of drip is regulated by the Screw-Clip. The drip must be inspected every ten minutes. The tubing should be long enough to allow the patient to use his arm freely and lie in any position.

Rate of flow.—The normal rate of flow in drip transfusion should be 40 drops per minute (a pint in 4 hours). If the patient is bleeding, the rate may be increased. In children the rate and the total quantity should be reduced according to the body weight. In rapid transfusions the usual rate is 20 c.c. per minute.

Choice of Method.—Rapid transfusion, as already pointed out, should be done only in cases where there is a normal Cardio-Vascular and respiratory systems. In all other cases drip transfusion is the method of choice. If the drip transfusion apparatus is not available the only option left in cases of diseased Cardio-Vascular System is to remove ½ a pint of blood and then transfuse ½ a pint to one pint of blood.

Complications.—(1). Rigors. (2) Phlebitis. (3) Clotting of blood in the canula. (4) Pulmonary œdema.

Fatalities in blood transfusion are due to.—Heart failure. If blood is transfused by the rapid method the blood volume increases in a short time in all cases except in those where Hæmorrhage occurs. Where the C. V. system is diseased, heart failure is an inevitable result.

2. Pulmonary œdema.

3. Incorrect grouping and consequent Hœmolysis which takes two forms, (*a*) Immediate and (*b*) late or uræmic reaction.

4. Transfusion reaction which may be either febrile or anaphylactoid.

5. Transfusion of blood for a second time from the same donor. If transfusion has to be given a second time, it is better to avoid the same donor and if the same donor has to be utilised, the blood should be cross matched once again.

Transfusion of stored blood.—1. Blood can be stored one to three weeks without any prejudice to the quality of blood if properly stored.

2. Transfusion of stored Cadaver blood has been tried extensively in Russia and has been perfected to a high degree. It takes a long time before we are able to practise such a method in our country.

3. Placental blood:—In Montreal as well as in Leningrad, a new source of blood for storage purposes is being exploited,—the placental blood. This placental blood is neither necessary for the infant nor does it play any important part in the mechanism of the detachment of the placenta.

It is easy to devise a technique for collecting and storing blood from the placenta. In large maternity institutions where there are ten or more confinements a day, the collection and storage of the blood is an easy matter and this provides an inexhaustible supply for use either immediately or after storage. The fœtal blood group is fixed, though not necessarily be the same as that of the mother. About 125 c.c. of blood may be collected from each case and about 125 c.c. of 2.5 % of citrate solution may be used as a preservative for 125 c.c. of blood.

The high cellular content 7-7½ millions R.B.C. per c.m.m. and 120 % of HB and more Coagulation power. Several samples of blood from the same group can be mixed and used.

Organisation of Blood Transfusion Service Needed.—In India, blood transfusion is tried only in hospitals. In many cases blood transfusion has been tried in the last stages when the treatment is of no benefit to the patients. Arrangements for a transfusion service are lacking. Bombay has recently established a Transfusion Service which should be copied by others. A national service on a voluntary basis in conjunction with the Red Cross or with large hospitals is very much needed. It is hoped that the newly established Association of Surgeons will give the necessary impetus for the organisation of blood transfusion services in the various urban areas and provincial towns.

Conclusion.—The evolution of the idea, indications and technique of blood transfusion are outlined. The recent mothods of using stored blood—Cadaver blood and placental blood are mentioned. A plea is made for organisation of blood transfusion services.

My Recent Experiences in Typhoid and its Treatment*

BY

K. A. Dhairyawan, M.B., B.S.,

Physician and Surgeon.
Specialist in Diseases of the Ear, Nose, Throat and Eye, Dadar, Bombay.

DURING recent epidemic of Typhoid fever in Bombay and particularly in Dadar, I had an opportunity of studying a number of cases. The various modes of onset, courses it displayed and different lines of treatment I had recourse to and its result have so much impressed upon me the utility and futility of certain drugs and injections so often recommended and used, that I have formed a firm opinion as to the line of treatment in cases of Typhoid fever and its complications. I am giving below a concise article on Typhoid and its treatment.

In most of my cases the onset was sudden with severe rigor, temperature rising upto 104° in the afternoon and instead of lowering in the morning upto 99° or 100°, it used to be 102°. This type of temperature used to continue upto 14th day of the fever and then in the third week it used to vary between 99° and 102°. From the 21st day onwards *i.e.* in the fourth week in plain uncomplicated cases, temperature used to rise in the afternoon, only upto 100° or 101°, and at night and morning to be between 97.5° to 98°. In not a single case the typical ladder-like temperature was shown. Pulse was slow, dicrotic varying between 72 and 105 p.m. in relation to the temperature. In one case variation in temperature during 24 hours was so great as to show the toxicity of the infection. Within one hour, the temperature used to fall from 105° to 99° and then within half an hour immediately rise to 103°. This jumping up and down of the temperature continued from the 1st to the 10th day and then remained constant between 104° and 102°. Profuse perspiration was another characteristic of the fever. Inspite of high temperature, patient used to perspire throughout the day, without lowering the temperature. Deafness was another symptom which was predominant in severe type. This occurred from the 7th to the 10th day. Delirium was most common in 75% of the cases; but one peculiarity of the delirium was that it was present in cases where

* Specially contributed to 'The Antiseptic'.

temperature was between 97 or 98° during major part of the day, maximum temperature in such cases being 101° only. This type of delirium may be called æsthenic delirium and should be considered of serious import inspite of intermittent temperature. In one of such cases, the patient had twice severe hæmorrhage per rectum, the first on the 14th day and the 2nd on the 24th day of the illness. The first was stopped within 24 hours and showed no bad effect on pulse or respiration which was—Pulse 80 to 85 and Resp. 24 to 30 per min. Unfortunately, I could not follow the case as a homeopath was put in. But on enquiry I found that the patient died 8 days after the 2nd hæmorrhage. Pneumonia was a very common complication in 80% of the cases. Severe tympanites never occurred in my cases except one and that too did not trouble me much as I was very particular in diet. While writing this article, I had a case which showed all the symptoms of acute Influenza with severe Bronchitis. The temperature used to become normal in the evening and remain so till 7 A.M. the next morning and then rise to 103°. This state continued till the 13th day when I took blood for Widal as there was an epidemic going on. To my surprise, Widal was positive 1 in 50. Although this does not prove an active typhoid infection, still we have always to bear in mind about this infection. The above case clearly demonstrates how particular we have to be in diagnosis of cases where temperature is intermittent and definitely suggesting malaria or some other infection. A clear book picture of typhoid is very rarely found in practice.

Treatment.—*Diet* :—Diet should be liquid, easily digestible and there should be more protein than carbohydrate. I do not agree with the practice of giving solid food such as rice, bread, eggs. My objection to the solid food is, it keeps a residue in the intestines, which passing over the inflamed or ulcerated Peyer's patches,prevents it from healing earlier and may also precipitate hæmorrhage. Food should be such as would not cause flatulence. I prefer butter milk, barley water and whey. Whey is the best. Oranges, grapes and pomegranate juice should also be given. Glucose water is also necessary ; but whenever there is diarrhœa with tympanites, I do not give glucose water, sometimes we come across cases with severe toxæmia where there is acute distension of the abdomen. In such cases my routine is to stop everything by mouth and keep the patient on plain water with Soda Bicarb for three days. I have found this the best way to relieve tympanites and also help in reducing toxæmia and lowering temperature.

Daily enema of salt water is my routine in all typhoid cases. I give this upto the 13th day and then stop it till the 21st day, as there is always a danger of hæmorrhage during this period. If there is no stool during these days I give Liquid Paraffin at night ; if still there is no stool and if abdomen appears distended, I give glycerine syringe. If abdomen does not show signs of distension, I allow a day to pass without stools.

Medicinal :—In a straightforward case of typhoid without any complication and where temperature is 99° or 100° in the morning, I have found a simple diaphoretic mixture with salol and little Quinine in powder form quite sufficient, whatever the period the temperature may take *i.e.* 14 or 21 days. I have tried to cut short this duration by giving Omnadin or Leucopyol but unfortunately in my cases in spite of my giving six of the former and twelve of the latter injections, it did not help me in any way. These injections I have tried in a couple of cases where temperature had been persistently high, ranging from 102 to 105 but here too it did not give me good result ; these cases neither ran an uncomplicated course nor their duration was curtailed. In almost all of my cases when I tried these injections, severe Bronchitis or Pneumonia developed between the 10th and 14th day of fever, two cases succumbed to it, where the rest took 36 to 42 days. I do not mean to say that these drugs caused complication but that they did not prevent it. The only drug that helped to lower the temperature and cut short the course of these cases of persistently high temperature with any complication was intravenous injection of 25% Glucose 20 cc. These injections I generally start on or about the 10th day, give two on consecutive days and then wait for a day or two to see the progress and then again repeat for two days. In one case, this has given me a remarkable result, the temperature which never came below 103° from the 1st to the 10th day, came down to 99° in the morning on the eleventh day after the injection was given. After the 2nd injection temperature was 97½ in the morning and 101 in the evening. Thus the course, which I thought would take many weeks with complication, was cut short to 14 days only. Along with reducing toxæmia glucose has a tonic effect upon myocardium and is very effective where there is myocarditis. Subcutaneous injection of normal saline 10 ozs. every day is also helpful in uncomplicated cases. I prefer giving continuously for two days and then stop for a day or two and then repeat.. If this is to help in reducing toxœmia, it will show its result with four injections. If no appreciable change occurs it is better to discontinue it, as

sometimes it leads to congestion of the lungs with Bronchitis and Pneumonia. Before giving normal saline, we must be sure that the lungs are absolutely clear. If there is the slightest sign of Bronchitis, I would not advise giving saline.

Complications.—Bronchitis and Pneumonia were very common complications. Transpulmin has proved the best injection to avert the onset of Pneumonia or to cure it, if it has already set in. My routine was to inject 2 cc. of Transpulmin immediately I found signs of bronchitis. Even in advanced cases where both the lungs were affected, daily injection of Transpulmin for about ten or twelve days has done immense good to the patient, and in many cases has practically saved the lives. In cases where after four or five injections no appreciable result is obtained, I used to inject Transpulmin with Vitamin C preparation such as Cebion. This has helped to clear the lungs. In very obstinate cases,especially in children where inspite of Transpulmin with Vitamin C, and also intravenous Glucose, the fever does not show any signs of abatement, lung condition does not clear up, mental condition becomes obscure, patient lies emaciated, unmindful of the surroundings, does not take even sufficient nourishment, the case entering fifth week and one is at a loss to know what to do, I have found that injections of liver preparations such as Campalon or Heparin are very beneficial. I think this must be due to increased blood which helps to fight this disease. So successful has been these liver injections, that cases which had been given up as hopeless, have been cured after six injections of Heparin. I think in most fevers when temperature runs on indefinitely without any reason, it is worth while to try liver preparations. In mentally apathetic cases Vitamin B such as Betabin or Betaxin along with Campolan or Heparin has proved beneficial.

Tympanites.—Another complication is tympanites. This is due either to faulty diet or severe toxæmia causing paresis of the intestines. I had remarked before that diet should be such as to leave very little residue in the intestines and also should not cause flatulence. I never give milk to typhoid patients. Strained butter-milk or whey with fruit juices is given. Inspite of this, sometimes tympanites occurs which causes much discomfort to the patient. In such cases I stop butter-milk, fruit juices and even glucose by mouth and keep the patient on water or whey for two days. He is given Carboligum powder or Carbonesia cachets and an enema of salt water to which either

20 ms. of oil turpentine or 4 drams of Tr. assafœtida are added. In my cases this starvation has helped not only to relieve tympanites but to reduce the toxæmia resulting in lowering the temperature. In toxæmic tympanites due to paresis of the intestines I prefer insertion of flatus tube along with turpentine stupes over the abdomen. Some have recommended pituitrin injections but I would rather avoid it for fear of hæmorrhage.

Meningitis.— As for this complication which may be due either to Pneumococci or Typhoid bacillus, I do not think there is anything which can cure it except lumbar puncture. This also is very doubtful; at least I have not succeeded in my cases. I have tried urotropin and cylotropin injections without any good result.

Diarrhœa.—Diarrhœa should always be checked with Bismuth Subnitras and Benzonaphthol and if it leads to constipation we can give an enema to empty the bowels. If diarrhœa is left unchecked, it lowers the vitality of the patient and increases toxæmia. Carbonesia cachets are also good in checking diarrhœa and preventing tympanites.

Hæmorrhage.—Hæmorrhage is a grave complication and if not checked immediately will be fatal. My routine was to stop all food by mouth, giving only glucose water. This stoppage of food will reduce intestinal peristalsis. Ice-bag over the abdomen continuously for 24 hours. Allow the bowels to constipate by giving Tincture of opium by mouth. Haemostatic injections such as coagulum ciba 20 c.c. or Neo-haemoplastinæ 2 c.c. twice a day if hæmorrhage is severe and once a day if mild for four days are sufficient. Calcium Gluconate also should be given. If there is not much distension of the abdomen we can allow patient to pass three days without stools; if necessary a very low plain water enemata may be given.

During this epidemic I had an occasion of seeing two cases of sudden cardiac failure on the 7th and 9th day of the fever without any reason. These patients had their temperatures ranging from 100° to 104° with pulse varying between 90 and 110 per minute. Lungs were quite clear,there was no distension of the abdomen. Till the 6th and the 8th day of the fever patient's condition was quite satisfactory but suddenly on the 7th day pulse began to fail, heart became very weak and within twenty four hours patients succumbed inspite of cardiac stimulants. It is very difficult to give reason for this failure. There were no signs of myocardium being affected.

My object in writing this article is to give a concise idea of the only line of treatment of typhoid and its complications, which have been found successful in a series of cases.

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What has Radiology done for Elucidating the Mysteries of Tuberculosis?*

BY

Rai Dr. G. C. Chatterjee Bahadur, M.B., (CAL)., F.R.I., (LOND).,

Calcutta.

WHILE Radiology is helping more and more in a remarkable way to illuminate the mysterious process of immunology in Tuberculosis of Lungs and leading to success those physicians who interpret X-ray findings by the light thrown by careful study of the clinical history of each particular case and careful periodical physical examination, it is leading astray, on the other hand, it is strange to state, the physicians who do not do so, since they take the X-ray film on its face value, without reference either to clinical history or physical examination. As these latter as a rule resort to mechanical treatment as A. P. and Phrenectomy, and later on Thoracoplasty, being guided solely by the films, disastrous results are taking place, a good many of the patients later on, dying if not of the disease, but of empyema setting in as a result of A.P.† or natural pneumothorax.

Now the first point which the writer has made the subject of this paper will be better understood if illustrated by reference to concrete cases than by dealing with the subject in a general way. The second point will be dealt with only incidentally in this paper. But before he relates the cases to illustrate this point, a few preliminary explanatory notes are given here.

* Specially contributed to "The Antiseptic".

† This empyema occurring as a complication in so much as 50 p. c. of cases of artificial pneumothorax furnishes again cases for thoracoplasty, to those surgeons who specialize in it and who claim it as ultimate cure of Tuberculosis which they believe otherwise is incurable. The question of rest and graduated exercise producing immunity sufficient to arrest majority of cases early as well as a good many of the late, does not come within their purview. This attitude of mind is best illustrated by two papers contributed by an Indian enthusiast of Thoracoplasty, performed by Italian Surgeons in a Hospital in Rome, who allowed him to report their cases. In the first paper, as much as 10 out of 13 cases reported were empyema resulting out of A. P. In the second paper, a good number of the 86 reported cases arose under similar circumstance. The claim of "cure" of Tuberculosis by thoracoplasty will be best appreciated when one learns that out of these total 99 cases leaving out those who died of shock of operation or of flaring of the disease in the other lung, in none of the cases reported as "cured", the period of good health exceeded 1½ years,in the majority it was not more than a few weeks or even a few days only.

When an infectious disease caused by entrance of a micro-organism occurs among a particular community in a wide-spread form and that goes on for several generations, morbidity rate tends to increase more than mortality rate, as the period of infection goes on increasing, till a time comes when there is large amount of infection without the cases showing any symptom. This is explainable on the assumption of occurrence of immunity among a large number of members of the community concerned. In certain parts of Africa, for example, wide-spread and intense malaria occurring among the indigenous population, a curious phenomenon is seen. There is wholesale presence of malaria parasites in their blood especially of children, though they are apparently healthy persons and not suffering from any fever and that the death rate is not co-extent with the amount of infection. In Tuberculosis, this holds good much more than in malaria, as here due to the disease being caused by a bacillus, and not protozoon, immunity occurs more than what takes place in protozoal disease. This immunity shows itself by a much larger number of cases assuming proliferative type than those which take exudative type, though it must be admitted that the opposite phenomenon of massive infection goes on as well in these communities and so the total death rate attributable to Tuberculosis goes on increasing. The writer confining himself to the point which is the subject of this paper,namely immunity reaction, wants to stress on the point, that in this country, due to recent wide-spread prevalence of Tuberculosis, especially among the Mahommedans,this type of case (namely proliferative) is cropping up more and more. Moreover, it is to be remembered that this produces, so long as exudative type does not intervene, very little symptoms, in spite of the huge extent of the lesion. Lastly, it is to be noted that the connective tissue which infiltrates the lung tissue and which is characteristic of the type, casts a very well marked and lasting shadow in the X-ray film quite unlike that of exudative type. The next point which the writer wants to stress in explanation of the phenomenon which is going to be related is that in this type of cases though shown by X-ray as extensive, there may not be present even a trace of physical sign. If there be any, it is so negligible as to make one think it an early beginning, but it is not so. Moreover, ocurrence of proliferatation is *per se* evidence of immunity. Lastly, putting the patient in favourable environmental surroundings and proper regime termed sanatorium regime, often suffices to put them on their legs.

Now, we come to the cases. The description of the cases is given in as short a note as possible giving the salient points only and in order of sequence as they presented themselves to me. Then is given true interpretation of the X-ray films of the cases. Then under the heading,'discussion', I raise the point how Radiology is unravelling the mysteries surrounding Tuberculosis.

Case No. 1.—A girl aged 18, was brought to my clinic in Aug. 1938 by her father, accompanied by her attending physician for relief of her complaints, which consisted of fever ranging between 100° to 103° for 4 days only, and cough. She was diagnosed already as Tuberculosis, as tubercle bacilli had been found in her sputum and there was definite physical sign occupying whole of the right lung from 1st: to 5th: space found easily both by physical examination and by the X-ray examination (Plate No. I) the film of which they brought at that time with them, but which I did not look at. By typhoid rest in a well ventilated room on the fourth storey, the temperature came down to normal and then a course of tuberculin was started. Cough gradually disappeared and so also the physical sign till the lung appeared normal, weight increased from 93 (pyretic period) to 113 lbs. (apyretic period). She has since been allowed to move about freely. At that time another X-ray film was taken without my knowledge. These two films, when seen by me, astonished me a great deal, especially the last, as it showed extensive lesion, though most careful examination of the chest showed not a vestige of physical sign. It is to be noted that this case before coming to me, was taken to clinics of three eminent consultants of Calcutta, all of whom agreed, independently of eache other, after looking at the film, in advising immediate A. P. without thinking of giving a trial even to rest treatment.

Interpretation of X-ray film reproduced in Plate No. I. was taken on 3-3-38, when there was marked physical sign in the right lung from 1st rib to nearly to base and there were marked symptoms of Tuberculosis such as fever, cough, anorexia and tubercle bacilli abundant in sputum. No. 2 (Plate No. II) was taken on 11-10-38, *i. e.* seven months after, when there was no physical sign, even by most careful examination no fever, no cough, no expectoration not to speak of presence of tubercle bacilli, moving about without production of any fever, weight increased by 20 lbs.

In the first—a triangular patch is seen between 2nd to 4th rib (right side) marked by arrow marked (A) and a second patch marked by arrow mark (B) from 4th rib, to 7th rib which

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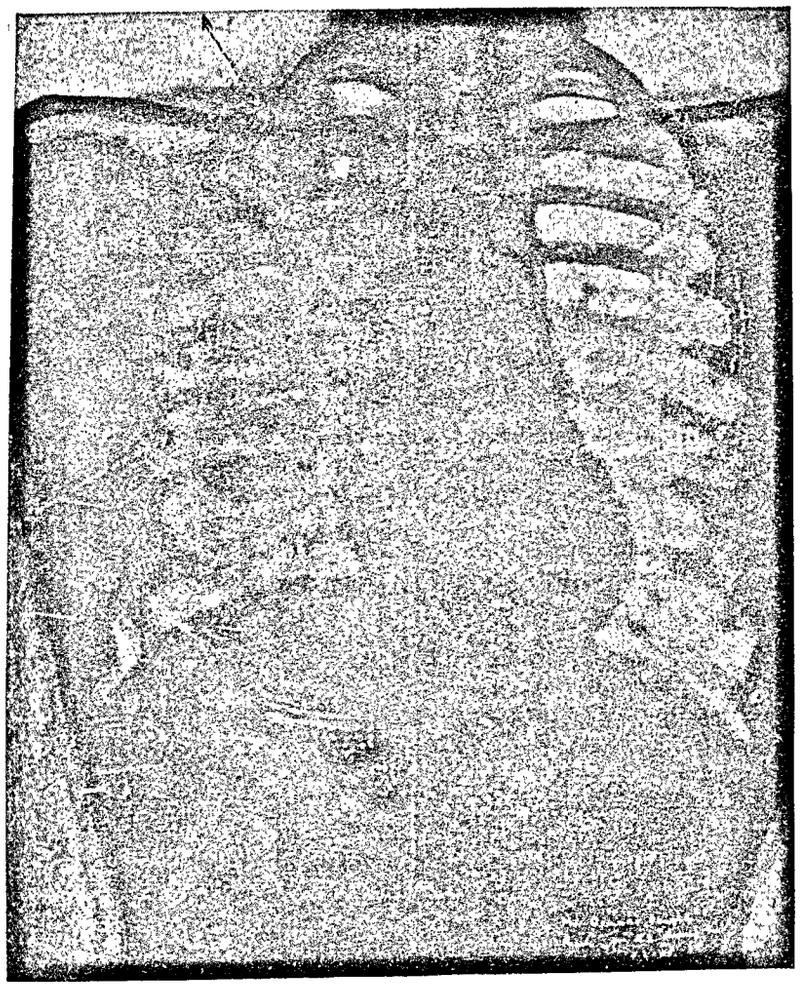

Plate No. I.

Film showing extensive proliferative lesion on the right lung—taken during pyretic period 3-3-'38.

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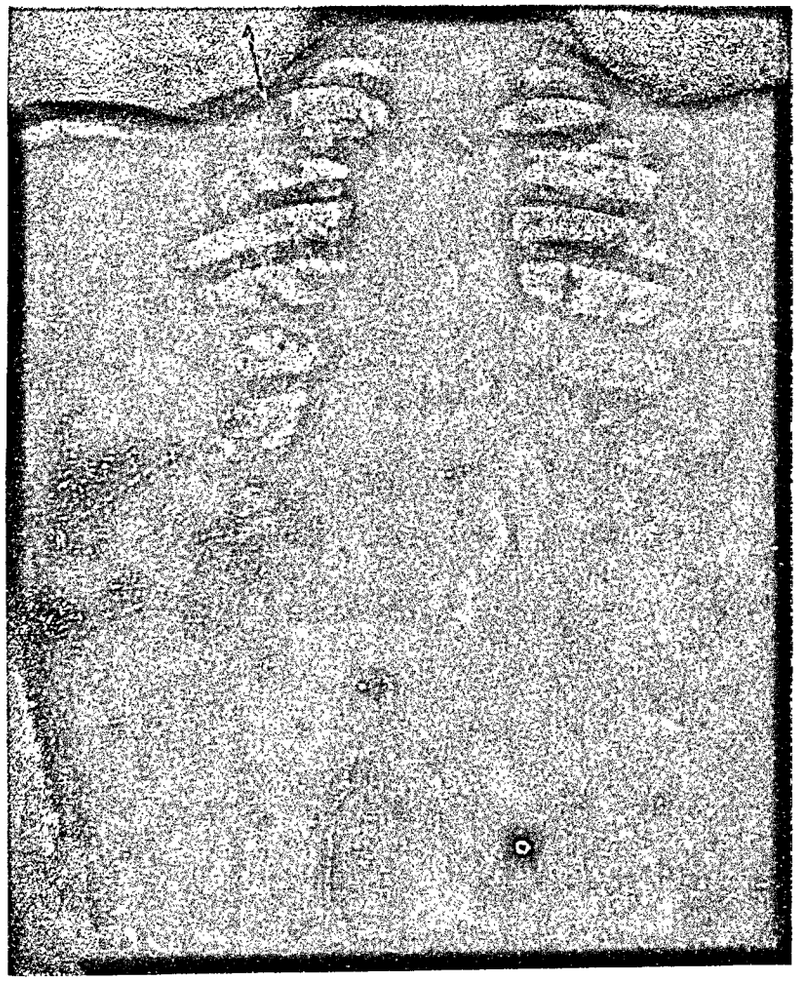

Plate No. II.

Film shows extensive proliferative lesion in the right side, taken during apyretic period, 7 months after.

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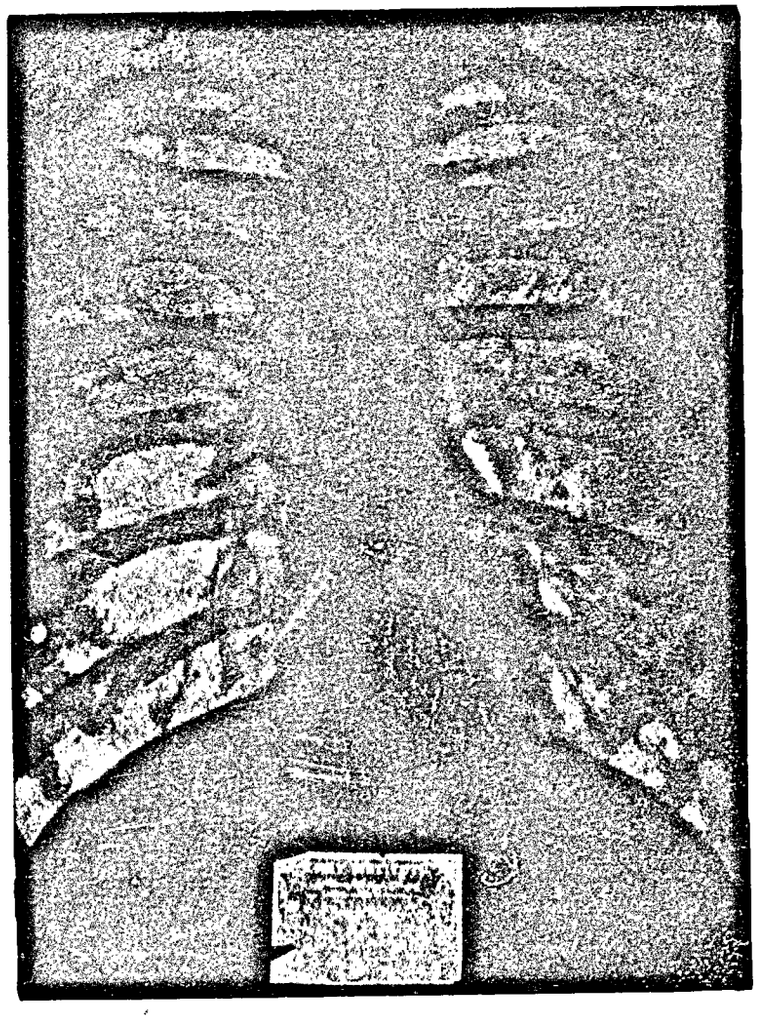

Plate No. III.

Shows extensive proliferative lesion, both lungs, showing no physical sign nor symptom.

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Plate No. IV.

Showing extensive proliferative lesion in the left side, heart dragged towards the axillary line, also similar lesion in the right side presenting no physical sign nor symptom.

seemed to be proliferative in character, this (B) patch surrounded a small cavity. Arch of diaphragm drawn upwards. The hilar shadow in the right side is well marked, being abnormally broad.

In the 2nd: the patch marked (A) seems distinctly less than (A) No. 1. but the 2nd patch marked (B), is much more prominent than (B) in No. 1. the cavity seen in No. 1. cannot be made out at all in No. 2. The hilar shadow is more pronounced than in (A) No. 1. The arch of the diaphragm is much more drawn upwards than in No. 1.

Case No. 2:—(Armenian Street). This case aged 30 was first seen by me in 1929, at his shop where I was sent for, for relief of hæmoptysis only from which he was suffering. At that time, there was an indefinite patch in the right interscapular region and cough and fever, sputum showed tubercle bacilli and history of failing health and slow fever, but not so much as to make him unfit for work. He was put under Sanatorium regime by which he gained 22 lbs. in weight. In 1934, four years after, when he was working hard and to all intents and purposes a healthy man, an X-ray film was taken out of curiosity. At that time there was no vestige of physical sign. X-ray film showed extensive proliferative lesion occupying both the right and left lung but curiously enough presented no physical sign.

Interpretation of film (represented in Plate No. III).

Film taken 4 years after disappearance of symptom of Tuberculosis and at a time when there was no physical sign shows extensive proliferative lesion in both lungs from apex to nearly one half of the lung field.

Case No. 3 :—The patient, a plump looking middle aged man, working as a station master, in a railway line, whose case was first diagnosed as Tuberculosis by the finding of tubercle bacilli in his sputum in the Railway Hospital, was first seen in the exudative stage supervening on a proliferative type of tuberculars of the left lungs in July 1937. This exudation with toxæmic symptoms passed away after two weeks' rest. He has since gained 13 lbs. in weight and is at present working hard, in order to keep himself above want. He gave a history of at least five years cough and occasional fever and slight hæmoptysis, but not of such a nature as to confine him to bed. X-ray film (Plate No. IV) taken when he was in healthy state. I saw him on 21-12-38, absolutely in healthy condition showing no trace of physical sign nor any symptom.

Interpretation of film—shows extensive fibrotic lesion in the left side—heart dragged towards the axillary line. The right side shows also extensive fibrotic lesion, but presented, however, no physical sign any time, during the period of my observation extending over a year.

Discussion :—Now to draw conclusion as to condition of the patients and future course of events by comparing the findings of the films, without the help of clinical findings, the difficulty will be appreciated, when we remember that the appearances seen by X-ray, are mere shadows of changes in the lung tissue, produced by activity of tubercle bacilli combined with the allergic response of the system, to prevent the spread of the germ lodged in the lung. We do not see by X-ray the tubercle bacilli nor the immunity reaction which produces this change. The writer has in his possession a few X-ray films showing well marked shadow, which after improvement could not be found later on in the films taken during the apprarently healed period. This gave a sense of relief to the patients when seen by them and their relatives no less to the doctor, but none the less, they died later on, of re-inoculation from focus invisible to X-ray. To make out the factor of immunity, which is the only thing that matters in making out prognosis, and not the shadow only, we will have to take the whole picture of the case, as presented by (1) clinical history (2) physical findings and (3) X-ray findings, interpreted properly.

So, from the study of these cases, one cannot help coming to the only conclusion that occurrence of the cases in which there is absolutely none or very little physical sign and also very little or no symptom but in which X-ray shows extensive lesions, indicates that these lesions are of long standing and of proliferative type, brought about by the immunity reaction of the system against the disease. As at some stage of the disease, these proliferative lesions may be the seat of exudative process, so the interpretation of these films taken at that time, by the rule that exudative lesions show wooly appearance, which clears away completely after exudation passes away and proliferatvie by extensive fibrosed strands which do not clear up, cannot be done, so we are no wiser for the X-ray, for there is no knowing at the time when the X-ray film was taken, whether it was during the exudative stage or after it has cleared away. Besides, due to complication which has arisen recently due to large number of practitioners, resorting without trying to interpret X-ray findings by the facts which the history of the case and physical signs present, to

mechanical treatment, taking the X-ray film on its face value, huge number of mechanical treatment is going on with its attendant dangers, in cases where this treatment is absolutely unnecessary, so it is extremely desirable to give proper importance to this teaching of X-ray finding. Accordingly one can lay down the rule that in all cases when there is very little physical sign or none, but where there is extensive lesion shown by X-ray, it is to be taken for granted that there is marked tissue resistance or immunity in the system. But as it may be that this immunity produced may not be of such an amount as to prevent further auto-inoculation, a system of treatment based on science is to be adopted to produce lasting immunity and not mechanical treatment.

These cases, along with many others, which the writer is meeting in his daily practice almost every day are on a par with those described as epi-tuberculosis occurring in children and adolescents, by Goldberg who reported 10 cases recently, and also by Eliasberg and Newland several years ago under the same name. They say that this type though showing T. B. in their sputum is different from ordinary tuberculosis of lungs occurring in adults, in being benign.

Similar phenomenon has been noticed also by Ornstein and Ulmar who illustrated their cases by serial rœntgenographs, in the paper "Classification of Pulmonary Tuberculosis" in Goldberg's publication "Clinical Tuberculosis". One case (fig. 59) showed infiltration in the right lung with tubercle bacilli in sputum but it ran an afebrile course in which 10 years later X-ray film (fig. 60) showed no change in X-ray finding but the patient, a woman, was found working hard in helping her husband to run a shop and in whom there was no sputum, no fever and no physical sign. The lesion was first found on routine examination of a contact case. Treatment consisted nothing more than rest for 5 months at one period of the disease. The same observers reported in their paper of a person holding important post, who insisted on examination of his chest, after he heard a lecture on Tuberculosis as a result of which a lesion (61) was found by X-ray, but in whom there was no physical sign nor any symptom. 5 years later (62) they found no change in the film. The treatment consisted of nothing but graduating his work, no other special treatment being adopted. Basing on these cases, the writer made the following statement which is a pertinent commentary on the prevailing mania for sending out all patients

of Tuberculosis to sanatorium. "This is the type of Pulmonary Tuberculosis in which grave injustice may be done to patients by sending them away and disrupting their careers."

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CASES AND COMMENTS

Arseno-Resistant in Syphilis

BY

Dr. M. Bhattacharjee, M.B., CHB. (EDIN.),

Visiting Surgeon, R. H. Hospital, Calcutta.

RECENTLY a few cases of Spiro. Tr. Pallada infections have come to my notice who inspite of receiving sufficient Arseno-benzol treatment, did not respond to it.

In the report of the treatment of syphilis the term Arseno-resistant is not uncommon to find and is used to explain the failure of the patient to respond to the treatment with the Arseno-benzol group of drugs. This failure is not due to arseno-resistant spirochoetes or trep. pallada, but is due to the fault of the patient.

On reviewing the literature on this subject Oelze[1] concluded that there is no justification for the term Salvarsan resistant spirochœtes but salvarsan resistant patient. Although there is some evidence that it is possible to produce drug resistant strain of blood spiroch and trepanomasoma, and also possibly spiroch palada, it is particularly a more difficult matter than in the case of Trypanosoma.

In an injection of Arseno-Benzol group of drug of medicine, by the time the injection is complete, more than half of Arsenic administered has disappeared already from the blood stream and is found principally in bile, urine, liver, spleen, etc. and arsenic

is mainly excreted in urine and fæces. It has been suggested that the idiosyncrasy or resistant to the treatment with the group of drug (arseno-benzol) may be due to abnormally slow or unusually rapid excretion of Arsenic.

For 5 to 8 hours after injection there is no apparent effect upon spirochœtes in superficial lesions. During this latent period the Arsenic is quickly taken up from the blood stream, is being converted by the tissue reaction into a substance lethal to spiroch., which circulates in considerable amount in blood stream for 2 or 3 days. Thereafter the concentration of the Arsenic in active form diminishes rapidly.

From the above present day theory and as generally believed from various works on that subject it seems that when a patient does not respond to arsephamine treatment it is much more likely that the fault is in the tissues which do not convert the injected remedy to those derivatives which destroy the Spiroch Pallada.

HOFFMAN[2] demonstrated a case of relapsing syphilis which was completely resistant to several injections of Arsephamine compounds until a Zillmans sweating cure was introduced after which the patient responded to the treatment.

Recently, I have been using Mapharside (known as Mapharsin in America) an arsenical preparation which differs from the arsenobenzol group of drug in this respect that it does not undergo any changes in the body as in arseno-benzol compound and is supposed to be the product resembling the substance produced from the arsenobenzol by the tissue reaction which is lethal to spiroch.

This preparation is supposed to have direct spirochœcidal action and does not require any tissue reaction. I have used this preparation to those patients who had sufficient injections of Arsenobenzol without any appreciable effect for the above reasons, and so far I got satisfactory results.

Mapharside was given extensive trial in America and in general it was considered satisfactory, and a dintinct improvement over old and new arsephamine. A full dose will sterilise a surface lesion in 24 hours and is better tolerated, less toxic, and causes less liver damage. Wieder and his co-worker found Mapharside to be capable in appropriate doses of causing rapid disappearance of lesion in syphilis and producing satisfactory healing of visible lesion in all stages of the disease.

The addition of other heavy metals like Bismuth, etc. is important in the treatment of syphilis with the arsephamine rather than using the arsenic preparation alone.

In the treatment of a syphilis case, arseno resistant, Bismuth is found to give satisfactory results though the visible theraputic action is not so quick as in the case of Mapharside.

Case 1 :—Mr. A, age 34 yrs., Anglo-Indian. Histroy :—Had an ulcer over coronal sulcus 8 yrs. ago, which was treated with ordinary external applications and healed up leaving scar mark still visible. About 6 months after, skin eruptions developed all over his body and were diagnosed as secondary syphilitic eruptions by a medical man. He was treated with injections of Neo-salvarsan and after a course of 10 injections the eruptions disappeared completely. He did not receive Bismuth Injection excepting one which according to him upset him very much.

Last year he contracted an ulcer at the peno-scrotal junction which was a papule gradually eroded and became ulcer. It was diagnosed as specific ulcer by his doctor and received neo-salvarsan again. This time he received 8 injections without any appreciable benefit and he said that the ulcer had increased in size after the injections. The case was sent to me by my colleague with a note that the Wassermann was 10/10 positive and though he received 8 injections of Neo-salvarsan no appreciable improvement was noticed. Bismuth was not tried.

The ulcer as appeared to me was typical of syphilitic in character having well marked indurated base and the superficial inguinal glands of the inner 2/3 of the inguinal regions were enlarged, discrete, and shotty in character. They were not painful. As the base of the ulcer was covered with good deal of sloughs I scraped and cauterised the ulcer with trichlor acetic acid after painting with cocaine sol. He was given weekly injection of Mapharside alone beginning with 0.04 Gm. The ulcer was dressed with Bismuth paste. After the third injection (*i.e.* two more of 0.06, Gm) there was distinct improvement visible at the site of the lesion. It healed up soon and he received two more injections to finish.

Case 2 :—Mrs. X, age 22 yrs., Anglo-Indian. She contracted a labial ulcer on the inner side of Labium Majus which was painless in character. Her doctor's report says that when she was first seen the ulcer was of the size of four anna bit and the edge was raised from the surface and irregular. The base was hard

when grasped between two fingers and the ulcer was covered with very little slough. The Wassermann was 8/10 positive. She was treated with novarsenobillion (May & Baker) alone and had received 6 injections without any visible benefit.

In fact the ulcer appeared to have increased in size more than before. On examination she was found to be slightly anæmic and excepting the ulcer there was nothing physically wrong with her. She received mapharside weekly for three weeks (0.04, 0.06, 0.06, gm.) when distinct improvement was noticed and it healed completely after receiving two more injections of 0.06 gm. She was given Bismuth Paste for local dressing.

Case 3 :—Mr. B., age 25 yrs., Indian. Last year he developed a 'lump' as he said over the freneum which became a sore due to constant rubbing with clothes ; It was painless but occasionally itchy and when squeezed between fingers a little blood came out. Three months after when examined by my colleague the ulcer was found to be of the size of a rupee, almost circular in outline having well raised margin and indurated base. His doctor wrote to me that the ulcer appeared to be typical of syphilitic and the Wassermann was not done for that reason.

He was given Neo-salvarsan and after a course of 6 injections no visible improvement was noticed. I gave him Mapharside and after the fourth injection (0.04, 0.06, 0.06, 0.06 gm.) distinct improvement was noticed. The ulcer healed up nicely and he received 3 more injections to complete.

Case 4 :—Mr. X. age 32 yrs. Anglo Indian. He attended my clinic some time last year with the history of bad sore on his penis and complained of foul discharge. On examination it was found that the prepuce could not be retracted due to phimosis caused by multiple chronic ulcers presented on its inner surface. When grasped between fingers they were felt hard like dried rubber and was painless. The glan of the penis could be felt with difficulty and he complained of slight pain. As the retraction was impossible the glan of the penis could not be seen and foul smelling yellow discharge which was coming out was supposed to be due to superadded Gonococcal infection. A temporary dorsal slit was decided but during the operation it was found advisable and practicable to perform circumcision to get rid of ulcer on prepuce. The glan was thus exposed and an ulcer was covering the dorsal surface of it. The base of the ulcer was covered with thick slough and the foul smelling discharge was

coming from it. There was no gonorrhœal infection found and the urine was clear. The blood Wassermann was 8/10 positive.

The ulcer was cleaned and dressed with Bismuth paste and he was given weekly injection of Solusalvarsan (May & Baker). After three injections I decided to give neo-salvarsan as no clinical improvement was noticed and ulcer appeared to be more or less as before. The ulcer failed to respond even after 4 injections of neo-salvarsan when I started Mapharside. He received 4 Injections of Mapharside when the ulcer appeared to have improved in appearance and in one place healing of the wound was noticeable but as it was found to be spreading in another direction I began to suspect the nature of infection. Though the inguinal glands were enlarged and painless before, they became painful and now suppurating. It was opened under anæsthetic and foul smelling pus escaped. It was decided to give him an intradermal injection of Demolcus for the diagnosis of Ducre Bacillus infection. He was found to be strongly positive and the site of the injection became very painful, indurated, brawny red and even started to ulcerate. He was treated with Demolcus vaccine curative after the ulcer was cauterised and a course of 5 vaccines cured him completely.

The ulcers over the prepuce was syphilitic and this case shows that one can have both the infections present at the same time. Though Mapharside showed no effect on soft chancre, there was distinct improvement noticed after the administration. The improvement of the ulcer before the vaccine couldn't possibly be due to dressing as the ulcer was dressed with Bismuth from the beginning of the treatment till last.

Conclusions.—No doubt there are cases of syphilis who do not respond to Arsenobonzol treatment alone and the fault lies in tissues. It is better to combine Bismuth injection with the course of Arsenobenzol treatment than to give this drug alone. Mapharside has distinct quicker effect in the surface lesion than other arsenical preparations.

Mapharside can be used in the so-called arseno-resistant cases of syphilis with advantage and in the above 4 cases it gave satisfactory results when arsenobenzol group of drugs failed.

I thank my colleague Dr. S. Mitra, M.B., for supplying me with the notes of the cases and also for referring the above cases to me for treatment by Mapharside.

Vaginal Atresia—Hæmatokolpos Causing Urinary Obstruction Cured by Operation

BY

B. Gunawardene, L.R.C.P. & S. (EDIN.), L.R.F.P. & S. (GLAS.),
Civil Hospital, Deniyaya, Ceylon.

VAGINAL Atresia is a congenital malformation and is not so rare a condition. The case I am quoting here will be interesting in many respects. Miss B, 12, F, was brought by her mother to the hospital for admission and treatment for difficulty to pass urine. That was her only complaint and she had this for the last two months the onset of the attacks corresponded to a particular date each month. This difficulty to pass urine on each of these attacks lasted for a day or so and passed off practically without any treatment. The mother was alarmed as this was occurring quite periodically and wanted a radical cure for her daughter. Miss B was a fully grown up girl, but,she stated that she had not yet attained puberty though breasts were enlarged, pubic hair was present and she had the full signs of a girl who had attained her age. Vaginal examination revealed a bulging mass through the vaginal orifice, tender and bulging and pulsating to the finger and stretching the urethral orifice, and obstructing the urethra by pressure which was causing this obstruction to the flow of urine. The hymen was completely covering the vagina and it had no opening. Exploratory puncture was made with a fine needle of a syringe and the needle struck dark coloured blood. Immediate operation was undertaken and under chloroform an incision was made through the bulging mass and a large quantity of dark coloured unclotted blood was removed from inside the vagina which was quite full, and the vagina was douched out thoroughly with a weak lysol douche. The incision was enlarged and made elliptical and the vaginal orifice was thus repaired and the girl made a speedy recovery and she was able to pass urine quite freely thereafter. This case is interesting in this respect that the vaginal atresia had masked the girl's attainment of puberty for two months. The first sign of the difficulty to pass urine was the attainment of age which was masked by the atresia vaginæ,

consultant practice from henceforth. The subsidized rural scheme is being enlarged and health duties have also been assigned to the Rural Medical Practitioners. The old Medical Registration Act was repealed and a new one has been enacted, introducing a common register for all Medical men, thus doing away with the caste system among them. The Public Health Bill recently introduced in the Madras Legislative Assembly comes at the top of these reforms, inaugurated since the assumption of Office by the Congress 18 months ago. Thus it was left to the Congress Ministry to redress the grievances of the Medical Profession, continuously and persistently voiced forth in the Antiseptic, after a lapse of thirty-five years. We are indebted to the Public Health Minister, The Hon'ble Dr. T. S. S. Rajan, for placing the Medical Profession in this Presidency in that high pedestal of equality with their compeers in the West. We are not, however, blind to the fact that individual grievances here and there do exist and dismay and disappointment prevail among those who have been or are going to be financially affected by these reforms but when it is considered that the reforms are intended for the greatest good of the greatest number, they must vanish into thin air.

As regards *The Antiseptic* we have tried to maintain its old tradition *viz.* Service—Service to the Medical Profession and Service to the suffering humanity. We have been publishing three Special Issues annually for some years past on topics which are of interest mostly to the General Practitioners and from opinions received so far, solicited and unsolicited, from our readers, they appear to serve their purpose well. We have, therefore, been emboldened to continue this service every year in the future. We take this opportunity and offer our sincere thanks to all our contributors who have made these special issues a splendid success.

We have done our best to give our advertisers regular service and fine display and we feel grateful to them for their continued patronage and support.

We wish, in conclusion, all our contributors, advertisers, and subscribers a happy and prosperous NEW YEAR.

CLEANINGS FROM MEDICAL PRESS

Surgery

The Prostate and the Endocrines: A Control Series, by R. Clerke. Brit. Jour. Urol. 9: 254, 1937.

The belief that prostatic hypertrophy is due to some endocrine abnormality is not new. The recent isolation of the male sex hormone stimulated an increasing interest in the endocrine mechanism in the male and suggested a line of treatment based on the latter theories.

In connection with the logical method of treatment, the question must be asked, " What is the nature of the evidence that we will require for conviction that prostatic hypertrophy in man is due to a particular form of endocrine imbalance? " According to the author, an essentially similar disease must be produced in suitable animals, either by extirpation of endocrine organs or by replacement or grafting therapy, and evidence should be forthcoming of the presence of a corresponding increase or diminution of endocrines in cases of the disease in man. Just now endocrine estimations can be made satisfactorily only from the urine, though it is possible that methods may be evolved for the satisfactory determination of hormones in the blood or other body fluids. At present no theory of prostatic hypertrophy fulfills such requirements.

In connection with the empiric method, one must ask, " What evidence do we require before applying endocrine therapy to the disease in man? " The author believes there is evidence of the efficiency of the preparations and of the adequacy of dosage.

He discusses the cases of ninety-three patients with prostatic obstruction who were not treated by surgery. The important question to decide is how far one may be justified in replacing surgery by endocrine therapy, or in postponing surgery to see what the endocrines can do. This postponement may cause irreparable damage in some cases. Furthermore, patients are being treated at present with at least two theoretically antagonistic preparations. Thus, according to the Cleveland Clinic schools prostatic hypertrophy is due to a diminution in the testicular output of inhibin. On the other hand, fat-soluble androsterone and its derivatives are being used elsewhere to produce the same effect. Were the inhibin theory correct, the use of this substance would seem to be contraindicated as it tends to increase rather than decrease the hypertrophy of the organ.—*C.R. Jour. P.I.MA.*

Treatment of Schezophrenia by Cardiazol

BY

P. D. D'Souza,

II Assistant, Mental Hospital, Ratnagiri.

CARDIAZOL 5 c.c. was injected intravenously twice a week. In about 60 seconds after the injection the patient developed a typical epileptiform fit starting with twitching of the eyelids. In the two cases on review there was seminal discharge during the fit.

Young patients reacted better in as much as they showed improvement soon after the first injection of 5 c.c. of cardiazol.

1. A male, aged 30, was irrational and had religious delusions. He showed considerable improvement after the first injection of cardiazol. After the second injection his talk became rational,delusions disappeared, and his general behaviour improved. He was given further three injections and was discharged cured.

2. A female, aged 24, was irrational, noisy and careless about her dress and had insomnia.

Soon after the first injection of cardiazol she showed improvement. After the second injection she was rational in talk and took notice of her surroundings and got good sleep. In all she was given six injections and was discharged cured.

3. B.M., male, aged 40, got periodical attacks of delusions of a woman troubling him ; at such times he cried and refused his food.

He was given in all five injections. He showed much improvement. Since the injections he works with concentration at the weaving loom of this Hospital and is free from the delusions for a period of over a month. He is further being watched.

This treatment was tried in six more cases including one female but with no encouraging results.

My thanks to Dr. D. M. Bhatawadekar, the then Superintendent, Mental Hospital, Ratnagiri, for his sound advice and able guidance in carrying out this new treatment in mental diseases and permission to publish these notes in your widely circulated journal.

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EDITORIAL

The New Year

ANOTHER year has rolled by and " The Antiseptic " has entered on its thirtysixth year of existence. A decade has passed since its Silver Jubilee in 1929 and during this period, especially during the past two years, almost all the reforms it suggested in regard to the Medical Profession in India have come to fruition, notably in this Presidency. It was in Madras that the first great attempt had been made to raise the standard of Medical Education, by abolishing the L.M.P. Course and converting the Stanley Medical School into a College. The next reform that was effected was the stoppage of recruitment to the Provincial Medical Services and the enlargement of the Honorary Scheme. The appointment, permanently, of an Indian for the post of the Principalship of the Madras Medical College is another praiseworthy reform that was instituted. The doing away with the services of the highly paid European Lay Secretary in the General Hospital and appointing an Indian on a lower salary with large administrative experience and financial knowledge is a step in the right direction, as it would conduce to economy and efficiency. The thorough re-organization of the Nursing Services and the introduction of the system of appointing male nurses which now finds favour in some of the European countries is another reform worthy of note. Private Practice by Government Medical men has been done away with and they have been allowed only

Some Difficulties in the Treatment of Dislocations of the Cervical Vertebra.—by T King. Australian & New Zealand Jour. Surg. 6: 380, 1937.

Compression fractures are rare in the cervical region, fracture dislocations are not uncommon, and dislocations in the cervical region are common. Injuries in the cervical region occur usually about the atlas and about the fourth, fifth, and sixth cervical vertebræ.

In the high cervical, hyperflexion injuries immediate reduction is desirable. The neck should be elongated by temporary strong traction and hyperextended, pressing the arch of the atlas backward with the thumb or index finger in the pharynx, and applying a cast after. If paralysis exists, the deformity must be reduced as soon as possible, and correction maintained by skeletal traction. Traction without manipulation generally fails to reduce the deformity. As non-union may result from interposition of the ligaments, the cast should be left for from three to six months. An exact reduction is not always possible, especially in injuries of more than ten days' duration. In cases of partial displacement, the deformity should be reduced at once, and reduction followed by application of a plaster-of-Paris cast. In cases of complete displacement, especially if complicated by cord injuries, it is essential to anesthetize the patient and reduce the deformity by Taylor's method. In hemi-dislocations lateral flexion and rotation of the neck are also necessary. If there is any paralysis, especially with skin anesthesia, it is better not to apply a cast covering the anesthetic area, but to carry out the treatment by skeletal traction.

Latent paralysis may be progressive if the displaced vertebrae are not correctly adjusted, and may even develop despite a good reduction. Overtraction must be avoided. Flexion more frequently causes injury than extension of the cervical segment. The first step is traction in the long axis of the neck, hyperextending the neck slowly. The dislocation is reduced by manipulation. When displacement recurs, one or two finger screws may be incorporated in the cast, especially for severe cervical injuries. Redislocation is common in spite of the use of a well-made cast. Complete fracture dislocations of the cervical vertebrae are more easily reduced than pure dislocations, but they are accompanied by more frequent injury to the spinal cord, and a plaster-of-Paris cast is usually contraindicated. Reduction may be maintained by hyperextending the neck over a small pillow and suspending the head by skull calipers. The head of

the bed is raised about 10 in. and a weight of 8 or 10 lbs. is attached, to the caliper over a pulley. After a week or two, the calipers may be removed, and removal followed by the application of a plaster cast including the head and forehead.

Skeletal traction must be reserved in cases with paralysis; cases of some days' or weeks' duration; cases with other injuries; and in the presence of severe shock or other constitutional disturbances which contraindicate immobilization in a plaster cast. Paralytic ileus is avoided by withholding purgatives and enemata, bowel lavage, rectal tubing, pituitrin, and other stimulants to the abdominal viscera. Morphine is very valuable in relieving pain and causes less harm than strong stimulants to the bowel. The diet should include chiefly fruit drinks, glucose, and the like. The bowels may not be evacuated for a week or two. The retained urine is drained continuously. Saline or weak boric acid solutions are used for irrigation, 100 c.cm. of saline or diluted antiseptic solution being injected into the bladder every hour.—*C.R. Jour. P.I.M.A.*

The Management of the Septic Patient with Otitis Media.—By J. H. Maxwell. J. A. M. A. 110: 1536-1538 (May 17) 1938.

The septic patient with otitis media should be individualized and not be treated according to a standard procedure. The term sepsis is used rather loosely to indicate one with leucocytosis and more or less high fever for more than five days. The septic patients with otitis media may fall into one of three groups: (1) those with an acute infectious process, local or general, producing a clinical picture of sepsis antedating the otitis media ; (2) those in whom there develops in the course of an otitis media, acute or chronic, some intercurrent infection such as pneumonia, pyelitis, erysipelas, rheumatic fever, endocarditis, coccic kidney or one of the acute exanthemata, which in itself is responsible for the appearance of sepsis, and lastly (3) those cases of real otitis sepsis in which the infection of the middle ear and mastoid is responsible for the whole picture. These last cases truly require individualized surgical and medical management. To this end a few suggestions were given : These cases are rarely surgical emergencies. The lack of mastoid tenderness due to eburnated thick cortex, inconclusive x-ray picture, and lack of sufficient aural symptoms may make it difficult to condemn the ear as the cause of sepsis. In such cases, bacteriologic studies of the aural discharge ; taking of temperature, pulse, and respiration every

two hours; daily blood examination at the same hour; daily urine examination; daily blood culture at the peak of a temperature rise or right after a chill; examination of the patient twice a day with special reference to the heart (endocarditis), the lungs (pneumonia), the kidneys (coccic kidneys), the skin (acute exanthem), the eye grounds (evidence of increased intracranial pressure), the central nervous system (meningitis, brain abscess), and the cervical glands (suggestive evidence of jugular phlebitis); x-ray of the chest every forty-eight hours; and radiographic studies of the mastoids should be done. All of these may help in deciding whether to operate or not. It must be remembered that reaotitic sepsis may occur without lateral sinus phlebitis or throml bosis, the organism gaining the circulation through the numerous veins of the middle ear and mastoid. Several pointers in the surgical procedure were given, such as careful exenteration of all accessible pneumatic bone; wide exposure of the sigmoid sinus; incision, not needle puncture; when doubt is strong, exclusion of the other ear and meticulous post-operative care, which should consist of forced liquid to as much as 4 to 5 liters a day for adults, high caloric and high vitamin liquid diet, reduced iron, repeated blood transfusions, and sulfanilamide in cases of streptococcus hemolyticus septicemia.—Geminiano de Ocampo, M.D.—*Jour. P.I.M.A.*

Newer Aspects of Acute Pancreas Necrosis and its Treatment.—By Nordmann, Zeitschrift f. Arztliche Fortbildung, 35 : 297, 1938.

The author prefers to use the term pancreas necrosis rather than the other terms commonly met with in the literature, such as pancreatitis, pancreasapoplexy, etc. Pancreas necrosis suggests its underlying pathological anatomical condition, and in a way, does away with the misleading conception that one is dealing here with an inflammatory process. It avoids confusion by dropping the use of *apoplexy* as this signifies characteristic changes in the blood vessels which are not associated with the condition.

The treatment of pancreas necrosis has undergone frequent changes during the last few years. As far back as 1890, Korte always advised against operative intervention in acute conditions except in the presence of such complications as pancreatic abscess, and pancreatic sequestrum. Later, however, he changed his views and advised operation even in the early acute stage of the disease. After the lapse of a few years, the conservative treatment, without resort to operation, began to be the treatment

of choice. Schmieden reported a series of quite persistent and fairly severe cases, which terminated in complete healing following conservative treatment. Attention was also called to the high mortality (50—90 per cent) registered of the serious cases which were operated upon.

The severe clinical manifestations can hardly be ascribed altogether to the anatomical pathological changes in the organ and abdomen, which consist in markedly enlarged and edematous pancreas, bloody and turbid ascites, and fat necrosis of the mesentery and omentum. The shock and cyanosis observed in the patient more than suggest that the condition is due to the absorption of toxin, probably from the split products of albumin. It is not hard to imagine the contributory cause of the rather high mortality after operations in severe cases, as it is quite clear that the strain and shock of the operation coupled with the further release of more toxins from the organ following the splitting of the pancreatic capsule are necessary accompaniments of the procedure. These observations subsequently led many to desist from operative intervention not only for milder but for severe cases of pancreas necrosis.

The diagnosis of the disease has undergone no appreciable alteration. Unlike other authors, Nordman is of the opinion that the diastase estimation is of help only during the first two days. Mild cases are more frequent than is currently supposed. The pancreatic cyst is an end result of mild attacks of acute pancreatic necrosis. As late complications of the conservatively treated cases, abscess and sequestration of the organ are frequently noted. These react very favorably to operations. Diabetes may be another late result of necrosis.—Jose V. de los Santos, M.D.—*Jour. P.I.M.A.*

Treatment of Psoriasis with Ethyl Chloride.—J. Meller and K. Tschofen (First Univ. Med. Clin., Vienna) treated a psoriatic because of an existing arthritis and the resulting muscle pains with ethyl chloride freezing, as recommended by Kraus, and made the surprising observation that the psoriatic efflorescences disappeared very rapidly from the places treated this way. Subsequent tests with other psoriatics revealed the same prompt action; during this it was noticed that, although only a few large efflorescences were frozen, even the plaques at a distance subsided, the smaller ones healing entirely. Ethyl chloride is sprayed on the efflorescences until slight freezing sets in and the patient has a mild burning sensation. This is repeated every 2 to 3 days

until the lesions of the skin have vanished. The action is only to be explained by the fact that under the influence of the ethyl chloride a certain substance forms in the skin which removes the disposition to psoriasis. This would support the theory of *Samberger*, who has assumed for years that the skin of a psoriatic has special characteristics. Since the number of patients treated this way is not large enough, nothing can as yet to be said about the permanent results.—(*Wien. med. Wschr., No. 20, 1938.*)—*Ars Medici.*

Medicine and Therapeutics

Effect of Calcium on the Digitalized Heart, by L. H. Nahum and H. E. Hoff. Proceedings Society Experimental Biology and Medicine, 36 : No. 5 (June) 1937.

The action of calcium upon the mammalian heart has certain similarities to that of digitalis. Their effects can be summarized as follows : slowing of the heart rate, A-V block of varying degree, and ectopic beats. The similar action of calcium and digitalis has given rise to the generally accepted opinion that both substances operate with the same mechanism or these substances have additive or synergistic activities when they are given simultaneously.

Experiments made on rabbits by giving digitalis in the form of digifoline, and calcium afterwards by intravenous injections, shows that the untoward effect of calcium upon the heart is independent from the untoward effect of digitalis.

Calcium alone given to fourteen unanesthetized rabbits produced the following effects : (1) Typical changes in the ventricular complex of the electrocardiogram ; (2) slowing in rate of the heart and delay in A-V conduction, becoming more pronounced with increasing quantities of calcium ; (3) auricular fibrillation and ectopic ventricular beats, and finally; (4) with continued injection of calcium, cardiac arrest.

The authors concluded that in the heart of the normal unanesthetized rabbit there is no additive or synergistic action of calcium and digitalis.—M.Q.—*Jour. P.I.M.A.*

The most important test of kidney function, and the most simple one, is the specific gravity test. Kidneys which can concentrate to 1018 and have, on kidneys concentration test, a changing but adequate concentration level are normal in function.—*Medical World,*

New Method of Treatment for Dermal Leishmaniasis (Oriental Sore).—By Flarer.—Presse Medicale, Sept. 17, 1938, p. 1388.) Abstracted in the Jl. A.M.A., No. 19, Nov. 5, 1938, p. 1803.)

Dermal leishmaniasis being comparatively frequent in Sicily. and its treatment not being entirely satisfactory as yet, Flarer decided to try the anti-protozoal medicament atebrin, which had been found highly effective not only in the treatment of malaria but also in another protozoal disease, namely lambliasis. The author describes his experiences with this treatment in fourteen cases of dermal leishmaniasis. In the first four cases he combined general and local treatment. The general treatment consisted either in the oral or in the intravenous administration of the medicament. Although it improved the local lesions and reduced the number of protozoans, they did not completely disappear until local treatment was instituted. In the first case, the author says, it was given in the form of intradermal injections so as to soak the entire ulceration with atebrin dissolved in distilled water. The slight œdema which followed persisted for about twenty-four hours, but without a trace of inflammatory reaction and without noticeable local pain. The ulceration regressed rapidly and the protozoans disappeared and remained absent after a month of observation, in the course of which the ulceration had been smoothed out. This and three other cases, in which general and local treatment was used, having convinced the author that the local treatment was the more effective, he used local treatment exclusively in the other ten cases of dermal leishmaniasis. In four cases he tried half doses (0.05 Gm. of atebrin) repeated twice at three day intervals. Since the local tolerance was excellent, he later administered 0.1 Gm. of atebrin dissolved in 1 or 2 cc. of distilled water, depending on the size of the ulceration. This treatment was followed by permanent cure with disappearance of the protozoans, even after a single injection. The author concludes that it is unquestionable that this treatment has advantages over all of those hitherto employed.

More albumin is found in the urine in secondary contracted kidney (chronic glomerular nephritis) than in primary contracted kidney (vascular kidney). The anæmia is usually more marked in the chronic glomerular nephritis with azotæmia.—*Medical World.*

"Unspecific" Actions of Male Sex Hormones.—To-day the treatment with hormones and vitamins is gaining ever greater importance, and justifiably so ; we are not dealing here with 'poisons' but with substances which are formed and are present in the human body under normal circumstances. These substances also have the advantage of being able to be turned to good account with deficiency diseases and to be split up and eliminated, without causing any harm, if large quantities are consumed unnecessarily. This has been sufficiently demonstrated in animal experiments.—Many hormones and vitamins have certain 'unspecific' actions, that is, they not only replace the same substances lacking in the organism, but also influence organs and diseases to which their relation is not quite known to us. We know of such 'secondary effects' of folliculin, vitamin D and C. *W. H. Veil* and *O. Lippross* (Univ. Med. Clin., Jena) have made interesting experiments with Proviron and Testoviron (both manfactured) by Schering-Kahlbaum of Berlin).

Since *W. H. Veil* has already made a report on the depressing action of the male sex hormone on the blood sugar, exact tests were made on this subject. In a healthy person the blood sugar did not decrease, in patients with senile diabetes, hower it did. A few days after the intramuscular injection of 2 c.c. Proviron+2 c.c. Testoviron the blood sugar values decreased appreciably ; the effect lasted 3 to 12 days every time. In a severe case of senile diabetes the blood sugar level was kept down for months through small doses of insulin and 3 c.c. Testoviron, injected twice a week. On suspending the hormone treatment, but maintaining the same doses of insulin the blood sugar always rose again.

Men treated with sex hormone often report spontaneously that the jet of urine has become stronger. The writers tested the value of these statements by controlling the water pressure of the stream of urine with a manometer. No change was observed in men with a normal jet of urine ; the pressure rose quite considerably, however, in patients with premature signs of senility or those having them at a normal age with a weak jet. The good results obtained in treating hypertrophy of the prostate with sex hormones are known to everyone.—In the same way, testing the expiratory pressure (more correctly blowing pressure) with a manometer showed no change in functionally capable lungs, but an apparent increase in the pressure of patients with, for example, senile emphysema.—Finally, the force of the digital pressure was measured with an ergograph. It rose about 50% in older men who had been treated with sex hormones.

Even more impressive than these observations are the frequent spontaneous declarations of patients treated with male sex hormone as to greater vigour, greater vitality and, above all, better spirits, so that one may really speak of a certain rejuvenation. An improvement in the libido was only observed in a few cases.—(*Klin Wschr., No. 19, 1938.*)—*Ars Medici.*

Therapeutic Experiences with Cobra Venom.—The conclusion that Macht draws from various experiments is that cobra venom, like opium and its principal alkaloid, morphine, relieves pain through its action on the higher centres of the brain. While morphine relieves pain promptly and the effect wears off within a few hours, cobra venom does not induce analgesia rapidly, but once it is induced the analgesia lasts much longer than that of morphine. Once analgesia has been established, patients may usually be kept comfortable with two or three weekly intramuscular injections of 5 mouse units of cobra venom. The author has personally administered two such injections twice a week to patients with advanced and hopelessly malignant cancers for months in succession and he has been able to keep them comfortable without using any other drug. While cobra venom has been chiefly advocated in cases of hopelessly advanced malignant tumours and their metastases, during the past year or two the author has extended its use to the treatment of certain non-malignant conditions (severe neuralgias, chronic arthritis and angina pectoris with subacute, long-lasting paroxysms of pain). The number of arthritic cases treated with this drug is still not large enough to warrant discussion, although considerable relief of pain has been obtained in some instances. Cobra venom has also relieved the pain and relaxed the rigidity of the muscles and produced a general amelioration of Parkinsonian symptoms in seven cases. The action of the drug in such cases is probably a complex one : (1) The analgesic action of cobra venom certainly plays a part ; (2) the anticonvulsant property of the drug may also exert an effect ; and (3) it is probable that certain peripheral effects of cobra venom described by Cicardo may be involved in the mechanism of its action.—*Annals of Internal Medicine, April, 1938, p. 1842.—Medical World.*

The Blood Index in Pulmonary Tuberculosis in Women, by Nestor J. S. Nathan. British Jour. Tuberculosis, 32 : No. 2 (April) 1938.

The Houghton blood index investigated in eighty female patients gave the following results : In 56, or 70 per cent. of the cases data similar to the clinical, X-ray and laboratory findings or the blood indices rendered great help in the prognosis ; in 24, or 30 per cent, of cases, a lowered index indicated unforeseen changes in the patients' condition, which occurred at a later date, *i. e.*, hemoptysis, spread of the disease, and fluid in an artificial pneumothorax. A sudden fall in the blood index should therefore be regarded as an alarm signal.

It was observed that the menstrual period has a marked influence on the variation of the blood index findings, during the premenstrual stage and the menstrual period, so that samples of blood should be taken immediately after the cessation of the menstrual period.

The clinical condition as well as the blood index must be taken into consideration in the prognosis of pulmonary tuberculosis in women.—M.Q.—*Jour. P.I.M.A.*

The Flotation Method of Sputum Examination, by C.Richard Smith. Amer. Rev. Tuberc. 37 : No. 5 (May) 1938.

A comparative study was made between the flotation method and direct smears. The procedure used, that of Pottenger, gave accurate results.

Examinations were made in 1248 sputum samples from 260 persons simultaneously, by direct smear and by the flotation method.

The results can be summarized as follows :

1. Fourteen per cent of smear-negative specimens and 19 per cent of smear-negative persons were positive by flotation.

2. Flotation smears showed an average of 85 times as many acid-fast bacilli as direct smears.

3. Tubercle bacilli in concentration as low as 0.000,001 mgm. per cc. in a 10 cc. specimen of sputum were observed by flotation test.

4. Non-pathogenic acid-fast micro-organisms were frequently present in the sputum and might be confused with tubercle bacilli.

5. The advantages of flotation over sedimentation procedures were better distribution of tubercle bacilli, and cleaner smears.

6. The flotation test proved to be of great value in the diagnosis and prognosis of those cases having very few bacilli in the sputum, particularly where collapse therapy has been used and X-ray pictures are not dependable.—M.Q.—*Jour. P.I.M.A.*

Obstetrics and Gynæcology

Can the Formation of the Sex be Influenced?.—This question was one of the topics at the last International Congress for Obstetrics and Gynæcology in Amsterdam (5th 1938). *Bittmann* (Olmutz) was of opinion that the sex is determined at the moment of fertilization. According to *Unterberger*, the chemical condition of the vagina plays a role and alkalization leads to the birth of males. The lecturer reported on personal experiments with 31 women who had sought medical advice because of sterility and hoped for male offspring. In all cases the day of ovulation could be determined by following up the menstrual periods for one year (*Knaus's* method). Intercourse was prescribed 48 hours before the ovulation term. All sexual intercourse was forbidden from the day of the last period up to the term of the assumed ovulation, after this term coitus with a condom was permitted up to the next period. Before the ovulation term daily vaginal flushings with a solution of sodium bicarbonate were made for 5 days. The husband had to take 2 tablets of Yohimbin 3 times daily and drink strong black coffee after the 2 main meals. Impassability of the women's tubes was, of course, excluded. The semen of the male was examined and Antelobin and vitamin E were administered even if the sperms were found to be normal. All of the 31 became pregnant, 27 of them bore boys.

F. Ludwig and *J. von Ries* (Berne) called attention to their experiments with fertilized hen's eggs ("Ars Medici" 1937, p. 26). If 500 units of follicle hormone are injected into such eggs on the 4th day, only female chickens are hatched. These experiments have been corroborated everywhere and prove that the determination of the sex is not yet completed at the moment of fertilization.

With the aid of personal experiments *Rubsamen* (Dresden) was able to confirm the results of *Fellner* and *W. Koch*, i. e., hyperfeminization of the female animal (by the administration of follicle hormone before fertilization) leads to the birth of 80% males. In man it could be proven that in most cases of spontaneous abortion the fœtus is a male. This is in accordance with the theory of hyperfeminization, for we are all aware of the tendency to abortion in cases of follicular hyperfunction of the ovaries (treatment with corpus luteum for imminent abortion!). Of 170 women who had taken 100 mouse units of Ovanorm, or some similar preparation, daily, for 3 to 4 months before conception, 73 per cent bore males. Too large doses of Progynon are to be avoided; they are followed by either no fertilization at all because the hyperæmia of the uterine mucosa is too intense or a tendency to abortion arises; in such a case corpus luteum hormone would have to be administered immediately after fertilization, had taken place. — Diminution of ovarial activity, hypofeminization, is achieved with corpus leuteum preparations. If a weakened period lasting about 1 to 2 days is realized by administering corpus luteum for weeks and conception is then permitted, predominantly girls are born. Of 235 women thus treated, 85 per cent bore females, wherein corpus luteum extract form the ovaries of pigs proved to be especially effective.—The above experiments of *Ludwig* and *Ries* found general confirmation. The writer's experiments with frog's eggs had similar results. Thus administration of follicular hormone with these animal species produces predominantly female offspring. With higher mammals, however, and with man hyperfeminization and hypofeminization act in the opposite way, that is, causing primarily male or female embroys, respectively. The lecturer is at present occupied with examination of the substitution or intensification, resp., of the action of follicle hormone furthering males through vitamin E combined with calcium and that of corpus luteum hormone treatment furthering girls through vitamin C. (Ztrbl. f. Gyn., No. 31, 1938.) —*Ars Medici.*

PROCEEDINGS OF CONFERENCES, SOCIETIES, ETC.

The Tinnevelly District Medical Association, Palamcottah.

(Tinnevelly Branch of the Indian Medical Association).

Tenth Anniversary.

The Tenth Annual Gathering organised by the Tinnevelly District Medical Association commenced at 4-30 P.M. on Saturday the 3rd of December 1938, in the Subrahmanya Karayalar Public Library, Palamcottah. Members numbering 75, including 7 women doctors were present. Two members of the Independent Medical Practitioners' Association, Tinnevelly, also attended the function.

The Business Meeting commenced under the Presidentship of Lieut. Col. T. S. Shastry, I.M.S. The Secretary Dr. K. Rama Ayyar, M.B.B.S. (Andhra), read the minutes of the last monthly meeting, held at Tuticorin on Saturday the 29th of October 1938 and also the minutes of the Special Meeting held at Vannarpet on the 16th of November 1938.

Then the election of Office-bearers was proceeded with :—

1. President ; Lieut. Col., T. S. Shastry, I.M,S., (re-elected).
2. Vice-President ; Dr. T. N. Govinda Iyer, M.B. & C.M., (re-elected).
3. Secretary and Treasurer ; Dr. K. Rama Ayyar, M.B.B.S., (Andhra) (re-elected).
4. For Women Members ; Dr. Mrs. E. Bernard Carr. (re-elected).
5. For the General Body ; Dr. L. Mahadevan, M.B.B.S., (Madras), D.O.M.S. (London) re-elected ; Dr. N. Isaac, Retd. Selection Grade Sub-Asst. Surgeon. (elected) ; Dr. K. S. Subrahmanyam, L.M. & S., (elected).

Member-Auditor ; Dr. K. V. Muthiah Pillai, L.M. & S., (re-elected).

Resolved that the following be the Programme of Meetings for the year 1939 :—(1) January ; Nanguneri (Temple). (2) Feb. ; Headquarters. (3) March ; Tiruchendur (Sea-side). (4) April ; Headquarters. (5) May ; Srivaikuntam (Temple). (6) June ; Papanasam (Waterfalls) (Ambasamudram). (7) July ; Courtallam (Waterfalls). (8) August ; Headquarters (President's Function),

(9) September; Sankarankoil (Temple). (10) October; Headquarters (Anniversary). (11) November; Koilpatti (Mills). (12) December; Headquarters.

Some other important resolutions regarding the constitution of the Association were also passed unanimously.

Then Lieut. Col., T. S. Shastry, I.M.S., offered a hearty welcome to all the members and guests.

Annual Re-union.

Lieut. Col. T. S. Shastry, I.M.S., opened the proceedings of the Conference as the Chairman of the Re-Union.

Dr. K. Rama Ayyar, M.B.B.S., (Andhra) read out the messages of Good Wishes for the success of the Conference received from the following:—(1) The Hon'ble Dr. T. S. S. Rajan, L.R.C.P., M.R.C.S., etc., Minister in charge of Medicine and Public Health. (2) Rao Bahadur C. B. Rama Rao, M.D., Bangalore. (3) Dr. K. Raman Tampi M.D., President, The Travancore Medical Association, Trivandrum. (4) Dr. P. Rama Rau, Radiologist, Madras. (5) Dr. Noble, M.D., F.A.C.S., Nagercoil. (6) Dr. K. R. Menon, L.M. & S., President, The Malabar District Medical Association. (7) Dr. D. V. Venkappa, Madras, President-elect of the All-India Licentiate Medical Practitioners' Association. (8) Rao Bahadur T. S. Tirumurti, B.A., M.B. & C.M., D.T.M. & H., (London), Principal, Stanley Medical College, Madras. (9) Telegram from Dr. U. Krishna Rau, Joint Secretary, The Indian Medical Association. (10) Telegram from Dr. P. S. Srinivasan, Dhanushkodi.

Dr. M. Venkatachalam Chetty, Sub-Assistant Surgeon, read out the following interesting clinical cases which were successfully treated and operated at the Government Headquarters Hospital, Palamcottah:—(1) A case of Tumour (Right shoulder) (Not operated). (2) A case of perforating wound abdomen. (3) A case of undescended testis (left side). (4) A case of Traumatic dislocation hip (left side).

Dr. Mrs. A. Brown, Woman Apothecary of the Government Women and Children Hospital, Vannarpet read out a case of Tumour on the left side of the neck.

A discussion of those cases followed, the Chairman of the Re-union contributing to the discussion and elucidating the therapeutics of the cases.

BOOK REVIEWS

Bile: Its Toxicity and Relation to Disease—*By O.H. Horrall,* M.D. Cambridge University Press, London. Price *sh.* 18/– net.

The book attempts to give in detail the physiologic and toxic action of bile, supported by observations and experiments carried on from time to time by the workers on the field. The author who has had thirteen years of experimental work in the department of Physiology in the University of Chicago, gives a critical summary of modern knowledge on the composition of bile and its relation to disease. The intention of the author in writing this book would seem to be to stimulate fruitful research to correlate and elucidate some of the clinical symptoms that appear in jaundice and to aid the physician to a more scientific treatment of patients with jaundice, and we are sure our readers would appreciate the spirit and help the author in his endeavours.

The 1938 Year Book of General Medicine—The Year Book Publishers, Chicago. Price $ 3.00.

This is one of the eleven volumes comprising the practical medicine series of Year Books founded in 1900 by Gustavus P.Head,M.D., and C.J. Head and published continually since then.

The present volume on General Medicine, edited by well-known men like George F. Dick, George R. Minot, W. B. Castle, W. D. Stroud, G. B. Eusterman and M.J. Burns Amberson, Jr.

The book gives a summary of the progress of medicine during the past year (1938), and presents the latest proved advances in handling 151 disease conditions encountered most often in the office and at the bedside.

Edited by six great clinicians representing five of America's greatest medical centres, the Year Book contains what these authorities believe every general practitioner and every specialist in his various fields should know about the most advanced procedures.

Our readers are already familiar with these useful volumes and with all the improvements the present series, we are sure, would be welcome.

A Hand Book of Midwifery for Obstetric Dressers, Pupil-Midwives and Midwives—*By Sir Comyns Berkeley,* M.A., F.R.C.S., F.C.O.G., etc. 1938, 10th edition, with one colour plate and 81 illustrations, Pp. 633. London: Cassell & Co., Ltd. Price *sh.* 8/– net.

The tenth edition has been completely revised and rewritten where necessary and brought up-to-date. A few illustrations

have been added. The book is written in a simple style and enough of material has been given for those to whom it is intended. It is highly practical and deals with the whole field of midwifery, and we recommend it to the nursing pupils and midwives as a trustworthy guide.

The Outline of Rationalism.—By Chandra Chakraberty, Published by Vijaya Krishna Brothers, 31, Vivekananda Road, Calcutta, 1938, Price Re. 1.

In this book, the author has attempted to deliver humanity from suicidal maniac, irrationalism, leading frequently to passionate outbursts of violent religious fanaticism, resulting in numerous grievous hurts and maimed limbs, terrible loss of lives and properties and tremendous wastage of time, energy and wealth and show them the right code of conduct. He has dwelt on varied topics, the most important of which are:

1. The Evolution of the Elements.
2. The Evolution of the Solar System.
3. The Earth.
4. The Evolution of Man.
5. Marriage.
6. Romantic love and eugenics, and
7. The Family.

The book will be found interesting to Eugenists and to Scientists who have a philosophical bent of mind.

Back to Activity.—By E. R. Desoutter. Published by Desoutter Brothers Ltd., 73, Baker St., London W. I.

The lot of an amputee is really hard and though he could be provided with some kind of artificial limb and made to walk, yet it has its own limitations and there is always a feeling of uneasiness and irksomeness about it. These artificial limbs were made of wood, leather and steel and were frequently ill-fitting and sometimes painful to wear. When Mr. Marcel Desoutter lost his leg above the knee in an aeroplane accident in 1912, it became necessary for him to get an artificial limb and his brother Mr. Charles Desoutter an aeronautical engineer designed the first light metal limb using the new duralumin alloy. The above book contains 5 chapters dealing with (1) the Technique of stump preparation and limb fitting. (2) Desoutter light metal limbs and their special features. (3) Special Desoutter features. (4) Some suggestions to help wearers of Desoutter light metal limbs. (5) The treatment of children and other special cases. There are as many as 80 illustrations and the printing and get up of the book are all that could be desired. We heartily commend the book to Orthopædic Surgeons and students who are interested in Orthopædic Surgery.

PREPARATIONS AND INVENTIONS

Tropulin or Schering's Tropical Insulin.—An important observation was made in the Journal of Tropical Medicine, March 1925 and January 1926, where it was recorded that Insulin in solid form did not undergo any change at high temperature and that it showed far greater resistance to tropical conditions than the aqueous solution. Consequently, Messrs. Schering Ltd., we are told, decided to introduce a special packing of Insulin, where the powder was suspended in a glass tube and kept apart from the solvent so long as the solution was not required for use. Such packings of Insulin after being for 2 years in places like China, India, Java and South Africa, were tested and found that they retained their full activity.

Messrs. Schering Ltd. have named this as Tropulin. We are further informed that a packing of it which was lying for 8 years in India was tested by their Main Laboratories in Berlin and the following report was received:—

(1) The solvent was absolutely clear.

(2) The Insulin Hydrochloride powder was quite dry in the tube.

(3) The solution was prepared by releasing the tube into the solvent, shaking it up and on being tested, it was found to have retained its full efficacy as shown by the standardisation test.

Considering that many towns in India experience high temperatures especially during the summer months we are sure that Tropulin, this improved Insulin of Shering's will be appreciated by the doctors, who naturally would be using a fresh solution and having a unit strength according to the declaration on the packing.

Cardiazol—Quinine—Knoll.—Combines rapidity of action with the highest possible degree of tolerability. The purpose of the combination is to complement the action of quinine in all indications requiring circulatory support. The Cardiazol component increases the solubility of the quinine salts very considerably which explains why absorption of the remedy is exceptionally rapid, why it remains in the organism a very appreciable length of time and why it is able to attain a high concentration in the blood. Relatively, large amounts of quinine in pure watery solution can be lodged in the organism by Cardiazol-Quinine injections (Cardiazol-Quinine ampoules, without additions of urethane, essential oils, etc.). The slight viscosity of the solution ensures satisfactory tolerance of the injections, assists rapid absorption and thus hastens the action. The chief indications for

Cardiazol-Quinine are influenza, pneumonia, bronchitis, rhinitis, tracheitis, anginous states, tonsillitis, typhus abdominalis, malaria, tuberculosis, also heart disorders such as conductivity disturbances,arrhythmias, hyperkinesia, hyperexcitability and tachycardia. It is of great value in the enforced pauses of digitalis therapy and indicated also in primary feebleness of labour, febrile abortion, to induce labour and abortion and for the prophylaxis and treatment of postoperative pulmonary complications.

Uleron.—Extract from a paper by Jo Hartung, which appeared on page 1899 of 9th December, 1938 issue of *Muenchener Med. Wochenschirft.*

The author takes up the suggestion, made in the early days of 'Uleron' treatment, to treat only sub-acute or sub-chronic cases of gonorrhœa, since it was very soon noticed that acute cases did not respond so well to therapy as cases of 2 or 3 weeks' standing. He was not satisfied with this rather crude suggestion and sought for an explanation. His work is based on 700 cases under 'uleron' treatment, All of them were subjected to Gonococci-Complement-Fixation-Test (henceforward abbreviated into *Go-CFT*). It was found that results were particularly good when the Go-CFT was positive, in other words, when the organism has already been in a position to form a certain amount of antibodies. He further found that in the majority of uncomplicated gonorrhœa cases, the Go-CFT becomes positive after a fortnight, and increases there-after. Individual cases behaved of course differently and from his material Hartung states that uncomplicated cases after a fortnight are positive in 20% of cases, while cases with certain complications reached 75% positive reactions. Sometime later the number of positive cases very quickly reaches a percentage of 80 and 100. It was found that results with 'uleron' were always better, the more outspoken the Go-CFT was: because in all cases where the Go-CFT was slightly positive, the first 'uleron' treatment of 4 days usually gave a cure rate of 83%. On the other hand in 222 cases of male gonorrhœa with negative Go-CFT there was only a cure rate of 36%.

The author endeavoured thereupon to find means to achieve Go-CFT positive earlier than found in the natural course of things and he found finally that vaccination with moderate doses made the Go-CFT positive at an earlier date than in cases which were allowed to run the natural course, and consequently 'uleron' results also became much better. He further states that vaccination with rather high doses, producing a feverish reaction usually makes a positive Go-CFT to disappear again, and on this observation he bases his recommendation to vaccinate the patient with sub-curative doses. For this purpose he has used 'gonargin' and injected on the first day 20, third day 40, fifth day 80, seventh day 160, and on the ninth day 200, and if necessary on the 11th day 250 or 300 million germs 'gonargin' or 'compligon' in corresponding doses and only after an interval of 2—3 days the first 'uleron' course was given. The 'uleron' treatment was extended usually for 4 or at the maximum 5 days only, and the result was a 80% cure rate. The whole treatment lasts between 14—20 days depending upon the date on which the Go-CFT becomes positive.

ANNOUNCEMENTS

M and B 693 in Gonococcal Infections.

We have received from Pharmaceutical Specialities (May and Baker) Ltd., a copy of another publication on that remarkable addition to chemotherapy, M & B 693. This sixteen page booklet which is entitled, "M & B 693 in Gonococcal Infections", is a complementary publication to "M & B 693 in Pneumococcal Infections", and "M & B 693 Biological and Biochemical Data".

We understand from the manufacturers that they delayed bringing M & B 693 to the notice of venereologists until they were satisfied that the use of this product marked a real advance in the chemotherapy of that disease. This booklet which they have now produced represents the pooled results of observations in over 1,000 cases.

Copies of this publication are available to medical practitioners on request.

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INDEX TO ADVERTISERS.

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The Antiseptic

A Monthly Medical Journal

Edited by

Dr. U. Rama Rau, M.L.C. & U. Krishna Rau, M.B., B.S.

CONTENTS.

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Index to Advertisements. see page 62.

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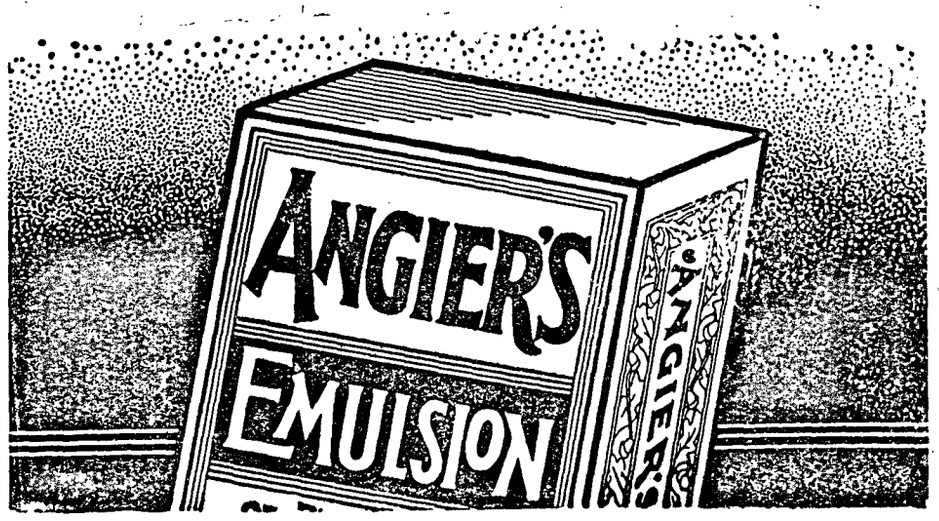

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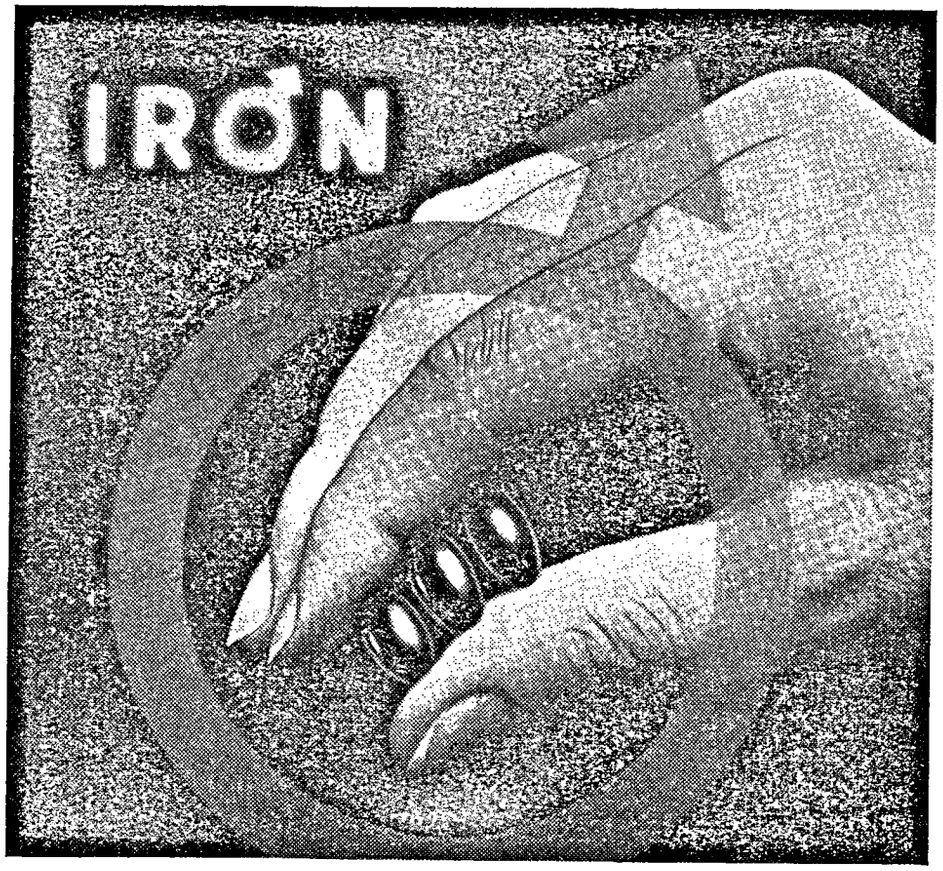

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Hormones in Gynæcology

BY

Dr. N. A. Purandare, M.D., F.C.P.S.

Bombay.

HORMONES are the essential substances contained in the internal secretions of the ductless glands in the body. They serve to govern various functions in the organism and maintain balance between the endocrine glands, being carried through the blood-stream. With regard to the reproductive system, it is recognised that the main governing gland is the anterior Pituitary Lobe which regulates the function of the gonads. Among other hormones, the anterior pituitary lobe generates gonado-tropic hormones which control the role of the ovaries in woman. These gonadotropic hormones govern the process of ripening of the Graafian follicle and of luteinizing the granulosa cells so as to form the Corpus luteum. The hormone concerned in maturing the follicle is called follicle-stimulating hormone and the other luteinizing hormone. They are also named Prolan A and Prolan B. It is convenient to regard these two as distinct hormones since each is connected with a definite phenomenon. When they are produced in adequate proportion, the usual phenomena are observed to occur regularly; but when formed in excess or less in amount or without relation to each other they give rise to alteration in the function, which is distinguished into hyper or

hypo or dys-function. Thus there may be hyper,hypo or dys-function of the anterior pituitary just as of the ovary. If there is hypofunction of the anterior pituitary affecting the gonadotropic hormone, the growth and development of the ovary and its function are relatively impaired. Besides, defective development of the uterus and external parts is also noticeable. Generally along with this deficient development of the genital organs, the patient shows special tendency to deposition of fat especially in the parts below the girdle line (Fröhlich's Syndrome). This condition is known as adipose genital dystrophy. Increased production of the pituitary hormones is to be seen, after the menopause is established or after the operative removal of the ovaries or their destruction by Rontgen rays, as well as on pathological changes induced in the ovaries by inflammation interfering with their ordinary function.

Gonads hypofunction consists in amenorrhœa, oligomenorrhœa, sterility and sometimes dysmenorrhœa. Hypofunction of the ovaries can be determined by reduction of the œstrogenic factor in the blood and the urine discovered by quantitative analysis. Dysfunction is seen in the development of functional bleeding (Schroeder's disease).

Relating to endocrine glands there are certain principles which are to be remembered :—

(1) An endocrine gland secretes more than one hormone.

(2) The hormones produced by particular gland do not stimulate the individual gland generating them.

(3) They stimulate other endocrine glands, especially those under their direct control.

(4) The hormones elaborated by these secondary glands may exercise inhibitory action on the main governing gland ; *e.g.* excess of œstrin may inhibit the production of the follicle-stimulating hormone of the anterior pituitary gland.

Relation of the hormones of the governing and subsidiary glands to lesions in genital tract :—In former days it had been suggested that some of the lesions of the generative organs were the result of altered function of the ovary. But since its hormones could be isolated and even prepared synthetically and their results evaluated on experimental animals, rapid advances have been effected. It has been discovered that the adminstration of the œstrogenic substances to animals produce certain pathological conditions. These are as follows :—

(1) The proliferation of the glandular tissues of the secondary organs of reproduction.

(2) A metaplasia of columnar to squamous epithelium.

(3) Hypertrophy of the fibromuscular walls of certain hollow viscera.

(4) Changes in certain of the glands of internal secretion.

(5) The development of some tumours-(Taylor A.I.O. & G.)

To recognize any of the above morbid conditions there are two methods of carrying out the biological examination : firstly, by getting the body fluid such as blood and urine and injecting the extract into experimental animals. This method of approach is not so exact ; because the data obtained are likely to be interpreted differently; secondly, to obtain the ovarian hormones either direct or prepared synthetically and to inject them in varying quantities in different animals so as to produce the pathological lesions. This method is more reliable than the first.

By performing these laboratory investigations the relation has been established between certain pathological lesions of the generative tract and excess or insufficiency of the ovarian hormones. These lesions are given below according to the structure affected.

Endometrium.—It has been established that cystic hyperplasia of the endometrium is the result of dysfunction of the ovary as displayed by the Graafian follicle not reaching its maturity and by non-development of the fresh corpus luteum. In that immature state it remains two or three months or even more, allowing the liquor folliculi to accumulate. As a result, the follicular fluid contains more and more œstrogenic hormone, which leads to excessive proliferation of the endometrium with enlarged and dilated glands. Shroeder and others have succeeded in securing greater amount of œstrogenic hormone, from the unruptured Graafian follicle and from the blood and urine of the patient in the non-bleeding period representing the prolonged amenorrhœa.

Sometimes some years after the menopause has been established, hypoplasia of the endometrium is developed, inducing bleeding per vaginum.

This condition is not infrequently associated with granulosa cell tumour of the ovary. The granulosa cells produce œstrogenic substance, which causes cystic hyperplasia of the endometrium, thus establishing the hormonal relation to the hyperplasia of the endometrium.

As has been mentioned above, a change of the columnar into squamous epithelium has been observed to occur in the experimental animals while having the injections of œstrogenic substance. In the same way in the cystic hyperplasic endometrium islands of squamous epithelium may be noticed. It is more the result of squamous metaplasia induced by œstrones of the hormones. This suggests the possibility that the hormones may be the factor of origin in the squamous metaplasia found in some cases of endometrial carcinoma, namely the so-called adenocarcinoma.

In laboratory animals, especially in a susceptible species of mice, injections of œstrogenic principles for a long time may give rise to cystic tumours in the breast. If simultaneously the skin over the breast is painted for a long time with tar, the tumour acquires malignancy. There is chemical relation between the carcinogenic hydrocarbons of the tar and the œstrogenic hormones of the ovary. Again it has been recognized that some of the hydrocarbons of the tar are also œstrogenic substances. Both hydrocarbons of the tar and œstrogenic principles possess the property of causing proliferative changes, the difference being, the former cause proliferation in all the tissues with which they come in contact; while the latter, in the secondary sex organs such as the uterus, the vagina and the mammary gland. In both the definite cancerous transformation is preceded by a preparatory period. When this stage has been reached, the carcinogenic agents whether hormone or tar, no longer need be acting; the carcinogenic effect follows spontaneously in the course of time. Furthermore in both cases the longer the stimulus has acted, the greater is the incidence of cancer.

Chorion Epithelioma.—In this affection the hormonic origin has been well established. It many a time follows vesicular mole occurring in pregnancy. In the latter, Aschheim-Zondek test is strongly positive. The mole is characterized by marked proliferation of the chorionic epithelium producing Anterior Pituitary like hormone (Pregnancy Problem). In the same way when the chorionic Epithelioma is developed there is pronounced presence of A.P.L. Hormone in the blood and urine of the patient. Thus, in chorion epithelioma as well as in hydatidiform mole the gonadotropic hormone that is recovered from the blood and urine varies from 40,000 to 100,000 rat units per litre. This is of clinical value, as Aschheim has pointed out. Incomplete removal, recurrences and metastases due to chorion-epithelioma can thus be diagnosed by persistence or recurrence of positive pregnancy test in high dilution.

Myometrium.—In connection with the muscular wall arises fibromyoma of the uterus. There are certain points which have to be recognized while considering to what extent the ovarian hormones are concerned with the production of the tumour.

(1) Fibromyomas are generally produced during the active child-bearing period.

(2) They have the tendency to undergo atrophy after the menopause of castration.

(3) Fibromyomas are not uncommonly associated with Cystic condition of the ovaries.

(4) Except the submucous variety, subserous and early intramural fibroids do not affect the menstrual cycle.

(5) Affection of the endometrium occurs more in connection with submucous fibroids.

Because of the occurrence of the fibroids during the period of ovarian activity and their diminution in size after the natural or artificial menopause and because of the cystic condition of the ovaries so frequently noticed with fibroids of the uterus, some laboratory workers maintain, especially as they found œstrin in great amounts in the tumours themselves, that their genesis resides in dysfunction of the ovaries. But Meyer opposes it on the grounds that 'patients with fibroids usually menstruate normally unless the position of the growth causes the bleeding, that they become pregnant, and that no corpus luteum deficiency is demonstrable, because the endometrium often shows a pregravid mucosal pattern'. Another plea is a fibroid which has established vascular connection with the other abdominal organs or the mesentery continues to grow in size even after the menopause.

Endometriosis.—It has been found that bits of the endometrium strewn on the rabbit's peritoneum are seen to grow. But if ovaries are removed afterwards the number of these implanted bits become definitely reduced. Moreover, if œstrogenic hormone is injected, the remaining bits can be preserved in the active state. Again endometriosis is observed in the period of ovarian activity; extraovarian implants appear to disappear in many cases on removal of the ovaries and the uterus. Many a time endometrioma of the uterine wall may be associated with hyperplasia of the endometrium or granulosa cell tumour of the ovaries. All these factors go to show the relation of endometriosis to the œstrogenic hormone of the ovaries.

Cervix.—Some workers contend that cancer of the cervix is also the result of perverted hormonic influence on the cervix but so far it has not been conclusively proved.

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The Menopausal Syndrome: Oestrin Therapy

BY

K. V. Subba Rao, M.B., B.S.,

Vizagapatam.

IN the last few years, the accomplishments of Gynæcological Endocrinology have been numerous and brilliant. And one of these is the definite establishment of endocrinal relationship for the menopausal syndrome. Menopausal syndrome comprises of a variety of clinical manifestations due to the withdrawal of the ovarian secretions and the resulting neuro-endocrinal disharmony occurring usually but not invariably at the time of menopause.

THEOBALD produced clinical evidence to show that there is a menstrual centre in the Hypothalamus. The afferent fibres for the centre are provided chiefly by the numerous stimuli from the generative organs and from the cerebral cortex. The efferent stimuli pass from the centre to the anterior lobe of the Pituitary which produces the gonadotrophic hormones (Prolan A & B). These hormones in turn act upon the ovary which manufactures Oestrodiol and Progestrone during the pre and post ovulatory phases respectively. These two ovarian hormones act on the uterus in succession ending in menstruation. Hence any interference in the production of these sex hormones will be followed by the disturbance of menstruation.

The ovary after certain age (Among Indians usually between 40–45 years) gradually fails to secrete its hormones due to autonomous exhaustion with the result there is dimunition and ultimate cessation of menstrual flow.

Ovarian hormones exert an inhibitory effect on the anterior Pituitary, and the withdrawal of the ovarian secretions at this time removes the inhibition and results in excess of the anterior Pituitary activity; this in turn produces the disturbance in the delicate endocrinal balance. This is evidenced by the excessive quantity of the gonadotrophic hormone of the Pituitary with marked reduction or absence of œstrin in the blood.

As there is close inter-relationship between the nervous and endocrine systems, the disharmony in the endocrinal system due

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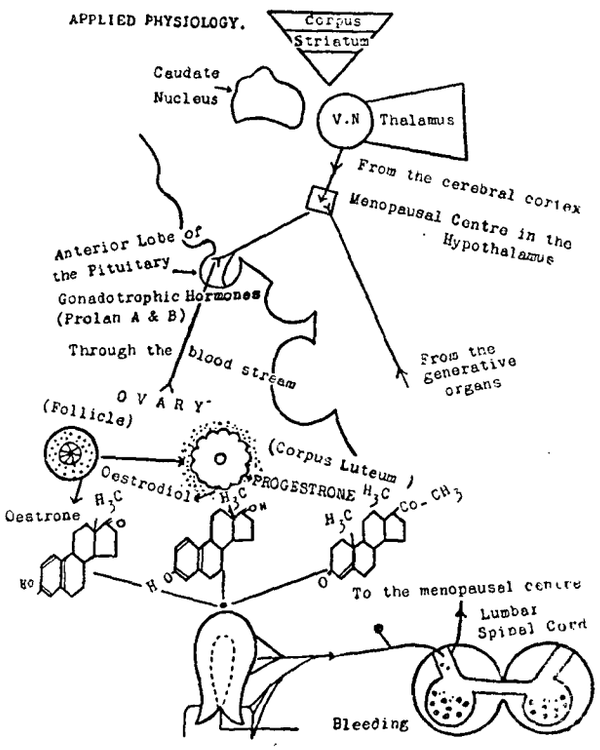

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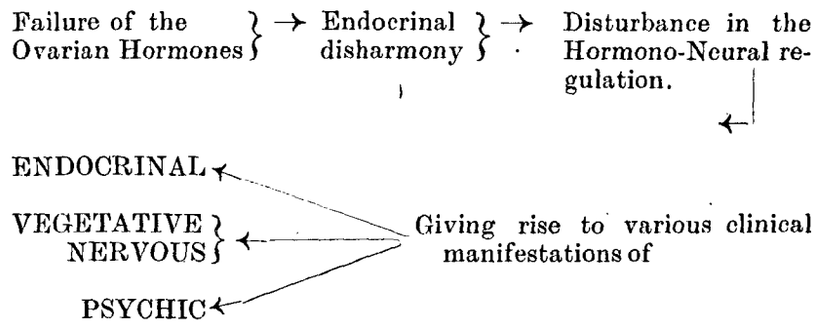
to the failure of the secretions of the sex glands affect the " Neuro-Hormonal—Hormono-Neural regulation " as well.

So the whole mechanism of production of the various manifestation of the menopausal syndrome is this :



Symptomatology.—Since most of the manifestations are due to the general " Neuro-Endocrinal ", disharmony different individuals react varyingly not only in degree, but also in 'pattern' depending upon their psychological background and physical make-up. Individuals who tend by nature to be "Highly sprung" are more easily susceptible.

Every woman who passes the " menopausal age " is not subjected to this malady. About 15% are luckily free from any manifestation whatsoever.

Symptoms, in general, can be labelled under three headings :

I. Endocrinal changes.
II. Vegetative nervous imbalance.
III. Mental manifestations.

I. **Endocrinal Changes.**—Much evidence has recently been accumulated to suggest that these endocrinal changes are also subject to great variation. The severity of these symptoms need not be in proportion to the degree of endocrine changes. Salmon and Frank found that such symptoms could not be correlated with the amount of circulating œstrin and with the urinary output of Prolan A. and yet adequate doses of œstrin will relieve the symptoms.

The Endocrinal changes may be DIRECT / INDIRECT.

1. *The direct Endocrinal changes* is the cessation of the ovarian hormones, and is clinically manifested as :

(*a*) Atrophy of the vaginal mucous membrane. (This fact is taken advantage of in diagnosis of this syndrome).

(*b*) Usually cessation of the *menstrual flow* followed by the atrophy of the uterus and waning of sexual libido.

(*c*) Atrophy of breasts.

(*d*) Later developments being pruritis vulva, atrophic senile vaginitis, kraurosis vulva etc.

2. *The Indirect changes*: — With the cessation of the *Trophic* action of the ovarian hormones, there is excessive activity of the " Opposite hormones "

(*a*) Anterior lobe of the Pituitary producing adiposity, diabetic Insipidus, virulism etc.

(*b*) Thyroid-hyperthyroidism, glycosuria, etc.

(*c*) The Adrenaline medulla :—Vaso-spasm (either local or general), hirsutism, hypertension etc.

CASE. 1. Mrs. L. aged 41, had irregular menses for six months. History of pruritis vagina, cracking of the skin of the feet and hands, *feeling hot* all over the body lasting for an hour or so. Frequency of micturition since a month. Urine contained 3—4% sugar. Vaginal smear contained typical degenerated flat epithelial cells characteristic of lowered œstrin content of the body.

0·3 mg. of œstrone daily by mouth, and 1 mg. of œstrodial benzoate (10,000 I. B. U.) intramuscularly once a week were administered. 20 units of insulin and 15 units of Protamine zinc insulin were given subcutaneously every morning before breakfast. The insulin therapy was stopped after a fortnight, as there were only traces of sugar in the urine collected for 24 hours. After 10 weeks of œstrin treatment all symptoms cleared when the hormone was withheld gradually.

II. **Mental Changes.**—These may vary both in character and in degree and mostly depend upon the hereditary tendencies, temperament and emotional background. Emotional instability, changes in personality and mood, irritability and depression are some of the manifestations.

III. **Symptoms due to the Imbalance of the Vegetative Nervous System.**—The symptoms are due to the over-action of

the sympathetic system and any part of the body innervated by this system may be involved.

1. *Vascular System*;—Hot flushes must be mentioned as the most common symptom of vascular disturbance. These are due to the dilation of the cutaneous blood vessels and may occur at any time of the day. They especially occur after any excitement or emotional stress.

Vascular spasm which is either local or general, produces manifold lesions and symptoms.—Headaches, transient and recurrent hemiplegias, epilepsy,angio-neurotic œdema, acrocynosis, are some of its effects. In general, no part of the body is immune from the vascular spasm, either transient or recurrent, which produces ischæmia of that part with its resulting symptoms like pain, œdema, etc.

CASE. 2. Mrs. S. aged 48, has been having amenorrhea since 5 years. History of " Feeling chill " when worked for 2—3 hours continuously or exposed to cold weather for a few minutes, followed by clattering of teeth and fainting. Occasional migrainal attacks lasting for 2 or 3 days being relieved temporarily by veramon. Eyes were examined a few months ago and the error of refraction was corrected by proper lenses. However, headaches have been coming on as usual. B. P. 112/72.

Weakly intramuscular injections of 1 mg. of œstrodiol Benzoate (10,000 I. B. U.—Progynon oleosum) and 0·3 mg. of œstrone 3,000 I. U. daily by mouth were administered. There was rapid improvement in all symptoms and she was free from fainting attacks after a month of œstrin therapy. The treatment was continued for four months when she was free from all subjective symptoms.

2. *Gastro-intestinal System*:—Spasm of the varions sphincters as associated wlth the inhibition of the secretions is the underlying pathology. Clinically these are manifested as colics, irregularity of bowel action, achlorhydria and microcytic anæmia.

CASE. 3. Mrs. S. aged 42, having irregular menses since 2 months. History of having " Flue " a fort-night ago and ever since she has been retaining very little and feeling sore all over the abdomen. There was nothing abnormal in the abdomen except pressure over the abdominal aorta produced 'shooting pain' radiating towards the chest and legs. B. P. 110/70,

Vaginal mucosal smear was typical of lowered œstrin content in the body.

0·3 mg. of œstrone (3,000 I. U.) daily by mouth and 1 mg. of œstrodal benzoate (10,000 I. B. U.) intramuscularly once a week were given. After a month there was a marked improvement in the symptoms when the intramuscular therapy was stopped. Oestrone by mouth was continued for three months and then withheld gradually. She is free from all symptoms now.

3. *Allergic Reactions*:—These are very common. Arthritis, fibrositis urticaria, migrainal attacks and asthma are some of the manifestations. It seems not only to predispose but also to exaggerate, an allergic tendency.

CASE. 4. Mrs. N. aged 42, menses scanty since 3 months. History of semi-cranial headache since 5 years. Since 2 years the interval between two consecutive attacks has been getting shorter and the duration correspondingly increasing. Eyes were tested and even after wearing the prescribed glasses there was no improvement.

Oestrin therapy was given as 0·3 mg. œstrone by mouth daily and 1 mg. œstrodiol benzoate intramuscularly every week.

Magnesium sulphate (50%) was injected intravenously every 5th day. Starting with 2 c.c. the dose was gradually increased to 4 c.c. which was continued till the end of this therapy. In three months the migrainal attacks appeared rarely and with less intensity, when the intravenous therapy was stopped. However œstrin was continued for another month when it was gradually withheld.

CASE. 5. Mrs. S. aged 54, menopause occurred at the age of 44, (but not certain), complains of recurrent swelling of the ankles and knees with limitation of movements. Pain over the small joints of the fingers and tenderness of calf muscles. Urine contained only traces of albumin and no cells. B. P. 150/110. Insomnia and headache were common. Bowel action was irregular, usually constipated.

2 mg.of œstrodiol benzoate (20,000 I. B. U.) intramuscularly every week and 0·3 mg. of œstrone daily by mouth were administered. After three months pain over the small joints cleared when the injection therapy was withheld. After six months of œstrin treatment the patient was free from all symptoms.

Duration.—The duration of these manifestations is subject to as much individual variation as their severity. In many cases,

compensation usually occurs in two years. In certain individuals in whom there is continuation of excretion of a high content of gonadotrophic hormone, the disabilities seem to be permanent, if adequate œstrin therapy is not instituted.

Diagnosis.—The diagnosis of the menopausal syndrome is easy in many cases if proper history is taken. The onset of symptoms is usually associated with irregular menses or menopause. The vaginal mucous membrane shows typical atrophic changes due to the lowered œstrin content in the body. The smear shows dark-staining round cells of the deeper layers of the non-cornified epithelium, constant presence of red cells and the cytolysed flat epithelial cells. Besides these, there will be alterations in the vaginal secretions and its pH value and in the bacterial flora. However, as all these manifestations are to be regarded as expression of the general neuro-endocrinal disharmony which may also result from causes other than the dysfunction of the sex glands, all such causes must be evaluated and excluded.

Treatment.—The treatment can be divided into (1) *Endocrinal* and (2) *General*.

1. *Endocrinal Treatment* :—Since the symptoms are the result of the cessation of the secretions of the ovary and excessive activity of the gonadotrophic hormone of the anterior Pituitary, the rationale of the treatment is to supply the 'absent' hormones. But the aim should not be to replace the complete ovarian activity of the premenstrual life but rather to accustom the patient gradually to the new level of the endocrinal bases.

MODES OF ADMINISTRATION :—Fortunately œstrin is one of the very few endocrinal hormones that can be administered effectively by mouth. For practical purposes there are two routes of administration, the oral and the intramuscular. The latter is five times as effective as the former.

DOSAGE :—As the symptoms vary so greatly, so the dosage varies with each patient. There is no hard and fast line laid down for the œstrin dosage. Like all endocrinal therapies, this is also a substitution therapy, and as such must be started with small doses and gradually increased till the optimum maintenance dose which controls the symptoms is found.

I usually start with 1 mg.of œstrodiol benzoate (10,000 I.B.U.) intramuscularly every week and 0·3 mg. of œstrone (3000 O.I.U.)

by mouth daily. But the dose is altered wherever necessary depending upon the severity of the symptoms and the reaction to the drug.

LATENT PERIOD :—Like the thyroid, œstrin too has latent period before its effects are actually manifested. Usually a week or more has to be passed before perceptible effects are noted. But in cases like arthritis, hypertension etc., the improvements due to the drug will only occur after several weeks.

But to administer large doses of œstrin with the hope of obtaining miraculous results at a short time should be deprecated.

COURSE OF THE TREATMENT :—Since the principle of the treatment is to replace the œstrin to allow the body to adjust itself to the new inevitable changes brought about by the age, the therapy should be continued till such adaptability occurs.

As a general rule it can be mentioned that œstrin therapy must be continued for at least a minimum period of three months. Continuation or cessation of the treatment after that period depends upon the persistence or absence of the subjective symptoms.

Usually symptoms referable to the disturbances of the vegetative nervous system will be cleared in three or four weeks.

Symptoms due to endocrinal changes can undoubtedly be improved with œstrin therapy in a month or two.

Hirusitism may not be effected but its progress can be stopped. Usually there is a return of sexual libido with changes in the vaginal mucous membrane and fullness of breasts.

Regarding mental changes œstrin therapy can only restore an individual to that mental state of health which was enjoyed before the onset of the menopausal syndrome.

OESTRIN WITHDRAWAL :—*Bleeding*:—A word about "Oestrin threshold bleeding" of the uterus during the course of hormonal treatment must be mentioned. If this occurs, it is a signal that the dose of œstrin must be lowered as the optimum maintenance dose will be less than this. It is found that the dose of œstrin required to produce that threshold bleeding is about five times higher than that required to relieve the subjective symptoms.

To avoid any alarm it is advisable to inform the possibility of such uterine bleeding during the course of treatment.

2. *General Treatment* :—General treatment is no less important. Sympathetic outlook and tolerant hearing are as essential

as the psychotherapy in these conditions. Patients whose vegetative nervous system is very imbalanced require sedatives of barbitone group. The pre-existing maladies like the heart disease which may be aggravated during this phase of life should be attended to.

Summary and Conclusions.—I have tried to mention briefly the wide range of morbid changes of the menopausal syndrome and the treatment by œstrin therapy.

In conclusion it must be mentioned again that almost every woman at this epoch of life will be a subject of this malady of some varying degree. The symptoms lack uniformity both in degree and in pattern, with the result they simulate other conditions. A proper diagnosis is essential for an effective œstrin therapy. This therapy can only restore an individual to that state of health which was enjoyed before the onset of this syndrome. Like other endocrinal therapies, œstrin treatment must be prolonged with adequate dose.

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The Sexual Hormone Therapy in the Diseases of Women

BY

Kapur, Basheshar Lal,

Hon: Med: Superintendent, Lahore Maternity Hospital.

THE most modern treatment of diseases of women lies in the administration of sexual hormones. The causes of the hormone deficiencies are still unknown, except that the ovaries are very sensitive. Even the prolonged fevers can decrease or stop the menstruation. So the greatest drawback of hormone therapy is that it is a substitution therapy and not a causative one. The possibility remains that the organs may take up their function or remain absolutely refractory or the success should be visible during the treatment only.

At the age of puberty the ovaries begin to function with two-fold duties, the vegetative and the germinative.

The vegetative function lies in the proliferation of the mucous membrane, the growth of the uterine musculature and the genital organs on the whole and their impregnation with blood, Lymph, etc. Moreover it gives the secondary sexual characters.

The germinative function lies in the secretion stage of the uterine mucous membrane and in the conduction of further pregnancy.

Both the above functions are governed by the gonad hormones of anterier pituitary glands, Prolan A & B. The A acts on the follicle and B on the corpus luteum.

Primary Ovarian Insufficiency.—The hormones can get scanty at any stage of life. If it happens just after puberty the result is primary Amenorrhœa. Further growth of the uterine muscle ceases. The genital organs remain undeveloped and it is also possible that the secondary sexual characters do not develop nicely. The hips and mammæ make no progress. The young girls begin to look like boys. In some cases it comes to severe Leucorrhœa because the vaginal mucous membrane is lacking in the hormones and thus the interspaces of the mucous membranes let out the fluids from the blood. Such cases do quite well on hormone treatment but very high doses of folliculin are required as illustrated in the cases below :—

S.D., Age 18, beginning of the menstruation at the age of 14. She menstruated thrice. Since then 2 years have passed; there have been no menses at all. She has developed nervous symptoms, loss of memory etc. The mammæ have become small; her looks are more like a boy.

First course of folliculin :—30 mg. of the medicine per dose were given for 4 weeks, triweekly. The girl got the menses for two days a week after the last injection. Nervous symptoms disappeared. Then there were no menses again. After waiting for 8 weeks she was given a second course of 20 mg. of follicle hormone triweekly for 3 months and she got well and the ovaries took up their function again. She was watched for 6 months. Her menstrual periods were quite regular.

Mrs. M.,28 years old, married 8 years back. Never menstruated. She complained of itch in the private parts for the last 4 years, during discharge. She is very nervous and irritable in temper. On examination the vulva is normal, uterus almond gross and ovaries not palpable.

Treatment.—30 mg. follicule hormone were injected triweekly and one tube of Prolan once weekly, for 6 weeks. At the end of the course she started profuse bleeding and it lasted for 3 days. For 8 weeks there was no more bleeding. Another course of injections was given. The so-called menstruation started again, but did not recur for two months. The patient felt quite happy with this treatment and all her troubles disappeared. Since then the patient gets her injection from time to time and thus feels psychologically quite fit. Occasionally she gets her menstruation. The uterus has increased a little in size.

Secondary Amenorrhea and Hypomenortion.—In this condition the women have had their menses for a certain period of their life after which it decreases considerably or stops absolutely. The doctors usually suggest curettage. The operation does more harm than good; if a slight flow of blood is already existing, it disappears absolutely. The Follicule hormone is the only proper medicine for this disease. In such cases the patients get 2 mg. twice weekly for four weeks. Usually it is enough. If it is not the case, one or two more courses can be prescribed.

Climacterium.—In climacterium the vegetative function stops naturally. On account of the loss of protective element (follicule hormone) it may result in senile vaginitis, inflammation

of the cervix and the uterus (pyometra) and pruritis. Some of the cases may complain of Eczema. If the climacterium is very abrupt, the joint or the heart troubles may come on. In order to achieve a magic-like success 50,000 units of ovarial hormone should be given at a time; if some symptoms still persist these doses can be repeated.

Dysmenorrhœa.—Dysmenorrhœa is very difficult to treat. The hormone therapy is effective only in some cases with the infantile uterus. In other cases it has either temporary effect or gives no relief at all. In an observation of 50 cases of mine, 25 had no relief at all, 15 were relieved for 3 months. They all had infantile uterus. Three got worse. They had severe pains.

Sterility.—The hormone treatment without studying the cause of sterility can do no good. One should examine the semen taken from the vagina after two hours of sexual intercourse. Further the hystero salpingography and the tubal inflation should be done and frigidity considered. The hormones would help only in infantile hypoplastic uteri and the above examination should show nothing pathological.

Frigidity.—In the Frigidity ovarial hormones are being prescribed lavishly. In my opinion psycho-analysis is the only treatment of this disease. There is always some unknown psychological trauma existing and it has got to be brought to light. As soon as the object is achieved the patients are cured.

Lactation.—The lactation producing substance and folliculin are two antagonists. If no lactation is desired after child birth 10,000 units of folliculin may be injected daily for 4—5 days.

Prolonged Bleeding.—This can either be due to the follicle persistence or due to the persistence of corpus luteum without pregnancy. The former can be determined by examination per vaginum when one of the ovaries is unnecessarily enlarged and is tender.

Either it should be evacuated by a syringe with a big needle or one should inject high doses of corpus Luteum. In the cases of corpus luteum folliculin should be prescribed. The modern literature talks of testicular injection. I have tried in 5 cases with success.

Habitual Abortion.—In cases of primary insufficient infantile muscle of weak uterus which cannot cope with the demands of pregnancy and still becomes pregnant one should

prescribe folliculin 50,000 units every fourth day for about six weeks. Further, the cases of abortion with normal uterus suggest corpus Luteum deficiency. They usually improve on progestine injections. If the cause remains unknown then vitamin E is best indicated.

Administration of Hormones.—The cheapest method of administration of Hormones is the urine of the pregnant. 100 c.c. of urine is sterilised by heat and given per rectum for 20 to 30 days. It helps only infantile uterus. This method is fairly unhygienic and the ladies would not submit to this type of treatment.

The hormones are available in the market in the form of tablets. They are practically useless because a greater quantity of the medicine is discharged in the liver and very little reaches the blood. Tablets of Progynon C are published recently. They are supposed to reach the blood circulation safely without being destroyed in liver but they are not yet available in India.

Next form of administration is per injection. This is the only effective method, but it is so very expensive that a man of ordinary means cannot afford it.

The local application for folliculin has won its praise in the literature recently, but I tried it only in four cases of infantile uterus and it was a great success. According to Grubrecht and Arnold Loeser one requires smaller doses. They advocate a stab of 4—5 c.c., of cocoanut oil containing 500 I. U., I applied these stabs in the mouth of cervix for 10 days regularly.

Reference:

Of the Local Action of Follicle Hormone on the Uterine Mucous Membrane from Grubrecht and Arnold Loeser Kliniische Wochenschrift, 1937, II, 1086.

Puberty *vs.* Menopause

BY

J. J. Desai, M.B., B.S., L.M.,

Gynaecologist, Ahmedabad.

Puberty.—Puberty is one of the critical periods in the life of a woman. It is the transition from girlhood to womanhood, and is characterized by certain anatomical and physiological changes, which indicate the awakening of sexual apparatus to activity. This awakening marks the beginning of what is virtually new existence for the girl. Till now, the growth was as a result of "Potential Energy" derived by blending up of an ovum and spermatozoon; with the awakening of sex organs, however, the burden of further growth is taken up by them. It brings about profound influence on Physical and Mental growth of individual.

Till this period both the boy and the girl appear almost alike but now (in the girl) the pelvis enlarges, the limbs round out with fat and the angularity of the body is replaced by graceful curves. The general carriage of the body is more womanly and dignified.

The breasts enlarge and become more prominent, fuller and firmer; the hair takes on more luxuriant growth. The external genitalia grow larger, darker, more vascular, have more secretion and emit a faint characteristic odor.

The voice also is altered, becoming more fuller, lower in scale and more melodious.

The mind undergoes alteration in intellect, will and emotions. The will especially during the change becomes uncertain, and the girl loses to an extent the control over it. Hysteric manifestations are quite common. The intellect broadens, new perceptions give a grander conception of life. The girl feels that a great transformation is taking place in her being, and the pride of womanhood and of anticipated wife and motherhood swells in her. The emotions during the period of change also become unstable. The girl laughs and cries often without reason; is happy, gay or sad and melancholy without cause. One must watch these manifestations lest they may exceed the normal. The inclination towards the male increases, while at the same time a sense of modesty appears. Libido artificially stimulated, usually does not fully develop until after marriage.

This transformation is the outward expression of the changes

occurring in the internal organs of generation and in the ductless glands.

The uterus is developing rapidly; the vagina lengthens and becomes rugous, the tubes grow longer, the ovaries take on a special activity, ova develop, the Graffian follicles ripen, in short ovulation begins.

With ovulation comes the ability to reproduce. Hypertrophy of thyroid and pituitary gland is constant during the period, and it is certain that the hypophysis has much to do with the changes above mentioned.

Over-function of the anterior lobe is associated with over-activity of the ovaries. The most important sign of the advent of puberty is the appearance of the menses. Puberty is marked by the inauguration of two new functions—ovulation and menstruation.

Menstruation and ovulation are co-related. Menstruation can't occur without preceding ovulation but ovulation can occur without any menses. Ovulation occurs in the inter-menstrual period about 13th to 15th day after last menstrual period.

Climate plays a less important part than race in the determination of the age of puberty, and that the racial factor is perhaps not of as great importance as the individual one, which embraces such considerations as environment, education and temperament, exposure or non-exposure to sex stimuli, nutrition etc.

The usual age here is 13 to 15. It is the period when the girl needs real guidance, sympathy and good association.

Menopause.—'The change of life,' 'the climacteric' 'losing the periods' etc, take place between 40 to 50 years. Thus the average length of the reproductive era of a woman's life is about 30 years.

The climacteric occurs earlier in sterile women, women in cold than in warm countries, in the poor than in the rich, in black than in white women. If puberty is early, menopause is late, the sexual function being strongly developed; but if the reproductive organs are overused or diseased, the menopause may be earlier.

The influence of maternity upon the menopausal age has been studied by the *Sanes* who concluded that active sexual life, with many child births, tends toward a late menopause, while unmarried women are more apt to cease menstruating comparatively early.

Heredity plays an occasional part in determining the climacteric. Usually the advent of menopause is announced by alteration, diminution, or irregularity of the flow. Cessation of menstrual function is one of the manifestations. In some it terminates quite abruptly. More frequently the cessation is a more gradual one, with periods of amenorrhoea of longer or shorter duration before permanent amenorrhoea ensures.

The cessation of menses especially in multi-para is often attended by nervous symptoms such as loss of vasomotor control, flushing of face and the body, flashes of heat and cold, hyper excitability, cerebral and spinal irritability, indigestion, constipation, nose bleed, profuse sweats, hysteric manifestations and many of the symptoms that accompany the beginning of the function.

Psychic symptoms consisting of irritability or pronounced tendency to depression if severe lead to 'Menopausal Insanity' along with other causes at work.

There is also present palpitation of heart and a moderate rise of B.P., to be distinguished from pathological hypertension of middle age.

Pruritis—general or localised and skin eruptions of one or more form may occur.

There is no characteristic effect upon the libido-sexuals. It may become markedly increased for the fear of conception is removed.

The body puts on fat on the back of thighs, buttocks or abdomen, hair often appears on face and the habit as in general takes on a masculine type. All these are the result of the atrophy of the genitalia combined with changes in the ductless glands. The ovaries, tubes, uterus etc. all undergo a process of senile involution and atrophy.

A well known author 'Cuerier' writes :—" All that tends to develop and strengthen the physical part of women, to render her *insensitive* to the ordinary ills of life, to make her forgetful of self, is favourable to a normal menopause. Races and nations which are phlegmatic, cold and apathetic, women with outdoor life and manual labor, peasants etc. complain little, while the sensitive,passionate nations, highly organised, nervous, city-bred, women of fashion, women who fret and worry are apt to experience disagreeable and annoying features of menopause." Women with frequent abortions and worries, disappointments, overwork, privation, exposure, suffer frequently.

There is universal retrogression in all organs at menopause.

The Problem of Nutrition and Pregnancy

BY

Subodh Mitra, M.B. (CAL.) M.D., (BERLIN), F.R.C.S. (EDIN.), F.C.O.G.

Associate Professor of Obstetrics and Gynaecology, Carmichael Medical College;
Surgeon, Sir Kedarnath Maternity Hospital;
Visiting Surgeon, Chittaranjan Seva Sadan, Calcutta.

THE importance of Antenatal Hygiene is still doubted in certain quarters due perhaps to the fact that Antenatal Hygiene in its true and proper sense is not carried out. The problem of nutrition forms the most important part of the Antenatal care because each individual case will be benefitted and a major part of abnormalities can be prevented by taking proper care of nutrition.

It is invariably found that most of our women suffer from general malnutrition during the reproductive period. Repeated child birth, strain of rearing them up, want of proper nourishment and ill-balanced diet bring forth physical wreckage. Additional strain of subsequent pregnancy makes the condition worse.

It has been calculated that during pregnancy body requirements would be about 2500–3000 calories which are roughly distributed as follows:—

Protein—100—125 gms. x 9.1=410—512 Calories.
Fat—50—100 gms. x 9.3=465—930 Calories
Carbohydrates—400—500 gms. x 4.1=1640—2050 Calories.

Of the minerals, Calcium, Iron and Phosphorus are of great importance because there is a constant drainage of Calcium and Iron from mother to the fœtus. Phorsphorus is required for assimilation of Ca & Fe.

Besides these, Vitamins play a great role during pregnancy, the most important of them being Vitamin A, Vitamin B_2 complex, Vitamin C, Vitamin D and Vitamin E.

Vitamin A.—has got anti-infective and anti-toxic properties. It helps to neutralise toxins, builds resistance and prevents infection during the puerperium. It is found in fats of animal origin

e.g., milk, butter, creams, eggs, liver, cod-liver oil and vegetables *e.g.*, carrots, cabbages, bananas, tomatoes and spinach.

Vitamin B Complex.—contains anti-anæmic factor. Deficiency of Vitamin B fails to maintain proper nutrition and frequently upsets the digestion. Best sources are germinating seeds, yeast, marmite or Betamite. Some of the anæmias of pregnancy respond well with Iron treatment when Vitamin B is combined with it.

Vitamin C.—This contains the anti-scorbutic factor. It prevents dental caries and increases resistance to infection. It is found in fruits, green vegetables and salads.

Vitamin D.—This is essential for absorption and assimilation of Calcium and Phosphorus, for the normal calcification of bones and the prevention and cure of rickets and osteomalacia. It is found in nature in fish liver oils (Cod-liver oils), yolk of egg, milk and butter. It can also be prepared from ergosterol by suitable irradiation by Ultra-Violet Rays.

Vitamin E.—contains anti-sterility and anti-abortive factors. Deficiency in it leads to early and recurrent abortions due to death of the ovum.

These vitamins have been standardised into international units and their requirements during pregnancy are:—

3000 Units of Vit. A. (equivalent to $2\frac{1}{2}$ pints of milk and $5\frac{1}{2}$ oz. butter or carrot).

200 Untis of Vit. B. (equivalent to 20 gms. of dried yeast, 1 lb. of potato, 150 gms. of whole wheat)

300-600 Units of Vit. B_2 (equivalent to 30 gms. of dried yeast).

300 Units of Vit. C. (equivalent to one orange, 1 oz. of lemon, 2 oz. of tomato 7 oz. of new potato,)

1000-3000 Units of Vit. D. (equivalant to 3 lbs. of butter, a few eggs or herrings).

It would certainly be advisable to get the Vitamin units from daily food, but sometimes one or other might be specially deficient which should be supplied by commercial preparations.

The proper balancing of diet leads to the prevention of various grave conditions as well as amelioration of certain already established fatal condition.

De Snoo and others assert that severe Toxæmia of Pregnancy can be entirely cut short by elimination of salt from the diet of

a pregnant woman specially during the third trimestrium. This would be a great achievement in the field of obstetrics, even if the assertion of De Snoo be partly true.

Quite a good number of women are already anæmic before the subsequent conception, which makes the condition rather fatal with the progress of pregnancy. If diets containing Liver, Vitamin B complex, Vitamin C and Fe are administered from the beginning the severe type of pregnancy anæmia can be avoided thus reducing the maternal mortality to a great extent. Vitamin A and Vitamin D will help in fighting against the puerperal infection. The greatest toll of maternal mortality is taken by Puerperal Sepsis, toxæmia and anæmia of Pregnancy and one expects much favourable results in this direction by proper adjustment of diets.

What should then be the proper and rational diet of an expectant mother ?

The average ordinary Indian diet contains too little proteins almost all of which is of vegetable origin, too little fat, too much carbobydrate, and as such lacks in required calories. It is also dangerously low in Vitamins, specially A and B ; and it is also deficient in calcium, phosphorus and iron as compared to a well balanced diet.

" The following is a type of well balanced diet recommended for a pregnant woman :—

Atta	...	3	Chattaks.
Rice (Home pounded or parboiled)	...	3	,,
Dal (preferably moong, arhar or Bengalgram	...	1	,,
Meat or fish	...	1	,,
Milk	...	8	,,
Vegetable oil	...	$\frac{1}{2}$	,,
Ghee	...	$\frac{3}{4}$	,,
Root Vegetables (potato, carrots, beans, etc.)	...	4	,,
Leafy vegetables (cabbage, etc.)	...	4	,,
Fruits	...	2	,,

This diet will contain 85 gms. of proteins, 90 gms. of fat and 373 gms. of carbohydrate, the total caloric value being 2652. With such a diet making 10% deduction for waste during cooking etc. in all the items, the available protein is 76.5 gms, fat 80 gms. and carbohydrates 340 gms. and mineral requirements will also be amply satisfied and net calories available will be about 2400.

In this connection it should be remembered that minimum requirements during pregnancy are much higher than those of normal health." (R. K. Pal by personal communication).

Even if the supply is quite up to the mark, the assimilative power of the mother might be at fault due to gastro-intestinal disturbances and various other reasons. So every effort should be made in these cases to correct any such disturbances to ensure proper assimilation.

For practical purposes we can study the dietetics in 3 different groups according to 3 trimesters (or three monthly periods) as certain food principles are particularly more of value in different terms of pregnancy.

During first three Months.—During the 1st trimester *i.e.* the three earlier months of pregnancy, there is very little increase in caloric requirements of the body from ordinary life.

There is greater demand of carbo-hydrates by the growing fœtus. The pathology of pernicious vomiting of pregnancy simulates exactly that of carbohydrate starvation. The detoxicating function of the liver is greatly hampered due to the depletion of glycogen (reserve carbohydrate) from the liver cells and so this favours accumulation of waste and toxic metabolic products giving rise to the state of early toxæmias of pregnancy. Carbohydrates also help to maintain the normal alkalinity of the blood and they are essential for the complete combustion of fats in the body. So the importance of adequate supply of carbohydrates in the diet in the earlier months of pregnancy, for reducing the incidence of early toxæmias, cannot be over-estimated.

Best sources of the Carbohydrates are :—

Cereals :—Home-pounded rice, puffed rice, etc ; Atta (wholemeal flour), suji, (semolina), brown or whole meal bread, toasts, porridge, biscuits etc. and potatoes.

During 4th, 5th and 6th, Months.—During the mid-trimester, the mother is comparatively free from toxic manifestations. The fœtus grows more rapidly and so there is a greater demand for nutrition from maternal resources. She must be given a well-balanced diet of the above caloric requirements. Periodic weight-taking of the mother may serve as a control of the proper nutrition of the mother. The mother increases in weight, as the pregnancy advances which is more evident during the 2nd and 3rd trimesters (about 3 to 3½ lbs. a month) due to the growing fœtus and increase in the maternal tissues, the uterus, the breasts and the blood volume. This increase in weight is very little

evident during the first trimester. If the increase in weight is less, it might be assumed there is under-nutrition due to deficient intake or improper assimilation. If there is excessive gain in weight, the diet should be restricted and more exercise should be advised. Physical exercise of the nature of walking and light domestic works must be undertaken throughout the pregnancy. Frequently we find in the early and threatening cases of toxæmias, there is sudden and excessive increase in weight of the mother, which gives us a timely warning.

The protein requirements are not increased to a great extent during pregnancy. The supply of nitrogen for the building up of the tissues, both maternal and fœtal, comes from the breakdown of proteins. There are two sources of supply, the animal and vegetable. Meat, such as beef, and mutton should be avoided due to high fat content. Egg should be given, one a day ; this also supplies the calcium. Milk is the best food to supply the necessary requirements of the pregnant woman. Not only its proteins are easily assimilable but it gives an additional supply of calcium, phosphorus and vitamins A and D. Fresh cow's milk should be given in liberal quantities, from 1½ to 2 pints a day throughout the pregnancy. Milk contains 3.3% of protein and 3.7% of fat besides its other useful constituents. 2 pints of milk yield about 10 grs. of calcium which is necessary for a pregnant mother. Milk may be allowed in other forms as Dahi, Ghol and Channa etc.

Fats in the form of cheese, ghee and butter should be allowed only in strict moderation. Heart-burn, acidity, indigestion which are complained of frequently are due to excess of fat in the diet in many cases. Fried foods should be curtailed as far as possible.

Mineral Salts.—The mineral constituents of the human body amount to 4.4% and all these are supplied with food, particularly in milk and vegetables. Among the different mineral constituents, Sodium Chloride or common salt, Calcium, Phosphorus, Iron and Iodine play important roles.

Calcium and phosphorus are the most important minerals needed for the human body. About 85% of the mineral elements of the bones consist of calcium phosphate. The daily requirements for an average sized adult is about .63 gram. The demand is considerably increased during pregnancy and lactation. The fœtus requires a large amount of calcium particularly in the later months of pregnancy. During lactation, there is an additional

drainage of calcium in the milk secretion. The undue depletion of maternal calcium resources, in the face of inadequate supply, leads to varied disturbances *e.g.* cramps, backache, twitching of muscles, dental decay, osteomalacia and toxæmias and also the child suffers from rickets and mal-development. Milk is again the best source for this calcium element.

The metabolism of Phosphorus and Calcium goes hand in hand. Phosphorus is also essential for the growth of bones and good bone calcification. The minimum daily requirements are about .88 grm. It is a constituent of cell nucleus and necessary for cell multiplication. As a soluble salt in the blood it helps to maintain the acid base equilibrium of the blood. Sources of supply are milk, egg-yolk, liver and vegetables.

Deficiency in Calcium and Phosphorus may result in faulty bone formation and perhaps to premature and dead babies.

The *Supply of Iron* in food is very small and lacking in most diets. In addition to the deficient supply, there is drainage of iron by the growing fœtus. As there is no reserve store of Iron in the body and there is constant demand both by the mother and fœtus, if the intake of iron is not adequate, the ultimate result is anæmia. Iron forms the main constituent of Hæmoglobin which is the carrier of oxygen to the tissues. The average requirements are about 15 mgrms. a day. One of the best sources of iron is meat, specially the liver. Other sources are eggs, spinach and green vegetables. It is advisable not to depend upon the dietetic supply of Iron if there is anæmia present but to prescribe adequate doses of Iron in some medicinal form.

Though the requirement of *Iodine* is very small still it is none the less important. Iodine in minute doses is essential for the preparation of Thyroxine, the active principle of thyroid gland. Best sources are sea-water and salt water fishes, also vegetables, fruits and cereals grown near sea-coasts. Cod-liver oil and iodised salts should be prescribed in case of deficiency which results in maternal simple goitre.

The only salt commonly consumed as such in NaCl or common salt which is found in small amounts in most foods, fruits, vegetables, milk, eggs and more so in meat. The average requirement is about 1—2 grams. only of NaCl a day. But the average intake is about 4—5 times more in our daily life. We use salts more liberally in our vegetable diets than what is physiologically necessary. Excessive salt intake must be restricted from the dietary and particularly so when the kidney functions are at abeyance and there is impending danger of toxæmia supervening.

Salts are not properly eliminated but retained in the tissues and water is also taken up to maintain the osmotic relationship resulting in the water-logging condition of the tissues.

During last three Months.—During the last trimester, a slight increase of fat intake is necessary as it helps in increasing the clotting time of maternal and fœtal blood. It also promotes, at the same time, the absorption of a good amount of calcium.

Much has been said about the protein intake during this period of pregnancy. Nitrogen requirements by the fœtus is considerably less during the later months and so there is a tendency for the storage of nitrogen and accumulation of intermediary products of protein digestion. In an effort to eliminate the waste and toxic nitrogenous products, there is more strain on the already over-worked kidneys, which are further damaged and thus a vicious circle is established and ultimately toxæmic manifestations appear. So it was held that protein intake should be definitely curtailed towards the later months. But this curtailment should not be increased to a great extent because of the fact that protein is necessary to maintain the hæmoglobin content of the blood and to prevent maternal and fœtal hæmorrhages by shortening the bleeding and coagulation times. Meats should be sparingly used. Eggs may be added. Milk is the best form and is to be taken in good quantity daily.

Another important factor is common salt which must be restricted during the later months of pregnancy, specially when the impairment of kidney functions is present, as it helps the development of late toxaemia. Common salt should be taken off from the diet and a salt-free diet is advised mostly of green vegetables which contains mostly potassium salts.

The following foods might be considered and a suitable menu may be framed out for her daily requirements.

Cereals.—Rice, parched rice, Atta, Suji, porridge, whole meal bread, toasts.

Vegetables.—Potatoes, beans, parwal, peas, bhendi, cabbage, cauli-flower, tomatoes, cocoanut and leafy vegetables in all forms except fried.

Fruits.—all fresh fruits available during the season.

Egg.—Duck's or Hen's (not fried)

Fish.—Mud fish *e.g.* kai, magur, singee, fresh water fish except fatty ones *e.g.* hilsa, chetal etc.

Meat.—Beef, mutton, pork to be avoided.

Chicken, Liver, kidneys, brains.

Milk.—Fresh Cow's or goat's milk in any form. Buffaloe's milk to be avoided.

Sweets.—Honey, molasses, jam, jelly. Sweets prepared in butter and ghee to be avoided.

Fats.—oil, butter and ghee sparingly. Dishes cooked in fat should be restricted.

Fluids.—Plain water, Dab water, Lemonade, oranges, aerated water etc.

The principles of dietetics will be, in short, a mixed and well-balanced diet consisting of (1) abundance of carbo-hydrates (particularly in 1st and 2nd Trimesterium) (2) Moderation in proteins (more of milk) and (3) least of fat and plenty of liquids with fresh fruits and green vegetables.

Fresh air and sunlight should also be enjoined along with the intake of simple nourishing and easily assimilable foods. Sedentary habits should be deprecated and open air exercises in moderation, such as walking, and light domestic works should be undertaken throughout the pregnancy.

In conclusion, it might well be asserted that with careful supervision over the nutrition of an expectant mother, many of the so-called ailments and accidents of pregnancy, specially the toxaemias, can be avoided and relieved to a great extent. We can thus definitely lower the percentage of morbidity and mortality and encounter less foetal deaths, which should alone be our guiding principle in the antenatal campaign.

Ectopic Pregnancies

BY

Ida Scudder, M.D.

Women's Christian Medical School, Vellore.

THIS paper is written primarily because I believe many an ectopic gestation is undiagnosed, and the patients either die at the time of rupture of the ectopic; or if they recover, become semi invalids for the rest of their lives unless some other condition necessitates the opening of the abdomen, and the pelvic condition is discovered and operated upon.

According to latest statistics, nearly 6% of the maternal mortality in New York City is due to Ectopic gestation.

History of Ectopic Pregnancies.—"The history of ectopic pregnancy parallels the great advances that have been made in the pathology of the female generative organs and in abdominal Surgery".

We get a bird's eye view of the subject from Schumann. It appears that the first recorded case of extra uterine pregnancy was that of Albacasis an Arabian physician living in Spain, about the middle of the eleventh century.

The earliest definite surgical interference for the removal of an ectopic foetus was done by Primerose in 1594. Until 1604 all cases on record were examples of full term or long retained secondary abdominal pregnancies. Riolan in 1604 recorded a case of tubal gestation with rupture, and classical symptoms. Mauricean in 1669 elaborately described a case of extra uterine pregnancy, his deductions giving rise to a bitter controversy.

The first suggestion of a true understanding of the cause of phenomena of extra uterine was found in the works of Pierre Dionis published in 1718.

The premier operation for extra uterine pregnancy in America was that of John Bard, a New York Surgeon in	...	1759
The second by Baynham in	...	1791
The third by McKnight of Philadelphia in	...	1795
The fourth again by Baynham in	...	1799
There are no further reports of cases in America until the fifth was performed by Wishart in.		1823
The sixth by Stephens in	...	1846

Only six cases in 87 years.

Lawson Tait in 1883 thoroughly established the operative treatment of ectopic pregnancy. He had been urged to operate for this condition in 1881 by a doctor who correctly diagnosed a case of rupture with internal hæmorrhage. Tait refused and the patient died. The first patient he did operate on died also but he attributed his failure to faulty technic and having the courage of his conviction he continued to operate and of the next 40 patients operated on for ectopic gestation, only one died.

It is interesting to note that even then there was some disinclination in America to recommend operative treatment. Electricity was advocated, the object being to destroy the life of the ovum by a strong galvanic current. Even as late as 1880 Howard Kelly of Baltimore said "he found no fault with those who use electricity in the early months, while holding themselves in readiness to perform an abdominal operation upon the appearance of the first untoward symptoms."

The first operation for ruptured ectopic in the tragic stage was done in New York by Briddon in 1883. In 1891 a comparison was made demonstrating the beneficent effect of operative treatment—comparing 123 cases operated on, with 121 treated palliatively with a mortality of 5·7 against 86·89 per cent. From this time forward surgical intervention became more and more firmly established as the procedure of choice. According to Schumann pregnancy is *extra* uterine in every 300 cases.—Curtis.

Race seems to have no influence on occurrence of Ectopics. We find them frequently in India and the East as well as elsewhere.

Age:— Ectopics occur in all ages of menstrual cycle with fairly equal frequency but the most frequent is between 25 and 35. Ectopic gestation is the development of a fertilized ovum at any point between the Graafian follicle and the cavity of the uterus.

Cause.—Much has been written on this subject.

1. Mechanical interference to the progress of ovum. Compression of the tube causing obstruction to the lumen due to:—

   (*a*) Pelvic tumours.

   (*b*) Intramural fibroids.

   (*c*) Polyps within the tube.

   (*d*) Cicatrical bands, resulting from chronic inflammations (caused by Syph. or T. B. or G. C.) which distort the lumen of the tube.

   (*e*) Any condition which interferes with normal peristalsis--as inflammation of the mucosa causing damage of the vibratory cilia and preventing the normal function.

   (*f*) Tortion of the tube, either congenital or acquired causing diverticula or blind pockets.

2. Congenital abnormalities.

   (*a*) Spiral twists.
   (*b*) Blind ending of ostia.
   (*c*) Diverticula and blind pockets.
   (*d*) Persistence of the foetal type of long tube.

3. Tubal spasm.—This has been known to follow tubal insufflation.

4. The ovum itself may have impaired vitality due to syphilis or Tuberculosis—or an unusually large ovum.

5. Erkstrand believes that the appendix may be an important factor in the ætiology of tubal gestation of the right side.

Inflammatory condition of tube—with patches of the surface denuded or normal epithelium which causes arrest of E. ovum.

Ectopic pregnancies have a tendency to be repeated commonly in the opposite tube but has been found repeated in the same tube. Twin Ectopics are not rare.

The various sites of implantation are shown below:—

1. Ovarian.
2. Tubo—ovarian fibriæ.
3. Fimbriated extremity.
4. Ampulla—the commonest.
5. Isthmial.
6. Interstitial—utero tubal.
7. Intraligamentous rupture=broad ligament hæmatoma.

Pathology.—Uterus enlarges as in a normal pregnancy. The diagnosis of an ectopic is made more difficult because of the enlargement of the uterus which may attain the size of a six weeks pregnancy.

Changes occur in the endometrium—decidual changes which are characteristic of a normal pregnancy. The decidua is cast off at about the 8th or 12th week—or when the fœtus dies. At this time there may be slight bleeding or "spotting". Some authorities believe that uterine bleeding does not occur as long as the ovum is alive and healthy.

Ovarian pregnancies develop for longer time than a tubal,

as there is more room for the ovum to grow and it may escape into the abdominal cavity and go on to full term.

In Vellore we had a few full term abdominal pregnancies, one, a Muhammadan woman, nine months pregnancy which was easily diagnosed as an abdominal pregnancy. She utterly refused operation, though we confidently told her we could save her baby. She returned to her village and two months later returned to Vellore saying the fœtus was removed. Adhesions to bowel made the operation very difficult. The woman made an uneventful recovery.

Morbid Anatomy in Tubal Pregnancy from Bourne's Gynæcology and Obstetrics.—*Modes of Implantation*:—The ovum embeds itself either in a furrow between two ridges of mucous membrane, or on the summit of a ridge (rare). It immediately burrows beneath the epithelium, and comes to lie in the submucous tissue.

By this time the trophoblast is well formed, and erodes the adjacent muscle, opening up the maternal vessels.

When in the ampulla, the expanding ovum pushes the capsular membrane (pseudo-reflexa) before it bulging into the lumen.

Later the capsular membrane fuses with the adjacent epithelial lining of the tube, obliterating the lumen.

When in the isthmus the lumen is so narrow that expansion of the ovum cannot take place into it, but it invades the whole of the tube wall, separating the mucosa from the underlying muscular wall.

Decidual formation is sometimes, but rarely partially present.

Capsular membrane is not of decidual formation. In its earliest stage it is made up of connective and muscular tissue, with possibly a few decidual cells, covered by the mucous lining of the tube.

Placenta.—Formation differs from that of normal pregnancy, in as much as the true decidua basalis is absent.

Hence fœtal villi directly erode the muscular wall of the tube and come to lie under the peritoneum.

Sometimes the villi erode the peritoneum and cause hæmorrhage. More often, rupture is due to a sudden extravasation distending the already thin-walled sac.

"The ovum, in making its own bed, digs its own grave". (Werth). Microscopical structure of the fœtal part of the placenta is identical with that of uterine pregnancy.

Structure of the Foetal Sac.—Formed chiefly by the wall of the tube, which becomes very vascular.

Very slight hypertrophy of muscular fibres, with later disappearance of muscle, so that the full-term sac is a fibrous envelope. Sac is surrounded by peritoneal lymph and adhesions.

Uterine Changes.—Enlargement due to muscular hypertrophy during first three months.

Decidual formation.

Exfoliation and expulsion of decidual membrane, either in fragments, or in one cast, on the death of the ovum.

The presence of decidual shreds in the discharge is of great diagnostic importance.

Tubal pregnancies may terminate:

(1) In death of fœtus and absorption.
(2) Formation of a mole which may be absorbed.
(3) Tubal rupture—or abortion through the fimbriated end of the tube.

Symptoms.—These show a perplexing variation and no pelvic disorder is so easily misinterpreted.

Amenorrhœa masked by irregular bleeding.

Differential diagnosis.

Pelvic inflammatory disease.

Salpingitis.

Congenital malformations—All may confuse our picture. A very careful history must be taken, if the patient is seen early, before rupture. In India with ignorant village women this may be most misleading, though as we all know some of the most intelligent patients give a confused history.

Points to be considered—Late puberty, amenorrhœa, dysmenorrhœa, post partum sepsis, etc., etc.

Curtis states that 19·5% of his ectopic cases occurred in the first pregnancy.

If a pelvic inflammation exists, a careful history of abortions, previous labours, especially the lying-in-period, if there has been slight fever, and long convalescence—(*b*) sterility after abortion. There is a great variety of symptoms. The chief ones which lead to a clear diagnosis are:—

(1) Some abnormality of menstruation—delayed period, etc., etc.
(2) After a period of amenorrhœa—"Spotting of blood",

(3) Pelvic discomfort. Body of uterus enlarged, pushed forward, easily palpable; Cervix pushed forward and looks in normal direction.

(4) Agonizing pain in the pelvis.

(5) Evidences of internal hæmorrhage.

(6) Retention of urine quite uncommon.

Let us study them as suggested by Curtis:—

Symptoms occurring (1) before, (2) at the time of rupture and those following rupture.

1. BEFORE RUPTURE.—Irregularities of the menses—A few days late "spotting" may be absent one day and slight the next. It may occur at the time of the period, or a week or more after the period.

2. There may be the discharge of the uterine decidua which causes some pain and the patient tells you she has passed clots. If the patient is intelligent and brings in the clot or shreds—a microscopic examination reveals the characteristic cells.

3. Usual symptoms of pregnancy are not marked.

4. Malaise.

5. Gastro-intestinal disturbances.

6. Rectal discomfort.

Pain—A gradual increasing discomfort in the pelvis—soreness and tenderness. Patient eases, the affected side bends forward to relax muscles. Pain may extend down the thighs.

Severe attacks of pain may be described—when the peritoneum around the pregnant tube is inflamed; or there may be an escape of blood from the abdom. ostium into the peritoneal cavity.

AT THE TIME OF RUPTURE: Acute *pain* may come on without any apparent cause even during sleep.

More likely to occur if any unusual exertion—straining at stool, coition, lifting.

Pain is agonizing as the peritoneal coat is torn and blood escapes into peritoneal cavity—stabbing or lancinating followed by faintness, Syncope—may be continuous or remittent. Confusion arises.

Distress—in upper abdomen (which may mislead one in diagnosis) nausea, vomiting.

Pallor—faintness, rapid weak pulse.

Cardiac pain and palpitation (makes diagnosis more difficult)

Dyspnœa, hemorrhage has been severe.

Anæmia, progressive.

If and when the urgent symptoms subside and the hæmorrhage has not been severe enough to alarm the patient, symptoms of anæmia and subacute inflammation exist,—lower abdominal pain, fever, leucocytosis, low hæmoglobin.

With rest and treatment the patient may recover partially without operation.

But the attacks of pain may persist,—anæmia increases and a pelvic mass is found which gradually grows larger, until operation is done. Symptoms may resemble those of a pelvic abscess or an hæmatocele is felt in Douglas' pouch.

If Rectal symptoms are complained of and there are repeated attacks of pain referred to the rectum with urgency to defecate and tenesmus, Ectopic should be considered.

Diagnosis.—Usually easily made, but at times it is very difficult to come to a conclusion. In early cases before rupture it may be confused with early uterine pregnancy,—slight irregular bleeding and pain which simulates an early abortion.

Pelvic examination may reveal an enlarged uterus often retroverted—ovaries prolapsed,—tender. If the uterus is in the normal position, slightly enlarged, with an enlarged mass at the side, the diagnosis is simpler.

It is extremely easy to confuse an ectopic with early abortion.

Subacute inflammatory disease presents identical symptoms in the stage before rupture, especially if there is irregular bleeding—with uterus enlarged, cervix bluish—it is difficult to be sure of an ectopic.

The clear picture is—clinically—before rupture.

(1) Delay in menses.

(2) Slight bleeding.

(3) Increase in size of uterus.

(4) Adnexa enlarged.

An effort must be made to be sure of a pregnancy, and if it exists—Friedman's test may clear up any uncertainty, especially if the ovum has not perished.

Microscopic examination of expelled clots and shreds, if of the decidua, will confirm the diagnosis. If chorionic ville are present, the pregnancy will be uterine.

Pelvic inflammation, if gonorrhœa, or post partum may be diagnosed from the history. Increased sedimentation rate in the first two months, suggest an ectopic.

There may be a moderate increase in the white count—a high count of over 16,000 points to pus or pelvic inflammation, but slight increase up to ten or eleven thousand may indicate an ectopic, or a slight pelvic inflammation.

When acute hæmorrhage sets in, the leucocyte count rises as the result of loss of blood. Cases are on record of a leucocyte count of 16,000 to 35,000—in extreme cases—Farrar of N. Y.

Temperature.—This may be subnormal, or raised but it is not of much help. If there has been a slight hæmorrhage into the peritoneum as result of rupture, the absorption of the clot may cause a slight rise of temperature to 100° or even 102°.

Palpation—A bimanual examination in an ectopic reveals:—

1. A mass in one fornix or both.

2. Exquisite tenderness of pregnant tube, tenderness in cul-de-sac of Douglas' and over entire abdomen.

Palpation of cervix may elicit tenderness if ectopic is in the active stage.

In suspected cases of Ectopic when the tenderness is marked, the patient should be kept in the Hospital under the most careful observation.

Pelvic examinations should be repeated with the greatest care and gentleness and only if the patient is in an hospital where treatment can be undertaken at once.

3. AT THE TIME OF RUPTURE.—The outstanding symptom is

(1) *Pain*—and here a differential diagnosis is at times difficult for there are other conditions such as :

(*a*) Acute intestinal obstruction or strangulation.
(*b*) Renal Colic.
(*c*) Gall stone.
(*d*) Acute appendicitis.
(*e*) Ruptured gastric or duodenal ulcer.
(*f*) Acute pelvic inflammation.
(*g*) Twisted ovarian cyst—(hard infiltrated).

The greatest aid in Ectopic is that the pain is low down in the abdomen and is of pelvic origin.

But the pain may be a general abdominal pain, or even in the upper abdomen, or right iliac fossa.

1. *Nausea*, vomiting and epigastric distress, chest pain—rectal and bladder distress often accompany the pain of rupture. Rubin emphasizes that pain in the shoulder is often present if

there is considerable hæmorrhage due to pressure on and stimulation of phrenic nerve.

2. *Weakness and Syncope*—patient may faint away; prostration.

3. *Anæmia*—rapid and progressive—facial pallor—tongue and lips, skin and finger nails—pale—fall in blood pressure.

4. *Pulse rate*—increasingly rapid and volume diminishing until hardly perceptible. There is an emptiness of peripheral veins (404).

Differential Diagnosis—marked leucocytosis without anæmia points to the appendix.

Agonizing pain—spotting of blood—history of missed period point to ectopic. Leucocytes increased—red cells and hæmoglobin decreased.

Pain—high leucocytosis—high temperature.

No anæmia points to Pelvic inflammation.

Tortion of ovarian cyst—pain—temp. normal, no leucocytosis

Respiration—No very great change early but air hunger—indicates extreme danger.

In very acute cases definite pelvic findings are rare—Repeated examination—may do harm and may even rupture the tube.

(405) If a patient survives a rupture—and is not operated on, the general condition improves, up to a certain extent but there is frequence of occurrence of pain, rectal symptoms, a pelvic hematocele and anæmia the patient becomes a chronic invalid.

If the embryo is discharged into the abdominal cavity it continues to grow, there will be abdominal enlargement, fœtal heart sounds and fœtal movements. In examining such an abdomen there is sensitiveness and muscular spasm. X-Ray will confirm the diagnosis.

A late method of making an accurate diagnosis—Peritoneoscopy ; can an ordinary cystocope be used ?

Prognosis.—It is always grave. The majority of cases rupture by the third month. Cases operated on early give good results. Operation for advanced abdominal pregnancy are very grave due to the adhesions, etc.

Treatment.—(Operate as soon as the diagnosis is made).

Every case should be operated upon. When cases diagnosed before rupture, the operation is not fraught with any danger.

At the time of rupture the necessity for operation is urgent and immediate.

Cases that revive the stage of rupture and the acute symptoms have passed, ultimately require operation.

At times the symptoms are so conflicting and the differential diagnosis so difficult that one is tempted to delay, but Holden has put it very aptly. "It is better to operate and be wrong—than *not* to operate and be wrong". Perforating the post cul-de-sac may cause just enough delay to prove fatal, or make the patient refuse another operation.

Abdominal section is preferable and the operation should be done as rapidly as possible and as soon as possible.

Subcutaneous injections—Intravenous infusions—a suitable donor, all apparatus should be in readiness, before opening the abdomen.

If the abdomen and pelvis are full of blood, an auto transfusion may save the patient—blood may be taken from abdominal cavity and transfused at once into a vein (there is a danger of infection).

Operation.—As soon as the abdomen is opened—search for the tube—control bleeding at once, with clamps (one near the uterus—utero ovarian lig. effected tube removed entire. One on the infundibulo and pelvic lig.) Leave blood if unclotted in the abdominal cavity and close (no stimulation or intravenous, salt and glucose until bleeding is stopped) Diversity of opinion.

As a second ectopic may follow, one has to consider removal of both tubes; according to statistics of one Hospital—out of 97 Ectopics, when one tube only had been removed—16 had a second tubal pregnancy, 18 bore children, 13 had an abortion—50 never became pregnant.

If the opposite tube is left, it should be very carefully examined, adhesions removed, straightened and insufflated so as to lessen the possibility of another ectopic. If the tube is tortuous and convoluted it is safer to amputate the tube leaving a small portion, make a cuff so as to allow a normal pregnancy to take place.

In the tragic and acute stage where hæmorrhage has been severe, and patient is in extremis not a moment should be lost.

Open the abdomen rapidly. Search for the bleeding point. Clamp and tie and remove only what is necessary.

Close the abdomen rapidly. Begin blood transfusion; or intravenous of saline and glucose. Get the patient into a warm bed, and start Glucose and Saline enema.

The Significance and Management of Hæmorrhages During the Period of Nubility

BY

N. C. Chatterjee, M.B.

Teacher of Surgery and Midwifery, Chittagong Medical School.

HÆMORRHAGES during the nubile period may be ascribed to a wide variety of causes. Leaving aside those cases where existence of pregnancy is beyond doubt, they may be dealt with under the following headings and as in the preponderating majority of cases their source is uterus and in a minority, they are from vagina or vulva, the former only will be considered in this paper, specially those with obscure pathology. Nubility corresponds to the period of reproductive activity and the significance of hæmorrhages during this period varies, as what may be the common cause during the start of this period may be a very uncommon cause towards the termination of the period :—

(1) Functional and unexplained causes (some of these cases are complicated by the existence of retroversion or retroflexion). Has a wide age distribution.

(2) Bleeding due to some complication of pregnancy *e.g.* unsuspected abortion—Ectopic gestation—Moles.

(3) Inflammatory diseases *e.g.* Endometritis with adnexal inflammation including, Schroeder's disease, (Metropathia *Hæmorrhagica); chronic subinvolution*; chronic Metritis (Fibrosis Uteri).

(4) Benign tumours *e.g.* Fibroid tumours—Polyps (ranks first in the pre-menopausal age).

(5) Malignant tumours—Cancer Cervix; Cancer Body; Chorionic Carcinoma or Chorion Epithelioma. (There is no particular age distribution but is uncommon in the first half of the period) excepting the last one.

When a patient presents herself with symptoms of hæmorrhage it is important that its site should be located. Bleeding from Urethra-bladder or rectum must not be confused. If the

hæmorrhage is uterine its relationship to menstrual cycle or conception will have to be unravelled. Then its magnitude and effect upon the general health *e.g.* secondary anæmia etc. will have to be noted.

The earlier the age of the patient, the greater the probability of the hæmorrhage being caused by some unsuspected complication of pregnancy. Consequently, the possibility of this occurrence should never be overlooked even when personal considerations would appear to warrant its exclusion. Any abnormal bleeding however trivial must be subjected to a thorough local examination as it is only by this means that it is possible at present to prevent a lot of unnecessary suffering amongst our women folk and detect that dreaded disease, cancer of the cervix, at its earliest when chances of a clinical cure are very bright. By local examination one by one the above causes will have to be excluded, and exclusion of the second cause is the first and most essential step in this period. After this, difficulty will be experienced in those cases where the uterus is slightly enlarged and nothing else abnormal is detected. Exploration of uterus-digital or with a curette may have to be done as a last resort in obscure cases.

Abnormal uterine bleeding is ascribed to a functional origin when the pelvic organs are normal and when no constitutional disease or blood dyscrasia exists to account for it. The present idea is to ascribe it to an alteration from the normal functional relationship between the hypophysis, the thyroid, the ovaries and the endometrium. Puberty and less commonly premenopausal age are commonly associated with irregularities in the menstrual function usually in the direction of excessive uterine hæmorrhages. They may be prolonged as well as serious occasionally and no explanation can be offered for them except by assuming the hypothetical view—a lack of co-ordination between the hormonic sex-stimulus and the endometrium, or it may be due to (too early) initiation of menstruation (effect of hormonic sex-stimulus) before the development of uterus (metrium and endometrium) is completed—truly a state of unstable equilibrium. For practical purposes it will be sufficient if it is remembered that from the first onset—a year or two frequently elapses before the normal menstrual rhythm is established and during this period the function may occur too frequently and too profusely. Sometimes the duration of the period of menstrual loss may be prolonged. Passage of large clots and bright red blood may sometimes mean that the escape of blood from the endometrium is too rapid for the formation of an intra-uterine

coagulum or that the endometrium is deficient in its Thrombokinase Content (Beckwith White-house). At the present state of our knowledge it will not be very wrong to call Functional bleeding as an erratic type of menstruation and the error may lie either in frequency, amount or duration or they may be even complicated and combined. The recent terminology of uterine hæmorrhages admits of four types of errors, *e.g.* Epimenorrhœa (frequency), Menorrhagia (quantity), Menostaxis (duration), Metrostaxis (irregularity).

Epimenorrhœa.—It means that the monthly uterine bleeding is too frequent—the interval period is less than the usual four weeks. It is a clinical manifestation of the endocrine imbalance or an abnormal state of the Anterior Pituitary and follicular activity of the ovary. It is common at the two extremes in the sexual life of a woman *i.e.* puberty and menopause. The former is associated with developmental influences and the latter with cessation of reproductive activity and both nevertheless contributing to a state of ovarian instability. Other causes contributing to this state of affairs may be enumerated as Excessive Thyroid activity—abnormal sexual stimulation from promiscuous mixing with the opposite sex or reading of modern sex riddled literature or conditions associated with fibrocystic changes in ovaries (ovarian Prolapse—Uterine fibroid).

Menorrhagia.—Here the loss during monthly periods is excessive in quantity. If no local cause can be found this symptom means a state of hyper-function of sex-hormones under the disordered activity of Ovary—Pituitary and Thyroid or the Autonomic Nervous System governing psyche may directly or indirectly initiate disordered endocrine activity resulting in Menorrhagia. Diseases of Thyroid are also seen to present this symptom *e.g.* in Myxœdema and early Graves disease, Menorrhagia is a frequent symptom. Pernicious anæmia—Leukæmia—Acute infectious fevers are often associated with this symptom. But apart from these causes which are rare enough to be of academic interest only, local morbid conditions are responsible for this symptom in well high over 90% of cases and these may be enumerated as Fibroid tumour, Polypi, Endometrial Hypertrophy (metropathia hæmorrhagica), Endometritis, Uterine fibrosis, Chronic Subinvolution, Salpingitis and Perimetritis. The usual explanation offered in these cases is that local morbid conditions lend to produce a state of pelvic venous congestion and on its top is added some form of uterine insufficiency which may lie either

in the muscle (myometrium) or in the endometrium (deficient production of the thrombokinase or excessive production of thrombolytic ferment).

Menostaxis.—Is a state where the menstrual loss is prolonged and is comparable to a state of incomplete abortion. Its clinical effects are neither marked nor severe unless there is associated menorrhagia and excepting discomfort due to prolongation of discharge there is hardly any other complaint from the patient. The condition is still very ill-understood both as regards its ætiology and significance but histopathological study of the endometrium shows patchy molecular necrosis—premenstrual hyperæmia—sub-epithelial hæmatoma all at the same time. Consequently the whole picture presents one of irregular endometrial (indirectly ovarian) function. Sometimes there may be no demonstrable pathological lesion and occasionally a tiny œdematous polypus may be the cause of the whole train of symptoms.

Metrostaxis.—This includes Uterine bleeding not directly concerned with menstrual function and its occurrence before puberty and after menopause signifies precocious and late ovulation respectively. The embryonic nature of the structure of the endometrium, the fact of its being in a state of constant necrosis and repair makes it very susceptible to general and local influences. Amongst a whole lot of causes the more important or obtrusive ones may be cited. The general causes such as Infective fevers—various psychopathological states—Cirrhosis of liver—chronic Nephritis with hypertension all predispose to a condition of capillary hyperæmia and oozing. The more important local causes are—abnormalities in pregnancy (both intra and extra uterine). Abortions—molar pregnancy—malignant growths of uterus—Cervix—polypus—submucous fibroid during the process of extrusion—direct trauma to the uterus by foreign bodies associated with contraception—neglected pessaries and badly eroded cervix.

The type and significance of the commoner hæmorrhages of the nubile period *e.g.* from various types of abortion—Ectopic pregnancy—hydatidiform mole—chorionic carcinoma—carcinoma cervix et corpori are far too well known and understood to be mentioned in this paper but their occurrence must never be forgotten by the alert clinician. One particular point which needs special emphasis is that the metrostaxic type of hæmorrhage in cancer cervix or what is otherwise called irregular hæmorrhages

from trifling causes *e.g.* introduction of a douche nozzle or following usual marital relations, is a comparatively late symptom as there is no early symptom in this disease and if the unwary clinician waits for the appearance of this symptom before insisting on a local examination he will be sadly let down and will have to rue his decision in almost all cases.

After the functional bleeding, the next group of all understood hæmorrhages are Schroder's disease—chronic subinvolution —chronic metritis.

Schroder's disease.—The bleeding is of the nature of a slow continuous ooze varying in duration from three to ten weeks and this hæmorrhage in a typical case is preceded by a period of amenorrhœa varying from five to twelve weeks. There is absence or lack of lutein tissue in the ovaries but one or more cystic ripening follicles are usually found in them. The endometrium shows hyper-plastic changes and this condition which produces hæmorrhage is in the present state of our knowledge considered secondary to the ovarian pathology. The disease shows its greatest incidence in the premenopausal and menopausal periods.

Chronic Subinvolution —The hæmorrhage may be of three types either Epimenorrhœal or menostaxic or metrostaxic and its significance is still ill-understood as well as its pathology. The hæmorrhage may be a manifestation of myometrial insufficiency (Goodall and Fletchershaw) or of pathological changes in ovaries (Wilfred Shaw).

Chronic Metritis.—(Fibrosis uteri) Menostaxis or Menorrhagia or the two combined form the types of hæmorrhages found in this disease. Just what is responsible for this symptom it is very difficult to gauze but can be guessed from its pathology, which is characterised by increased amount of fibrous tissue deposit in the outer third of the uterine muscle wall and frequent association of this condition with retroversion or retroflexion, tubo-ovarian inflammation, arterosclerosis, chronic nephritis and with a high percentage of positive Wassermann reaction.

The management of a case of hæmorrhage during the nubile period depends upon a correct diagnosis and institution of appropriate treatment. The treatment of Schroder's disease, chronic subinvolution and chronic metritis varies from uterine styptics and stimulants to curettage—Radium therapy or

hysterectomy according to the needs of a particular case. Functional bleedings are most difficult cases to deal with as the wide age distribution of this condition necessitates a variation in the objectives of the treatment and the methods at our disposal often fall short of what is ideal. The large number of therapeutic measures which have been introduced and which are being introduced of late is proof positive that our ideal is still to be attained. The treatment of the rest of the hæmorrhages depends upon the pathological condition found and fall within clear cut and well-defined lines and consequently will not be discussed at all. The lines of treatment may be conveniently grouped under the following headings :—

(1) Hygienic measures.
(2) Uterine stimulants and styptics.
(3) Measures which increase coagulability of the blood or decrease the permeability of capillaries.
(4) Endocrine Therapy.
(5) Removal or destruction of Endometrium.
(6) Roentgen or Radium Therapy.
(7) Surgical procedures upon the ovaries or the uterus.

1. Under this heading falls such measures as combating of dietary deficiency—severe secondary anæmia or focal infection. It also includes change of vocation—climate or environment.

2. These include drugs such as Hydrastinine Hydrochlor-Stypticine—Pituitrin—Ergometrine or the breast stimulation method of German gynæcologists *e.g.* mud packing or Faradization of Breast. It is needless to add that these treatments are valueless excepting in cases of Post-partum subinvolution.

3. *Mocassin Venom* (intramuscularly 1 in 3000 strength), begin from 0.5 cc. daily and very gradually increase dose upto 1 cc. As much as possible is to be injected within first ten days as desensitization is necessary beyond that period. To be effective treatment usually is to be continued through three menstrual periods. *Cevitamic Acid* protects endothelial cells and shortens coagulation time. 50 mgs. to be injected daily intramuscularly and in successful cases checks bleeding within 4 to 6 days.

Congo-Red—intravenously 5 to 10 cc. of isotonic solution. It produces increase in thrombocytes and decrease in coagulation

time. The drug seems to be effective even in the absence of blood dyscrasias.

Neohæmoplastin or *Collip's Parathormone* all to be administered in conjunction with Calcium preferably intravenously.

Recently *Manetol* (*Bayer*) a hæmostatic principle from Spinal Cord has been introduced and promises to be fairly reliable.

Blood Transfusion remains the last word in our armamentarium in this group and exerts its dual effect—replacing to some extent the blood already lost and also stopping further loss by some as yet unknown Biological process.

4. Proluton—Antuitrin 'S'—Thyroid Extract according to the indication in any particular case but it must be realised that these are all of the nature of substitution Hormonic therapy and much depends upon a correct determination of the particular deficiency and potency of the preparation used.

Regarding the last three courses of treatment *viz.*, removal or destruction of endometrium—Rœntgen or Radium therapy or removal of ovaries or uterus and before deciding on which course to adopt, the wise clinician must remember that before and during reproductive ages, the maintenance of menstrual and reproductive functions demands a trial of less radical measures, and in the preclimacteric age, Rœntgen Irradiation of ovaries or surgical ablation of uterus with ovarian conservation seems to be the best course to adopt.

Treatment for Post Partum Hæmorrhage

BY

S. K. Gupta, M.B.

Addl. Gynaecologist, Calcutta Medical Institute.

Post Partum Hæmorrhage is one of the most severe and serious types of emergency for which not only an obstetrician but a general practitioner is also called upon to tackle. It becomes frightful to such extent at times that hardly any time is left at our disposal to think what to do. This complication is particularly present in the society where antenatal care is not properly looked after and where the labour cases are attended by unauthorised persons—with little knowledge for the prevention of such a complication.

Instead of going into the theories or different lines of treatment I, from practical point of view, intend to state here a definite line of treatment which should be followed by the person in charge of the case.

Post Partum hæmorrhage may occur from two sources either (1) from the injury to the birth canal or (2) from the placental site.

1. Hæmorrhage due to injury is of an oozing character—uterus remaining contracted and retracted.

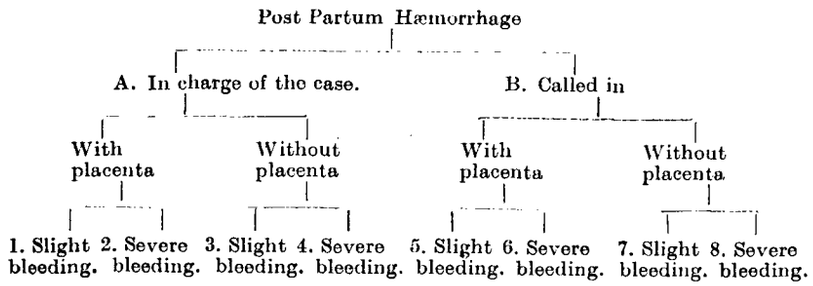
2. Uterine hæmorrhage can be diagnosed from the following points :—

(1) It is intermittent, *i.e.*, at times it occurs, at times it subsides. It occurs when there is relaxation of the uterus but does not come out of the uterus, but remains inside of it to be expelled during contraction. From this we may conclude that *all uterine hæmorrhages are first concealed and then revealed.*

(2) It occurs in gushes.

(3) It generally indicates that something is left inside the uterus because the percentage of cases due to non-contraction of an empty uterus is very insignificant.

Cases of Post Partum Hæmorrhage of uterine origin may be divided as follows :—



Case No. 1.—*i.e.*, the patient is confined by me, placenta not cast and she is bleeding slightly. Here first control the fundus—*i.e.*, put the ulnar border of the hand against the vertebral column taking the fundus within the palm of the hand and knead it till it becomes hard, and then look for any tear and relieve the bladder. If bleeding still continues, perform Crede's method of expression of placenta—(In it the uterus is kneaded till it becomes hard. When it becomes hard, hold it between the fingers on one side and the thumb on the other and squeeze the uterus within the palm pressing it downwards and backwards). If the placenta does not come out, try once again. If it is unsuccessful sterile saline about 10 oz. may be injected into the umbilical vein with Higginson's Syringe. This procedure is generally successful and manual extraction of placenta is generally not required.

Case No. 2—as indicated in the above table. First control the hæmorrhage with Bi-manual compression of the uterus and then arrange for other steps. *Complications, if thought of and arranged for, do not come ;* therefore, before removing Bi-manual compression, treatment for the complications should be arranged for. They should be directed as follows :—

(1) Arrangement for manual extraction of placenta if bleeding recurs.

(2) Prevention of shock by Intravenous injection of Glucose and Calcium as well as Sub-cutaneous saline.

(3) Plugging in extreme cases.

When everything has been arranged and Intravenous Glucose and Sub-cutaneous saline (it may form abscess due to lowered vitality) given, Bi-manual compression should be removed, and placenta expressed out. If it fails manual extraction should be done by experts under anæsthesia. This procedure should be done completely and quickly. Injections of Cardiac stimulants such as Caffeine Sodi Benzoate or Cardiazol Ephedrin as well as Pituitrin or Pitocin should be given. To counteract Shock, rectal saline should be administered as quickly as possible. If there is further chance of hæmorrhage tight vaginal plugging with moist sterile gauze under strict aseptic conditions, should be done. It should be removed after twenty four hours and injection of Neuclin may be given to prevent sepsis.

Case No. 3.—Proceed as in case No. 1.—Inject Pituitrin, Aseptic Ergot and examine the placenta. If bleeding still continues, exploration of the uterus should be done under anæsthesia in proper aseptic condition.

Case No. 4.—Same as case No. 2, *i.e.*, Bi-manual compression of the uterus, inject Pituitrin, Aseptic Ergot and examine the placenta. Exploration of the uterus may also be required as

empty uterus never bleeds but must be done under strict aseptic precaution.

CASE No. 5.—If you are called in, and you have got no knowledge of the case, proceed as in case No. 1, remembering that aseptic precautions are very important.

CASE No. 6.—Compression of the abdominal Aorta, though theoretically sounds well but practically it is difficult. Therefore Tinc. Iodine should be rubbed all over the hand and the uterus should be Bi-manually compressed, then other steps should be arranged for as in case No. 2.

CASE No. 7.—Same as case No. 3, but examine the placenta.

CASE No. 8.—Same as case No. 4. but examine the placenta.

From what has been said above it is clear that temporising treatment in Post Partum Hæmorrhage is dangerous, because hæmorrhage may re-appear and it may be the lethal dose for the patient.

The next point to remember is to counteract the effect of bleeding.

1. *For Cardiac Deficiency.*—For this purpose careful attention should be given to the condition of the patient to determine whether central stimulus or peripheral stimulus will be required. For central stimulus Cardiazol Ephedrin, Solu-Camphor, Coramine, Caffeine Sodi Benzoate may be tried. For peripheral stimulus Atropin, Adrenalin Chloride Solution, Veritol may be given.

2. *For replacing the fluid lost.*—Sub-cutaneous Saline or Rectal Saline should be administered before it is too late. Intravenous saline should not be given as it tends to raise blood pressure and thus predispose to re-start the hæmorrhage. Personally I never give it. Intravenous injection of 25 to 50% Glucose Solution 150 to 200 c.c. slowly administered through 20 c.c. syringe needle with the help of gravity is very efficient and prevents shock as well.

3. *For Shock.*—Shock is one of the most severe complications. It follows hæmorrhage so they do not co-exist. If shock supervenes local treatment is dangerous and may cause death of the patient at once. No shock should be treated first.—Get the head-end of the bed low or raise the foot and keep the patient warm without disturbing the patient much. Morphin $\frac{1}{4}$ gr. with Atropin 1/100 gr. should be injected at once. Intravenous Glucose of high percentage solution with Calcium improves the condition excellently. Cardiac and Respiratory Stimulants should be given as directed above. Oxygen and transfusion of Blood should be had to recourse before it is too late.

4. *Lastly Sepsis.*—Is another important complication. So every step must be aseptically conducted.

Bacteriology of Puerperal Sepsis

BY

Capt. N. Seshadrinathan, M.B., B.S., D.T.M.

Madras.

Doctors and midwives attending on labour cases have always been dreading puerperal infection. Methods of sterilising the instruments and the hands of attending doctors and midwives and the genital passages of the women in labour have been elaborated. In spite of these measures puerperal sepsis had remained an enigma.

During the puerperium sepsis gets located in the uterus, in the adnexa, in the external genitals, in areas subjected to trauma during labour and in the urinary tract. The organisms usually concerned in sepsis of the uterine cavity have been shown to be streptococci, especially the ærobic hæmolytic variety, to some extent the anærobic variety and in a very few cases, the coli group of organisms.

Considering the fact that hæmolytic streptococcus has proved to be capable of producing a very severe and often fatal variety of puerperal sepsis, Dr. Leonard Colebrook and his associates have made a special study of these organisms. Dr. Dora Colebrook has been enabled by the Medical Research Council of Great Britain to go into the problem of tracing the source of the streptococcal infection. The results of her work have been published as a Medical Research Memoir in 1935.

Hæmolytic streptococci do not all turn out to be harmful. The classification of hæmolytic streptococci has proved that this variety of organisms have sub-groups recognisable by serological and biochemical methods. Into one of these fall practically all the strains which are pathogenic to man, such as those causing scarlet fever, erysepelas, sore throat, acute tonsillitis, whitlow, impetigo, wound infections and perhaps acute rheumatism. The researches of Dr. L. Colebrook and his associates, Lancefield. Hare and Dora Colebrook have established the identity of the above group of hæmolytic streptococci with those found in definite cases of puerperal sepsis.

The recognition of the identity has facilitated the tracing of the source of infection in such puerperal sepsis cases. Investigation was directed to the genital passages of the parturient woman before and during labour, the bowel organisms, the organisms of the

skin of the perineum of the patient, and on the normal skin of the hands, in septic foci, in the respiratory passages of the patient and contacts. The conclusions arrived at were:"The hæmolytic streptococci present in the vagina before labour and the great majority of those present after delivery, are relatively harmless to the parturient woman ".

Whenever strains belonging to the human variety have been present in the uterus, in such instances severe puerperal fever occurred almost invariably.

Examination of the rest of the body of the patient in cases of puerperal fever has showed that the hæmolytic streptococci pathogenic to man could be isolated from pre-existent septic foci on the body or in the respiratory tract. The identity of such streptococci with those found in the uterus was established by serological methods. In all likelihood the infection has been carried to the genitals by the fingers of the patient either from the skin sores, or the dried nasal secretions.

Examination of the medical or other attendant, or other persons related to the patient with puerperal fever has revealed the existence in them of respiratory tract trouble such as septic sore throat, impetigal sores in children etc., due to human hæmolytic streptococci serologically identical with the strains isolated from the septic uterus of the patient.

The discovery of the source of infection has made it easy to prescribe the methods of preventing puerperal sepsis. Antenatal clinics should bear in mind the possibility of auto infection and advise and treat pregnant women to eradicate any septic foci in their body or in those of her relations likely to be closely associated with her during labour. Medical attendants and midwives should realise their share of responsibility and whenever they suffer from any inflammatory condition of the upper respiratory passages or any part of their body they should refrain from attending on confinement cases. Scrupulous care should be taken in the toilet of the skin of the hands. Attempts to sterilise the vagina before delivery usually results in replacement of the non-pathogenic normal vaginal flora by potential pathogenic ones, such as B. Coli, B. proteus, staphylococci, and fœcal streptococci.

Among other septic conditions of the puerperium urinary infections stand out foremost. The other troubles like peritonitis, salpingitis, pelvic cellulitis and thrombosis of veins are usually extensions from a primary septic uterus and are usually due to hæmolytic streptococcus. Urinary infection forms one of the commonest causes of puerperal fever and is very difficult to

eradicate. The fever may be brought under control, but the condition of bacilluria and pyuria remain persistent and capable of lighting up acute exacerbations off and on during subsequent confinements. The organisms concerned belong mostly to the colon group. The following is a list of organisms that have been found responsible for such infections.

B. Coli (Eschericia coli).
B. Lactis ærogenes.
B. Proteus.
B. Pseudocarolinus.
B. Pseudoasiaticus.
B. Asiaticus.
B. Morgan.
B. Fæcalis alkaligenes.
B. Dysenteric shiga and other dysentery organisms though rarely.
B. Gærtner.
B. Paratyphosus.
B. Typhosus.
Streptococcus viridans.
Staphylococcus in most cases contaminants.

Careful investigations in many cases have revealed the existence of the urinary infection in the antenatal period, and in some cases in a dormant state from infancy. Systematic microscopic and cultural examination of the urine during the antenatal period can reduce the incidence. By such examinations the attendant medical staff can be on the guard and look for the possibility of exacerbation of the urinary trouble during the puerperium.

In conclusion, it should be impressed that the diagnosis and therefore, the efficient control of puerperal sepsis needs the closest co-operation between clinical and laboratory staffs, and that it can only be efficiently carried out by providing such facilities in all hospitals.

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Treatment of Puerperal Infections

BY

Dr. Manindranath Sarkar, M.B., F.R.C.S.,

Second Professor of Midwifery and Gynaecology,
Medical College, Calcutta.

PUERPERAL infections are one of the commonest complications of labour for which a practitioner is often consulted. In fact, as conditions prevail in our country, most pregnant patients are seen by her medical attendant only when something abnormal crops up during labour or when she gets high temperature during the puerperium. Under these circumstances, the attendant has to treat the patient as he gets her. He has no opportunity, in the vast majority of cases, to prevent the occurrences of this dangerous complication by careful antenatal care or expert supervision of labour itself. Nevertheless, it is very important for him to be thoroughly conversant with all methods of treatment—whether it be preventive or curative. Furthermore, he should have a thorough clinical knowledge of the various types of this infection—their complications, practical and simple methods of investigation and lines of treatment and management. It will be the purpose of this article to discuss these points from a general practitioner's point of view.

A morbid puerperium—that is one where the temperature rises to a maximum of 101·4° F. in one of the two occasions when the temperature is supposed to be taken in 24 hours for the first ten days of the puerperium—is very common and does not require expert treatment, nor should it cause any grave anxiety. But all the same—any rise in temperature should be carefully watched and should not be slighted—as "Milk-fever"—or "reactionary fever." Another point to remember is that all fevers associated with the puerperium need not be due to the puerperium. The practical rule should be something as follows:—If any patient who gets into labour with a normal temperature and where temperature has been normal for a fortnight before labour—gets a rise of temperature and where this raised temperature is kept up for three consecutive days—she should be presumed to be suffering from puerperal infection. This rule should be applied to cases of so-called normal labour. If there have been interferences during labour viz.—several vaginal examinations, use of instruments—any rise of temperature should be looked upon with great suspicion. As a matter of fact, these cases should

receive prophylactic treatment whether there be any fever or not. So far attention has been focussed on the rise of temperature, because the temperature rises along with the establishment of the infection. But in grave cases—in asthenic patients—the degree in the rise of temperature does not always indicate the seriousness of the infection.

We shall now discuss the ætiology of this infection. During pregnancy and labour, the uterus and the upper third of the vagina are bacteria free. If a vaginal examination is made when labour has just started—there is this possibility that the examining finger may carry some bacteria up to the external os or even through it, into the cervical canal. When membranes rupture these bacteria may actually get into the amniotic cavity. If the fœtus is expelled without any artificial aid and further if the placenta is expelled spontaneously—a huge raw area appears in the wall of the uterus—that is the area of placental attachment. Bacteria can get into this raw area and may thrive there or may actually get into the blood stream. If in addition to this there are tears or loss of substance anywhere in the birth canal starting from the cervix up to the perineum these areas are suitable soils for the growth of infective bacteria. Occasionally, bits of membranes or blood clots may be left behind inside the uterus providing a very suitable pabulum for the abundant growth of saprophytic organisms.

Where the placental area is the sole focus of infection, the worst complications follow. Depending upon the virulence of the organisms, the infection will either remain localised within the wall of the uterus or generalize into a septicæmic condition in the brief space of a day or two. Even when a localised puerperal ulcer forms, the infective organisms may pass through tissue continuity or through lymphatics into the surrounding peritoneum causing pelvic peritonitis or in grave cases generalized peritonitis. Such a complication may also be brought about by vigorous scraping of the uterine wall with the idea of getting rid of the infective material or by the use of intrauterine douche, when the pressure of the douche fluid may inject septic material through the tubes into the peritoneal cavity. If the uterus cannot properly empty itself of clotted blood, bits of membranes and such other debri—these latter may be infected—may form an abscess, as it were, within the uterus. Such an abscess will ultimately discharge itself through the cervical canal if vigorous interference is avoided. A lacerated or torn cervix very often undergoes sloughing. Infection may proceed from this focus

along the lymphatic to the pelvic cellular tissue. The ensuing Pelvic cellulitis very often resolves. Suppuration occurs in a small percentage of cases, the abscess usually points above the outer third of the Poupart's ligament. Occasionally, the pus may track along fascial planes and along the course of blood vessels and the ureter to such remote areas as the gluteal region or to the lumbar region behind the kidneys. These complications may arise from infections on the lacerations and wounds of the upper reaches of the vaginal canal. A simple laceration of the perineum may look innocent in so much as there may not be any local extension of the infective process, but at the same time from this local lesion, the infection may get into the blood stream.

Puerperal septicæmia is one of the gravest conditions that human flesh is heir to. It is usually ushered in by repeated and prolonged rigors. The temperature goes up to 105°F. and drops down to 99°F. There is considerable sweating during the stage of defervescence. Patient gets into a toxic condition. The functions of the vital organs gradually become involved. The myocardium is early affected. The heart dilates, pulse becomes very rapid and the sounds are muffled. The quantity of urine passed diminishes and there is the presence of albumen, casts and red-blood cells in the urine. Very often the patient suffers from intractable diarrhœa. She passes copious quantities of watery, bile-stained stools. The abdomen remains puffy, distended, tender on palpation. The tongue looks dry—raw red like beef—in streptococcal infection. Malignant Endocarditis appears in these infections. Embolic abscesses may appear anywhere and everywhere. Occasionally these embolia may lodge in one or other cerebral hemisphere producing Hemiplegia. Pyæmia has also been reported in a number of cases. There may be periarticular or intra-articular suppuration.

Phlebitis of the pelvic veins occurs in chronic infections. This affection is usually unilateral and follows upon infections within the uterus or in the cervix by organism of low virulence. One of the lower limbs swells up and looks pale and feels cold to the touch. With careful treatment, the thrombi within the vessel are found to be absorbed. Circulation is re-established and the limb comes back to normal condition. This process takes a long time. If the patient moves the affected limb too frequently, there is always the danger of a clot or clots being washed away into the circulation. Consequently there may be the risk of emboli shooting into viscera or even there may be sudden death due to a Pulmonary embolism.

Streptococci, B Coli Communis, Staphylococci, Pneumococci, Gonococci are some of the organisms responsible for puerperal infections. Of these again the first three are very commonly found in blood, urine or in uterine discharges. Presence of any or all of these organisms in the vaginal discharges does not mean that the patient has been infected by them. If a pure growth of one of these is found in the blood, urine or in the discharge taken directly from the uterus, that alone is a certain proof of the causative organism. Wherever possible, such an investigation should be made. A blood culture is best taken as soon as possible after a rigor if the patient gets one. Where facilities for such laboratory investigations are not practicable a clinical diagnosis should be made from the general condition of the patient, the type of temperature, variation and the nature of the particular lesion and symptoms of the patient. Excursions of the temperature are highest with B. Coli infections; though it is common to find high rise in Staphylococcal Septicæmia of a very grave type. A streptococcal infection is responsible for repeated rigors and wide fluctuations of the temperature. Patient looks highly toxic and very soon gets into what is clinically known as the "typhoid" condition. In B. Coli infections even when the patient is suffering from high fever, her general condition never causes any anxiety. She retains her appetite, has a clean tongue and has very little to complain. Staphylococcal septicæmia fortunately is not very common. In our experience, we have never seen a patient get over a Staphylococcal septicæmia.

B. Coli affects the urinary track giving rise to Pyelonephritis. In mild cases, patient gets dysuria, and burning sensation during micturition. Infection of Pelvic cellular tissue is usually due to streptococci.

Treatment.—An expeirenced medical practitioner was asked by an aged relative of a patient of his—"Doctor, how is it that you have not got a quinine-like remedy for puerperal fever?" This was quite a natural question from a person who must have seen ravages caused by Malaria when the use of quinine was not popular among the masses, who has also seen the cures effected by quinine in these cases. What answer the particular practitioner gave is not known. But true it is that a similar query has cropped up in the minds of most of us who have to deal with cases of puerperal infection in the course of our routine work.

In recent years we have come across three different stages in the evolution of the principles followed in the management of

a case of puerperal fever. In the beginning of this century very few cases were confined in Hospitals and Institutions. The small number of cases that were admitted into the hospitals were usually cases of abnormal pregnancy and labour. A fair number of Anglo-Indians and Europeans with normal and abnormal conditions were, however, confined in the Hospitals. It is not, therefore, unwise to draw conclusions from Hospital statistics. Besides these statistics, we get additional information from the personal experience of veteran practitioners on these lines. We find from such varied sources of information that generally speaking a rise of temperature up to 102°F.was expected and thought to be due to malaria, engorgement of breasts, common cold, or some other cause. Infections of the genital canal were not studied and conceptions on the parallel of wound infection were not in vogue. Great stress was laid on the quantity and odour of the lochia. Water intake was severely restricted and antipyretic drugs like Quinine, Sulpho-Carbolates and Salicylates were widely used. With further advance in pathological knowledge of wounds, such terms as "Sapræmia" and "Septicæmia" came in general use.

During the years of the Great War and in subsequent years, the change was in favour of vigorous local interference. This was the second stage. Cases of Septic Abortion, miscarriages and labour were very common. Surgical principles of treatment which have been found efficacious in treating infected wounds in other parts of the body were applied to the conditions exisiting in the Birth-canal. Uterine cavity was scraped and flushed with antiseptics. Carrel Dakin's method was adopted in Intra-uterine and intra-vaginal infective conditions. Hysterectomies were done to remove the infected uteri-ligation and excision of veins were undertaken in cases threatening Phlegmasia.Posterior-Colpotomies were done to drain peritoneal cavity infected from septic uteri. All these methods did not prove successful. Out of these intensive surgical methods came Mr. Remington Hobbes's method, which took advantage of the surgical principles, but avoided the actual manipulative excesses. This method will be described in greater detail afterwards.

Inspite of all these methods, a search for a medicinal antidote against actual causative bacteria went on and is still going on. With the discovery of the Sulphonamide group of drugs we can say we have reached the third stage, *viz.*, the stage of Chemotherapy and Autotherapy. Vigorous local and general interferences are usually discouraged. The main principle is to protect the

patient against infection and when infected to supply her with the suitable antidote. There is another very important principle followed. This is the principle of Prophylaxis. Various researches have been made as to the sources of the causes of infections. All possible sources of autogenous and exogenous infections are found out and suitably dealt with. It is the desire and aim of the modern obstetrician to manage a case of labour whether normal or abnormal on the lines of Aseptic and not Antiseptic Surgery. This does not mean that Antiseptics have no place in modern obstetrics. For obvious reasons—the birth canal—the surgical area—will always have to be treated with antiseptics. Modern discovery has armed the obstetrician with antiseptics of great lethal action to the bacteria, but comparatively harmless to the tissues of the patient. The use of such antiseptics has definitely diminished the incidence of cases of puerperal infection.

Methods of Prophylaxis.—Puerperal infection in common with any other malady is better prevented than treated. The patient should receive careful attention during the antenatal period. She should be prepared to go through the labour and puerperium. Any obvious focus of infection—septic gums—tonsils—nasal sinuses—discharging ear, come under this head. If, anæmic, the cause is to be discovered and treated for. As a routine it is advisable to put the patient on the vitamins A and D particularly with Calcium in easily assimilable form. During labour and for six weeks before labour vaginal manipulations should be restricted to the minimum. The ideal is to do no vaginal examinations at all. Such an ideal is not impossible to achieve. Any obstetrician of experience can recount hundreds of cases of multiparæ where they have been safely confined without a single internal examination. Even in a primipara—not more than two or three examinations need be made. When such examinations have to be made, all precautions should be taken. The external genitalia should be cleaned and shaved. The accoucher should put on a surgical mask and should have rubber gloves on. The fingers should always be introduced into the vagina by sight and not by feel. During labour, the same cleanliness and antiseptics must be observed. Even in cases of normal labour, shaving and cleaning of genitalia and neighbouring areas should be done as a routine measure. Any perineal tears or lacerations must be treated surgically. The whole labour should be managed in such a way that the patient is not unduly shocked or exhausted. Catheterisation of the bladder should be done less frequently and when done, careful aseptic technique should be observed,

Where sepsis was apprehended—as in badly handled cases of obstetrical emergency—prophylactic injections of Polyvalent Serum were advised. The streptococcus is the most dangerous and common organism of puerperal infection. With the discovery of streptocide drugs, Serum injections are going out of vogue. For prophylaxis, the following plan is recommended.

10 c.c. injection of 5% solution of either Prontosil, Soluseptine, (Sulphanilid) is given every day for three days. For the next four days 30 grains are given orally daily, divided into two doses. Where there have been tears and lacerations, 5 c.c. to 10 c.c. of milk injections are given intramuscularly bi-weekly for 3 or 4 injections. These are done in addition to the routine care of the Puerperium.

Next comes the question of treatment of a case of Puerperal Fever. The essential thing to remember is that the patient's strength must be maintained. On an average, if everything goes in her favour, a period of fortnight passes before the temperature comes down and stays at the normal level. During this time there may be repeated rigors and excursions of temperature to 103 or 104 degrees. Patients must be supplied with easily assimilable diet and plenty of fluids. Milk or milk derivatives should constitute the principal item of the patient's diet. Fruit juices and sweet drinks should be given in large quantities. We have found that patients like to take green cocoanut water even though they would not care to take plain water or barley water. Alcohol in the shape of liquor Brandy has been used. Its use has been recommended with the belief that it spares tissue proteins from being exhausted and, in addition, it has been looked upon as a cardiac stimulant, because of the œnanthic ethers it contains. We have not found any good result from the routine use of Brandy and Rum in a large number of cases. In grave cases where alimentation by mouth has not been possible we have tried to maintain the patient's circulation by continuous infusion of saline and glucose or by rectal infusions. In very few cases we have used the subcutaneous or the intramuscular route for infusion.

A careful investigation must be made as to the causative organism. Examination of the discharge taken from within the uterus, cultural examination of the urine and a routine blood examination for any parasites, the total and differential count should be done in all cases. The discharge from the uterus should be taken by a person who knows his job. The urine has to be collected by means of a sterile catheter by an expert nurse. If

such expert persons are not available, these methods of investigations need not be done. Want of ordinary care may result in fresh troubles for the patient. When these investigations are being made, the patients must receive intensive Sulphonamide therapy. These drugs have been proved to be specifics against all streptococcal infections. These are the most dangerous organisms. If these drugs are used empirically, no harm can be done. This does not mean that streptocide drugs can be used irrespective of the patients' condition and as a matter of routine. Patients with grave anæmia—those with damaged kidneys and those suffering from diarrhœa—should receive this line of treatment under careful supervision and only when streptococci have been found in one or other of the body fluids. The Sulphonamides have also been found to destroy B. Coli in the urinary track. B. Coli, when they are growing in the blood—seem to escape the destructive action of these drugs. Staphylococci are immune to these drugs.

With a view to saturate the system rapidly, the sulphonamides should be used intramuscularly in aqueous solution along with oral administration- 30 c.c. of a 5% solution of one of the various preparations (Prontosil, Soluseptasine) by the intramuscular route and 30 grains by the oral route can safely be used in 24 hours in a patient of average build—who is not grossly anæmic and whose renal function is not grossly affected. Such heroic treatment may have to be continued for a week; after this period in favourable cases the intramuscular injection may be stopped—but the oral administration should be continued till the temperature settles down to normal. Where the blood culture has shown the presence of Streptococci, the treatment should be continued till the culture is sterile. During the treatment patients should not get any sulphates by mouth and should not take any article of food containing large quantities of sulphur e.g.—Onion, Eggs, Garlics.

B. Coli are found in the urinary track and also in the blood stream. Where the patient gets frequent rigors and where there is a pure growth of B. Coli—along with numerous pus cells in a Catheter specimen of urine—Mandelic Acid therapy is indicated. With the discovery of various palatable preparations of this drug, the details of the treatment are very simple. The water intake is restricted. The maximum of $2\frac{1}{2}$ to 3 pints are allowed in the day. The medicine is given 3 hourly for 4 or 6 days in 24 hours for a period of 3 days. "Mandelix", and 'Ammoket' and "Neoket" are some of the preparations in popular use. In B. Coli septicæmia intensive alkaline treatment is indicated. Drachm

doses of pot. citras are ordered every 8 hours even at night and the water intake is increased to minimum of 5 pints in 24 hours. All proteins, even in milk is cut off from the diet. The urine is tested with litmus paper for its reaction. This treatment is pushed till the urine is frankly alkaline. The temperature usually settles down. If it does not, another blood culture is made. If there is still a free growth of B. Coli, the alkaline therapy is continued. A 40% solution of urotropin 3-5 c.c. in amount is injected with 25% of 12½% solution of Glucose intravenously to check rigors where they are frequent. Stock vaccines, Auto-vaccines, Specific proteins, non-specific proteins are sometimes employed in chronic infections with results that have been reputed to be good.

If the involution of the uterus is delayed, the cause has to be found out. Where the uterus remains bulky and drops down into the Pouch of Douglas, the lochia becomes scanty and offensive. In these cases, the uterus should be lifted up by vaginal manipulation and kept in position with the help of a pessary. A vaginal douche with an antiseptic solution and at a low pressure should be given daily, so long as the pessary is inside. The pessary should be taken out at the end of a month. "Dettol" and "Zant" are the two antiseptics that are very widely used for this purpose. Their especial merit lies in the fact that they are germicidal in weak strengths and comparatively strong solutions do not damage healthy tissues. Occasionally one comes across cases where the lochial discharge is profuse and offensive. The uterus remains bulky. The patient complains of pain when the uterus is palpated either per abdomen or per vagina. These cases do well if pure glycerine is injected into the uterus. An ounce or two of pure sterilized glycerine is injected with an India Rubber Catheter attached to a syringe. The glycerine comes into contact with the wall of the uterus and abstracts moisture; in this way fresh lymph and serum laden with phagocytes are attracted into the uterine wall. The uterus slowly and gradually involutes. If the uterine cavity is full of debris in the shape of blood clot, sloughing bits of membrane or placenta—these latter have to be cleared out very gently with a sponge holding forceps. In no case should an attempt be made either to scrape out the walls of the uterus or to flush out the uterine cavity with an antiseptic douche. These measures will only push the infection into the blood stream and endanger the patient considerably. If the cervix is found to be sloughing badly, no intra-uterine instrumentation should be attempted. To drain the uterine

cavity, the cervical canal may be dilated with a uterine forceps and the pent up discharge allowed to drain out spontaneously. Massaging of a uterus per abdomen is dangerous in these cases. A sloughing cervix, vagina or perineum is not necessarily a cause of great immediate anxiety. Irrigation of the parts with a mild antiseptic once or twice a day is all that is necessary. A gauze soaked in 2% solution of mercurochrome in cod liver oil is applied over the sloughing area. The slough clears out and the area heals by granulation. Another advantage of this line of treatment is that subsequent atresia and stenosis of the cervical and vaginal canals consequent upon the healing of extensive ulcerated area are prevented. As a complication of extensive sloughing and infection of cervix one can get Pelvic Cellulitis and Phlegmasia Alba Dolens. To avoid this, local drainage and antiseptic care must be maintained from the beginning. Patient's resistance to infection should be increased by keeping her in fresh air, and sun-light. She should get calcium and vitamin D. It is the routine practice in these cases to give bi-weekly injections of a preparation of milk, minus its fat *e.g.* Aolan, Lactaolan etc. These patients must be encouraged to move themselves in bed and to turn their sides as frequently as they can. The head end of the bed should be raised at least 1½ to 2 feet above ground level. It is our further practice to make these patients lie on their faces for an hour at a time 3 or 4 times a day after the baby has been nursed.

Pelvic cellulitis has to be vigorously treated. The focus of infection which is usually a torn cervix has to be kept clean with douches and local applications of a mild antiseptic. Solution of Acriflavine in Glycerine is recommended for this purpose. Application of heat is a very helpful method in promoting resolution of the inflammation in the cellular tissue. Hot vaginal douches and hot enemata are recommended. In long standing cases, extrapelvic diathermy is very useful. In a great majority of cases suppuration does not occur. Where pus forms, it should be let out by Hilton's method through an incision an inch above the outer third of the Poupart's ligament, where the abscess usually points. After the incision daily dressing of the wound should be done. Dry cupping of the wound is a very helpful device to promote drainage of the abscess cavity.

Occasionally one comes across a collection of pus in the Pouch of Douglas. There is the characteristic hectic rise of temperature with rigor and the defervescence is accompanied with profuse sweating. Patient complains of pain in the abdomen,

there is a frequent desire to defaecate and a glycerine-like substance comes out of the anus. Under these circumstances, the pus must at once be let out by a posterior colpotomy. In neglected cases, the abscess bursts into the rectum and there is a spontaneous cure. But in these cases patient subsequently suffers from a constant dragging pain in the back. This pain is felt most at the time of defaecation especially so if the patient is constipated. When such abscesses are drained per vagina subsequent treatment must be carefully conducted. For the first forty eight hours after the evacuation of the abscess, the cavity should not be douched for fear of pushing the pus into the general peritoneal cavity. The incision itself should be dilated with a sinus forceps and the pus let out. Subsequently the abscess cavity may be gently irrigated with a douche given with the help of a Bozeman's catheter.

Phelgmasia Alba Dolens is one of the most troublesome sequelæ of puerperal infection. The patient suffers for a long time and months elapse before she gets perfectly all right. This condition is better prevented than treated. It seldom appears before a fortnight after labour. During this time the patient runs a low grade temperature—the maximum may be 102° F. There may be ulcerations in the vagina or in the cervix. Involution of the uterus is usually delayed. From the third or fourth day after labour the patient should be encouraged to move her limbs and to alter her position in the bed. An alkaline mixture with liberal doses of citrates should be prescribed. When the condition has actually appeared, the affected limbs should be kept in absolute rest between sand-bags. Extreme care should be maintained when the patient uses the bed-pan or when her body is sponged. Cotton wool without any bandage should be wrapped round the limb to keep its temperature. Local applications of glycerine Belladonna are not of much use. No attempt at massage should be made so long as the limb remains cold and pale. The limb may be raised for about six inches from the bed. In favourable cases within a fortnight, the swelling tends to disappear very slowly indeed. When this stage has appeared and when the limb feels warm, gentle massage with mere touch may be done by expert hands. Not until the swelling completely disappears, should any active movement be allowed. It sometimes takes months before the patient can actually walk on her own.

Malignant endocarditis and embolic abscesses sometimes occur in connection with virulent puerperal infections. Patient's

strength has to be maintained and the sulphonamide drugs are to be pushed to maximum doses. The prognosis is not favourable, but by no means always fatal. The success will depend upon the patient's capacity to tolerate these drugs and of the medical attendant's determination to push them to their full therapeutic doses. In a recent case the drug was pushed till the patient actually broke into a generalised scarlatiniform rash all through the body and looked cyanotic. Pyæmic abscesses sometimes appear and are really very troublesome to treat. Ultraviolet therapy is of great use in these cases. The abscesses should not be opened too hurriedly—they should be allowed time to resolve. Visceral or joint abscesses are best left alone till the patient's conditions improve to a considerable extent.

Blood Transfusion.—A morbid Puerperium is one of the complications to be expected in Placenta Praevia and in cases where there is considerable Post Partum Hæmorrhage. Repeated blood transfusion is indicated in these cases. Besides these cases, blood transfusion should be resorted to, to increase the patient's resistance where she is anæmic and where the infection is with the streptococcus Hæmolyticus. We have not been able to give a continuous blood transfusion by the drip method. It has been found difficult to maintain the constant temperature of the blood. Immuno transfusion does not seem to be within the practical scope of the general practitioner.

Pelvic Cellulitis—Acute

BY

S. N. Chaudhuri, M.B.,

Teacher of Surgery and Midwifery,
Jackson Medical School, Jalpaiguri.

Definition.—Pelivic cellulitis is the term applied to inflammation of the connective tissue of the pelvis outside the uterus.

Pelvic connective tissue.—Between the pelvic peritoneum and the recto-vesical fascia there is connective tissue which fills all the gaps left by the pelvic viscera and the blood vessels. The connection is open and loose so as to permit free movement and a good deal of stretching. The principal collections of connective tissue lie at the sides and in front of cervix of the uterus and at the base of each broad ligament. The whole of the pelvic connective tissue is rich in lymphatics and veins. The connective tissue about the uterus is often called parametrium and the inflammation of the same is called parametritis.

Ætiology.—The infection of the pelvic connective tissue may result from operations upon the cervix, or injuries and ulcers of cervix, urethra, vagina and rectum or from puerperal infections. In puerperal infections the organisms travel directly through the the wall of the uterus into the pelvic cellular tissue. Inflammation of the cellular tissue as a result of infection of the tubes and peritoneum is a very rare event and then, it only occurs at a late stage of the pathological process.

Leaving aside the rare causes such as infection from an operated cervix or ulcerative stages of cervix, urethra, vagina and rectum, the arch offender turns out to be puerperal infection. Practically every case of primary acute pelvic cellulitis can be traced to infection from labour or from abortion. When infection follows an abortion acute cellulitis is not likely to occur as the amount of cellular tissue is very much less than what it is at term and lacerations of cervix and vagina are not so apt to occur. Secondary inflammation may be set up by extension from an inflammatory focus in some adjacent organ such as the retrocæcal appendix.

The fact that almost all cases of pelvic cellulitis is due to an infected endometrium, the importance of checking the endometritis at once when present and of preventing it wherever possible cannot be over emphasised.

The commonest point of entry of the organisms is through laceration of the cervix and the upper part of vagina.

Pathology.—Pelvic cellulitis is largely a lymphangitis of the connective tissue around the uterus. It is usually due to the streptococcus, the staphylococcus or the colon bacillus and in rare cases it may be due to gonococcus. As already stated this cellulitis is favoured by deep lacerations of cervix or upper part of vagina which open up the portals for entrance to germs into the connective tissue about the uterus. Like inflammation elsewhere the tissues become hyperæmic and infiltrated with blood and leucocytes. This phase is very soon changed into one of serofibrinous exudation and œdema of the infected area. This swelling is at first soft but becomes indurated from coagulation of blood and lymph in the tissues and thrombosis in veins. This mass to start with is felt at the base of broad ligament on the same side as the laceration is. If the process goes on extending it may extend towards the antero lateral pelvic wall and may be felt above the Poupart's ligament and in the iliac fossa. Backward extension is also possible along the utero-sacral folds and may travel along the connective tissue layer of the ureter and point in the loin, or the infection may extend along the connective tissues around the blood vessels and may point in the gluteal region and in the Scarpa's triangle.

This inflammation may end in resolution or abscess formation or general sepsis. If resolution takes place, Nature does it so nicely that no trace of any damage to tissues is left behind. If suppuration takes place resulting in pelvic abscess and if this is opened, the inflammation subsides leaving only infiltration and scar-tissue which cause but few symptoms besides distortion of the parts. The inflammation however may extend to the peritoneum in which case there are added the signs and symptoms of pelvic peritonitis.

Septic thrombosis may be the starting point of a pelvic cellulitis. The infection here enters the thrombi that fill the uterine sinuses after labour. It forms a severe—very often a fatal type of—puerperal sepsis. Nature tries to limit the process by forming thrombus proximal to the infected part. If this also gets infected, another thrombus proximal to this is formed and so on. This process may go on until the veins of the broad ligament are extensively thrombosed. If infection enters through the upper part of the uterus (the usual placental site), it affects the ovarian veins in the upper part of the broad ligament and if

it enters through the lower portion of uterus the uterine veins in the lower part of the broad ligament are involved.

If Nature succeeds in limiting the process, pockets of pus may form in the thrombosed veins and may leak into the connective tissues around, forming pelvic abscess. If nature fails, the process spreads along the ovarian veins to inferior venacava or along the lower uterine veins to internal iliac and common iliac veins and finally into inferior venacava. When common iliac is involved the process may spread distally into the external iliac vein causing Phlegmasia Alba Dolens. At any stage of the septic process, infected particles may become detached and pass into general circulation leading to general pyæmia.

Chronic pelvic cellulitis is never a sequel of the acute one.

Symptoms.—In the second week of puerperium generally the patient has a rise of temperature possibly associated with rigor and acceleration of pulse rate. The range of temperature may be between 100°F. and 105°F. Pain is not a constant accompaniment unless the peritoneum is also involved in the process. The skin becomes dry and gradually desquamation sets in. There is usually a vaginal discharge.

On abdominal examination the lower abdomen is found to be tender on pressure. This tenderness is usually confined to one side but may be present all over the lower abdomen. On account of this tenderness the abdominal muscles are held more or less rigid and so deep palpation is made difficult.

The vagina is found hot and tender. There is pulsation of the large vessels in the lateral fornices. A tear may be detected in the vaginal wall or in the cervix.

In the early stage of acute pelvic cellulitis when the exudate is serous and the tissues are œdematous there may be no definite mass palpable—only there is a feeling of slight resistance on the affected side. When the exudation after a few days has become fibrinous, an indurated and tender mass may be palpable around the cervix and upper part of vagina. More often the mass is felt on the side of the uterus or behind it. The exudate may extend all around the uterus and thus fix the organ as if plaster of Paris has been poured into the pelvis and has hardened there. The lateral fornices are depressed as well. In these cases of extensive distribution of exudates, the sensation imparted to the examining finger is that of a firm roof across the pelvis just above the fornices. The lateral displacement of the uterus caused by an unilateral massive exudate is almost a myth. It occurs but rarely and has very little diagnostic value.

If the exudation extends upwards or downwards along the connective tissue prolongations around the abdominal wall, or vessels or ureters, masses may be felt above and along the Poupart's ligament anywhere between the iliac fossæ, in the loin, in the groin or in the gluteal region or it may be found between the uterus and the rectum along the uterosacral folds involving the front and lateral aspects of the bowel. When the exudation extends along utero-sacral folds, the Pouch of Douglas is found to be empty unless there is also peritonitis.

If there is collection of pus of considerable size, fluctuation may be present—the soft area being surrounded by a hard zone formed by an area of exudate which has not yet broken down but if there is only a small collection of pus—which is not large enough to give fluctuation—its presence is all the same made out by persistent fever and marked tenderness over some part of lower abdomen. The presence of pus is also indicated by œdema and pitting of the skin over the tender area. Bursting of a cellulitic abscess into the bladder, vagina or rectum is a rare event.

Diagnosis.—One of the earliest signs of cellulitis is the fixity of the cervix accompanied by a tender unilateral swelling. If the swelling is large enough, it obliterates the vaginal fornix. When the exudate has spread out the folds of the broad ligament, uterus gets fixed up. If the exudate spreads along the uterosacral ligaments, the diagnosis becomes easier with a rectal examination, which reveals a horse-shoe shaped band of induration, in front of and along the sides of the rectum. This mass is continuous with the induration in the uterosacral ligaments. There is a history of a recent labour or abortion or of operation of the cervix or vagina with subsequent pyrexia. In other cases a rectal or vaginal examination may reveal ulcer or cancer though this is a very rare cause.

Only in very rare cases the diagnosis becomes difficult. Appendicitis may confuse the issue. In some cases a tumour with a twisted pedicle or a broad ligament fibroid or a hæmatoma caused by rupture of a varicose vein or intra-ligamentary rupture of an ectopic gestation may simulate cellulitis. A detailed history of the case easily clears up the diagnosis.

Prognosis.—Prognosis is dependent upon the nature of infection, time of onset of symptoms, type of temperature, pulse rate, number of rigors and intestinal condition. A hæmolytic streptococcus infection, an early appearance of symptoms from

the date of delivery or operation, a persistent high temperature, pulse rate above 110 per minute, frequent rigors and intractable diarrahoea mean grave prognosis.

Under favourable circumstances the exudate is completely absorbed and recovery is complete. If abscess forms and it is drained, recovery is generally rapid. But there are cases where suppurative process takes a long time to point and in these cases it may be a matter of months. In untreated cases, in cases with continuous septic absorption in spite of operation and where pyæmia has developed, the outlook is grave.

Treatment.—*Prophylactic* :—It has already been stated that puerperal infection is the main cause of pelvic cellulitis. As for infection travelling from an operative wound of cervix or vagina it is rather an unfortunate accident that crops up on rare occasions. Ulcers of rectum or cervix or cancer of cervix may cause pelvic cellulitis and are produced from neglect of patients in seeking advice in time and such cases are as well rare.

Thus the most important factor that requires control is the puerperal sepsis.

Statistics show that the organisms that cause puerperal sepsis are :

(1) Hæmolytic streptococci—particularly belonging to Lancefield's Group A
(2) Staphylococci
(3) Pneumococci
(4) Anaerobic streptococci
(5) Bacillus coli
(6) Bacillus Welchii and other spore bearing anaerobic bacilli.

The last three types of organisms are normally present in or near the genital tract—the anaerobic streptococcus in the vagina and B. Coli and B. Welchii in Faeces and therefore may easily reach the skin of perineum and vulva. But these organisms cannot flourish in normal lochia unless there is some necrotic tissue to help them. The transmission of organisms is of course favoured by the passage of hand or instrument and so this type of cases may be regarded as cases of complicated midwifery. Thus in normal deliveries infections of this type of organisms are rare. As for the complicated cases, the control of infection lies in the hands of the obstetrician.

In infections due to the other group of organisms—the haemolytic streptococcus, staphylococcus and pneumococcus—the problem is a very different one. The control of such infection lies again with the obstetrician and the attendants. There is also a possibility of air-borne infection. The patient herself may be harbouring the germs in her respiratory passages or in some ulcers somewhere in her body. Therefore a prenatal, intranatal and postnatal care of the patient and surgical cleanliness of the attendants and dressings etc. become imperative. The place of delivery is also another factor which deserves a good deal of consideration.

Drugs of the sulphonamide group such as Prontosil, ureasulfazide are proving very useful in the prevention of puerperal sepsis, particularly of the haemolytic streptococcus group.

Curative treatment :—The patient should be enjoined complete rest in bed. She should have one or two good bowel movements daily and laxatives may be given for the same purpose, if necessary. Hot vaginal douches every six to twelve hours according to the severity of inflammation is useful. Pain is best relieved by hot applications over the lower abdomen. In some cases cold applications give more relief. Sedatives may be necessary but morphia should not be given as a rule, as it disturbs stomach, checks secretion and in addition masks the pain to such an extent that the progress of the case cannot be watched properly. Coal tar derivatives mask the fever and so they are also to be avoided.

Foreign protein treatment such as Aolan or sterilised milk injection given intramuscularly is very useful. The first injection consists of 5 c. c. of Aolan or milk—the latter being sterilised by boiling for about 10 minutes. The reaction is usually fairly severe,temperature rising to about 103°F.or 104°F. in a few hours and then subsiding. The subsequent injections consist of 10 c.c. doses at intervals of 3 to 5 days, depending upon the severity and duration of reaction. Generally, 6 to 12 injections suffice.

Chemotherapy :—Drugs of the sulphonamide group are much more useful as curative agent than they are as preventive measures. Diathermy and Inductothermy are also useful and Inductothermy *i.e.* heat produced in the body by induced current, has proved to be very useful in relieving congestion and in absorption of exudates. If infection has taken place through an operation wound, the sutures should be removed so as to give free drainage to the inflamed area. If the infection has followed labour or

abortion the interior of the uterus may require to be explored either with the finger or with a curette. In these cases glycerine tampoons and glycerine poured into the uterus are very useful. In some cases where the internal os shuts in secretions and lochia, the os may require dilation for proper drainage.

If pus has formed and can be felt low in the pelvis, it should be opened and drained by vaginal incision and a self retaining rubber drainage-tube should be inserted for proper drainage. Irrigation of the abscess cavity is to be avoided. Gauze drainage is worse than useless. A considerable proportion of failures and secondary operations are due to improper drainage.

If a collection of pus or a mass of exudate that may or may not contain pus is formed high up in the pelvis it should not be disturbed during an acute attack unless the patient's life is threatened. Abdominal operation should be avoided if possible during an acute attack. In some cases the inflammation may subside completely by the ordinary measure already mentioned. In others, the virulence of the organisms will get much less later and then the operation can be carried out with much less danger. In those cases where delay is dangerous, the abscess may be opened extra-peritoneally and the route followed is the same as for the ligature of the external iliac artery.

Blood transfusion may be very helpful in anaemic cases with low vital resistance. Repeated small blood transfusions are also useful. Autoserotherapy also gives good results in some cases. Vitamin deficiencies are also to be corrected—particularly Vit. C and D.

Other measures to improve the patient's general condition and to help elimination are the same as for acute infection elsewhere.

A Programme for Dealing with A Case of Eclampsia

BY

R. K. Bhattacharyya, M.B.,

P. O. Nabadwip (Nadia).

Prevention.—Eclampsia is a common disease amongst the Indians. Not only is child birth still regarded by the women folk as an occurrence filthy in nature, but also the expectant mother is scarcely allowed to be treated by a Doctor, however ill she may be, mainly for fear of abortion being caused by medicines and to a great extent by carelessness. Disorders of pregnancy are regarded as inevitable complications that would ultimately pass off after childbirth. So, constipation, scanty urine, oedema feet and anasarca together with anæmia, headache and all concomitant signs and symptoms are allowed to go on and when a seizure of eclampsia actually takes place, the weird wizard gets the first preference to drive away the devil that must have possessed the unfortunate victim. Thus, the progress of the case goes on, aggravated by the meddlesome witchcraft, till some better sense prevails and induces the party to see what a doctor can do in the matter. The remedy is female education, for, otherwise, even educated people are often found to yield to the superstitious waywardness of their women folk. Surely, eclampsia is preventable to a very large extent by adequate antenatal care. Municipalities should strictly be enjoined to employ a sufficient number of trained midwives, to keep watch over all expectant mothers in the towns and to diffuse knowledge about the dangers of the pregnant woman. District Boards, Local Boards and Union Boards may all be induced to engage travelling midwives who would preach, missionary-fashion, up-to-date knowledge about the pregnant stage and childbirth, prenatal and postnatal care of mother and child, and the myth of possession by the evil spirit. Unfortunately, the majority of the women who suffer from complications during pregnancy actually get well uneventfully after delivery and thus afford the unbelieving housewife ground for rejecting modern ideas. Fotunately with the general awakening of India, converts to modernism are fast growing in number. These families may be educated by leaflets such as how to keep watch over the maladies of the

pregnant women and when to seek medical advice. It is, however, highly desirable that such medical advice and visits should be arranged by the concerned corporations free of charge to the family, on receipt of a notice only.

The individual medical practitioner can do much to help the women folk of families of which he is the attending physician by diffusing knowledge in matters of childbirth amongst them, as soon as a pregnancy occurs. And he can insist on being kept informed of all ailments, however insignificant, of the expectant mother. Generally speaking, it is a sound policy to examine catheter specimens of her urine every week or fortnight and look for albumin. Eclampsia occurs very frequently in those with albuminuria. There are however cases of chronic Bright's disease, in whom there occurs gradual aggravation of the nephritis with successive pregnancies but without the occurrence of eclampsia. Therefore, recent appearances of albumin in the urine is the more to be apprehended. It should also be remembered that the symptom-group of scanty urine, constipation, lassitude and headache is always to be dreaded, even without the appearance of albumin, specially if it be the first pregnancy, for eclampsia sometimes occurs without albuminuria. In any case, whenever suspicion arises, it is sound policy to put the patient to bed, keep her on a milk diet and eschew meat, fish, hot spices, fried food and rich dishes, to keep the bowels open, the urine free and the nerves soothed by bromides and alkalies. Such help would tide over an impending attack; or if an attack comes it would in all probability be mild.

As a general rule, pregnant women from the sixth month onwards should rather be placed on a plain diet with plenty of milk and without meat or fish; and if there be much œdema or anasarca, salt may profitably be withheld, for a salt free diet improves the water logging while it keeps the blood pressure down. She must be kept aloof from all worries, anxieties, mental and bodily strain, and irregular habits. But general activity must not be curtailed till, from signs and symptoms, rest is considered absolutely desirable.

It has lately been discovered that an impending attack of eclampsia shows itself by a sharp rise in blood pressure of the patient. In expectant mothers, apart from the routine examination of urine, blood pressure readings should also be regularly taken at frequent intervals, specially if there be the premonitory complications as stated above. A reading above 120 should be regarded with suspicion, and steps taken for lowering it.

Eclampsia, like an apoplectic stroke may occur without any warning in the shape of previous signs and symptoms. These cases may be anticipated by blood pressure readings.

Treatment.—In the great majority of cases the patient is a primipara and she is already inwardly in labour, although unable to express the fact. Seizures that take place before labour has set in or after delivery has occurred, are generally more amenable to treatment. Yet, the prognosis in eclampsia should always be regarded as grave. The danger is really very great if the convulsions follow one another in rapid succession, if coma appears at an early stage, if there is anuria from before and if the temperature runs up high and tends to be continuous at that level. Even then one should not despair of a case till the very last, for desperate cases have been known to recover after dogged perseverance on treatment. Death results from the coma and toxœmia, from exhaustion in a paroxysm, from the very high internal temperature in hyperpyrexia, or from sequelae, like pneumonia, septicaemia, etc.

Of the innumerable theories as to the causation of the disease the one most amenable to reason appears to be a condition of auto-intoxication produced by a pathogenic autolitic stage in the placenta—The Placental Theory.

But like the futility of local treatment of the wound in a case of tetanus, prompt evacuation of the uterus with removal of the placenta, does not help and is now regarded as meddlesome treatment that does more harm than good. So, if the labour is otherwise normal recourse should on no account be had to accouchement force. In abnormal cases, of course, relief must be given at any cost. As in tetanus, the toxin becomes fixed to the central nervous system and causes the spasms centrally, so also there may be some fixation of the toxic material to the C.N.S. in eclampsia. The uniformity of the disease picture with regard to the nature of the spasms-(epileptic in one word)-points to the toxin acting on the brain and spinal cord by fixation. The preparation of an anti-eclamptic serum from cases that have been cured, and the early employment of such serum in massive intravenous doses, is an idea worth investigation.

As in tetanus, external stimuli provoke an attack, so also in eclampsia. On getting a case one's first look-out should therefore be to place the patient in a quiet darkened room, to loosen all tight fitting garments, and to keep the patient

undisturbed. An intelligent nurse should constantly be on guard, ready with an improvised mouth gag to prevent injury to the tongue in the fits. It is better to place the patient on her side to let mucous secretions dribble down instead of interfering with respiration.

Often times no diagnosis is necessary; but one should keep in mind hysteria, epilepsy and apoplexy, in unusual cases. If the patient be conscious between fits, one should immediately administer a brisk purge like S. S. Mag. Sulph., or Pulv. Jalap. Co., if unconscious, Croton oil in two minim dose on the back of the tongue should be administered. If the fits recur very often it is better to give an injection of morphia straight off in 1/4 grain to 1/2 grain dose. Now watch her to find if she is already in labour; if so, one can keep her under light anæsthesia by chloroform. The progress of labour is always undisturbed by the convulsions. But the successive pains call forth successive fits, and these can be minimised by the anæsthetic. It can also be employed to enable an examination P. V. or of the B. P. to be made, or a treatment like an intravenous injection or lavage to be given in a calm atmosphere. But the inhalation should always be in small whiffs and for short periods only, and is only to be employed when actually necessary.

One should try and examine a catheter specimen of urine for albumin, sugar, acetone and diacetic acid. A simple bed side test for the last, is the addition of 3 c.c. of urine to a few drops of liqr. ferri. perchlor. :—A deep red colour which disappears on heating is positive.—Swayne. No separate test for acetone is needed when diacetic acid is detected. The presence of diacetic acid is a contra-indication to the employment of chloroform, while albumin and the quantity of urine passed indicate the amount of actual attention that the Kidneys require.

It should always be remembered that the more the number of fits, the greater is the amount of waste products that accumulate within the system for removal and the greater is the amount of damage done to all the internal organs and other tissues, and the consequential rise in pulse rate and temperature. The pathology of eclampsia in one word is capillary hæmorrhages, cloudy swellings and the retention of products of protein disintegration everywhere within the system. The toxin has a tendency to cause an initial rise in blood pressure and this rise aggravates the disease picture by inducing the rapid succession of seizures. It acts like a vicious circle till the very last when heart failure sets in. It has been found that by keeping the blood

pressure down the fits can be wonderfully controlled. Full blooded patients may be bled to let out some toxic matters with the blood. But bleeding has its limits and can scarcely be done with impunity in private practice. The introduction of injection of Veratrone as a routine measure has ousted blood letting to a very large extent. It can be safely employed and repeated with the Sphygmomanometer as its guide. 120 m.m. is taken to be the danger point. The B. P. must be kept below this by frequent readings. The initial dose is 1/2 to 1 c.c. hypodermically, determined according to the height of the B. P. Readings are taken frequently, and if there be no appreciable fall within one hour or if after an initial response the pressure rises again, the dose may be repeated. The injection of Veratrone may sometimes produce a sharp fall of blood pressure, considerably below 100. This need not cause anxiety; but if collapse appears, saline glucose per rectum and strophanthin I. V. may be administered. If the fits still recur, morphia may be repeated.

The rectum may be emptied by a good bowel wash. If found convenient the stomach may also be emptied by emetics or by washing out with the stomach tube. In the latter case 2 ounces of S. S. Mag. Sulph. may be conveniently left within the stomach for hydragogue action. For hyperpyrexia, ice baths and ice caps may be supplemented by copious iced bowel washes; a weak solution of Potass. Permanganas used for the purpose, may serve to relieve toxaemia to some extent. The axillary temperature should not be allowed to rise above 100 F.

If there be history of scanty urine from before, the loins at the kidney region may be dry-cupped or covered with hot linseed poultices or antiphlogistine. Continuous rectal saline by the drop method, prompts the kidneys to action. In the meantime, the skin may be induced to sweat by hot packs. In mild cases the time honoured bromide chloral mixture does immense benefit. If necessary this may be given per rectum. To induce diuresis and to feed the heart at the same time, glucose solution may be injected intravenously or if this route be considered undesirable, intramuscularly. This serves to make up for inanition during the period of unconsciousness. Injections of luminal or luminal sodium may be given to lessen irritability of the brain cortex.

The Use and Misuse of the Curette

BY

Beatrice Noel Fletcher, M.B., Ch.B., D.T.M.,

John Bishop Memorial Hospital, C. M. S. Anantha Nag. Kashmir.

I. **The Curette.**—is of great service when the patient is suffering from immediate or remote effects of retained products of conception. The presence of these products (which may be so minute as to defy detection by any means except the microscopical examination of the tissues evacuated by curettage) may be suspected when the patient gives a history of an abortion, or the termination of a full-time pregnancy, followed by :—

(1) Severe hæmorrhage per vaginum persisting from the time of abortion (or delivery).

((2 Severe hæmorrhage commencing some weeks after the termination of pregnancy.

(3) Irregular hæmorrhage between and severe loss at, the menses.

(4) Excessive menstrual loss—in both (3) and (4) the trouble following a termination of pregnancy.

When a patient gives such a history, a curettage is indicated and if correctly performed almost invariably leads to complete cessation of the trouble.

It must be remembered that in these cases the wall of the uterus may be much thinner and weaker than normally, and the curettage must be performed with extreme gentleness coupled with extreme thoroughness. Personally, in a case where the trouble is of recent origin and hæmorrhage is still active, I prefer a blunt flushing curette to any other, and I mix one fluid drachm of Liq. Iodi Mit in the last pint of water used, the temperature of the water being 115°—120° F. Neither the uterus nor the vagina should be packed, nor should gauze be inserted in the vagina after the operation. An external dressing, sterilised, is all that is required. Following the operation, the patient may be given a mixture containing a small dose of Ext. Ergot Liq. for a day or two, to be followed by an Iron tonic.

II. **The term "Endometritis".**—Is loosely used. A true endometritis is by no means a common complaint. In certain cases of endometritis a curettage proves of real value, in others

it has little effect. If the infection of the endometrium is believed to be of recent origin and appears to be localised, I believe that it is better to refrain from curettage, since the operation may result in a breaking down of the protective barrier formed beneath the infected tissue, and lead to a more generalised infection with serious results.

III. **Diagnostic Curettage.**—There are patients who come to us complaining of a watery, blood stained discharge per vaginum, noticed daily or at irregular intervals. Usually, these patients have passed the menopause, and at once we suspect carcinoma of the body of the uterus, the alternative diagnosis being senile endometritis. Should the disease prove to be " carcinoma of the body " a hysterectomy is imperative, and the Surgeon who undertakes a curettage with this diagnosis in mind should be prepared immediately to perform hysterectomy, should his suspicions prove correct. Should the diagnosis of Senile endometritis prove correct, a curettage *may* effect a cure, and in any case opportunity must be given to see its effect before more radical treatment be undertaken.

In a country such as India, where the distance to the nearest large hospital may be great, and the poverty of the patients be extreme, it may not always be possible to act as indicated above, and for this reason an alternative course of action is suggested. Let the patient be prepared for a curettage. When she is fully anæsthetised, the Surgeon will dilate the cervical canal and gently scrape the uterine wall. If the disease be carcinoma of the body, soft fragments of Necrotic tissue will come away from one portion of the wall ; these fragments will usually be of the consistency of Dutch cheese. If such fragments are seen, stop the curettage at once. If *no* such fragments are seen, continue with a gentle and thorough curettage. Needless to say, it is only experience, preferably gained through working with an experienced gynæcologist, that can lead to skilled and accurate diagnosis and treatment in many of these cases.

IV. **Sterility and Dysmenorrhœa.**—I deal with these last, as though curettage is often advised as a means of relieving these troubles, it is really to the dilatation preceding the curettage that the relief obtained should in most cases be credited.

Sterility :—The writer has had many happy results from carefully chosen cases. The most hopeful are those in which the uterus is of normal nulliparous size, with a very tight conical

cervix. After dilatation has been performed, a thorough curettage is carried out, and it is most important to remember the area near the cornua and the strip of tissue across the vault of the uterus. In this country where risks of post-operative infections are rife, it is my custom to dry out the uterine cavity with a little sterile wool wrapped around a Playfair's probe, and then to swab the cavity with a probe similarly prepared but dipped into Liq. Iodi. Mit. (the excess of Iodine being expressed from the wool before the cavity is swabbed). It is important to see that the wool is tightly adherent to the probe as otherwise it may be lost in the uterine cavity and retrieved with difficulty.

If possible, the operation should be performed a few days after the cessation of the menstrual period, and after remaining five days in hospital the patient should return home, and marital relations be resumed without delay.

Dysmenorrhœa :—Curettage is usually futile as a means of relieving dysmenorrhœa. If the trouble has apparently arisen as a sequel to an endometritis, it may be justifiable to see whether any benefit occurs from the operation.

The Misuse of the Curette.—The curette is grossly misused :—

(1) If asepsis is not perfect.

(2) When used in the examining room of the Out-patient Department. I am distressed at the off-hand way in which doctors use the curette in the course of a morning's work. It must be constantly borne in mind that the uterine cavity opens, by means of the Fallopian tubes, directly into the peritoneal cavity of the abdomen. To perform a curettage without the strictest attention to asepsis is an act of criminal negligence.

(3) A curettage should never be performed (except in an emergency) if there is a history of remote or recent gonorrhœal infection.

(4) Curettage is futile as a remedy for amenorrhœa.

The writer is fully aware that the above article is by no means exhaustive, but if it leads to more thought and care on the part of many who have to decide whether or not to perform a curettage, and to a greater measure of safety and relief for the women of India, it will not have been written in vain.

Cervical Erosion

BY

Elizabeth Pais, M.B., B.S.,

Lady Hardinge Medical College, New Delhi.

THE majority of cases that present themselves at the general O. P. D. in Zenana Hospitals are suffering from chroric infection of the cervix.

Causes.—The primary lesion is usually laceration of the external os during labour. This may be extensive or slight and has no index of the type of labour and has no bearing on the amount of subsequent cervical infection.

In nulliparæ the usual cause is gonorrhoea. Less commonly the trauma of instrumentation may be followed by infection, while tuberculosis and syphilis are very rare causes.

Pathology.—On account of the trauma and the gaping of the laceration brought about by muscular traction, pyogenic infection supervenes and tends to become chronic. Besides inflammatory reaction of hyperæmia and œdema, an important result of this infection causes pathological stimulation of the secretory function of the cervical glands. Hence the secretion increases and forms with the inflammatory exudate, the white discharge or leucorrhœa, so characteristic of the condition.

The continual discharge produces in turn maceration and desquamation of the squamous epithelium surrounding the external os. The raw surface so produced becomes covered by a layer of columnar epithelium with associated racemose glands which is thought to be an extension outwards of the epithelium lining the cervical canal. The process is really one of metaplasia as in many cases the epithelial cells present aberrant appearances partly squamous, partly columnar.

The denuded area covered by foreign epithelium forms a red ring round the split external os. This is easily seen on examining with the help of a speculum, when the red, granular patch, suggesting an ulcerated or eroded surface shows out clearly. The surface is covered usually with a viscid mucus or a muco-purulent material.

It is velvety to the touch and the name " Erosion " was given to it when it was still thought to be merely an ulcerated area. This name persists though a better one, " pseudo-adenoma" has been suggested.

A similar condition may be found in virgins and may be due to congenital extrusion of columnar epithelium and glands beyond the external os or to congenital metaplasia in this region. It is called a congenital erosion and may be one of the causes of leucorrhoea in virgins.

It is probably one of the predisposing factors in cervical cancer of nulliparae. The condition has to be distinguished from Ectropion of the cervix, where after bilateral laceration the two cervical lips flare apart, exposing the mucosa of the cervical canal. This is normally rugose and reddish and may closely simulate erosion.

Microscopically.—A piece of tissue cut from the surface of an erosion shows hyperæmia and round-celled infiltration and there are scattered areas of desquamation of the stratified epithelium. In many cases, the characteristic change is in the appearance under the squamous epithelium of numbers of irregular gland spaces lined by a tall epithelium similar to that lining the glands in the canal of the cervix.

These down growing gland tubules may project into the spaces where desquamation has occurred and may actually open on the vaginal aspect of the cervix. Later on the cervix may be much thickened by inflammatory infiltration throughout its entire substance and areas of lymphocytic infiltration are found mostly under the surface epithelium or surrounding the glands and blood vessels. Attempts to restore the squamous epithelium are soon made and growth of these cells occurs from the periphery towards the external os either superficial to or deep to the columnar epithelium. In this way the erosion may be covered over and the red halo disappear from the external os, being replaced by tissue rather pale and more sclerotic from the normal pink mucosa of the vaginal aspect.

The orifices of the glands in the erosion, however, become blocked either by inspissated secretion, by fibrous or epithelial plugging which may fill the entire glandular lumen. The glands become distended and produce fosses or knobs of varying size-mostly on the vaginal aspect of the cervix—the nabothian follicles. This has to be distinguished from carcinoma *i.e.* the hard nodular condition of an early localised carcinoma. But the diagnosis clears up at once if they are pricked with the knife when the viscid contents can be expressed.

Similar changes may occur in the cervical canal from inflammatory blockage of the gland ducts which by escaping the

effect of local treatment may lead to a persistent leucorrhœa inspite of local cure of erosion. Such glandular distension if advanced and multiple may occupy most of the cervical tissue and produce cystic disease of the cervix.

While these reparative changes are proceeding the original infiltration of the cervix becomes replaced by fibrosis, so that the hypertrophy is replaced by fibrotic atrophy. With the occurrence of the menopause and the reduction of blood supply during this time, atrophy becomes more marked and the cervix previously eroded, hypertrophied and thickened may be represented by a mere nodule in the vaginal vault. The epithelium does not share in this atrophy and may be normal and active up to an advanced age. This is the reverse of what occurs in the body of the uterus and is one of the most important aspects of the predisposition of the cervix to carcinoma.

Local extension of the inflammatory process is common. Extension into the base of one or other broad ligament producing infiltration, and tender to touch and the common clinical symptom of iliac pain, is present in about 60 per cent. of these cases. This is more common on the left side where cervical laceration is more usual, and as the infiltration is later replaced by fibrosis there will be a fibrous cicatrized cord stretching across one—usually the left-vaginal fornix, with impaired uterine mobility.

Posterior extension of the inflammatory process will involve the utero-sacral ligaments and is one of the main causes of low backache in women. This is detected clinically by pain in attempting to move the cervix forwards. Upward extension to body may be by :

(1) Direct spread—very unlikely.

(2) Via cervical lymphatics—usually.

So chronic irritation with fibrotic hypertrophy occurs followed by endometrical hyperplasia and menorrhagia which is also caused by the thickening of the tunica albuginia in the ovaries to which the infection will also have spread. This prevents the follicles rupturing and therefore corpus luteum formation.

Further extension may affect the whole of tubo-ovarian region and may cause any degree of involvement from the slightest stenosis or kinking, interfering with tubal potency and thus predisposing to tubal gestation or if bilateral to sterility and also Salpingo-oopheritis.

Carcinoma may also be a sequelæ.

Symptoms.—*Leucorrhœa* is a constant symptom and may be the only pelvic complaint. More or less persistent vaginal discharge usually viscid, due to the large admixture with mucus from the cervical glands and sometimes purulent. This may irritate the mucous and skin surfaces of the vagina, vulva and thigh.

2. *Pain*—usually in the lower abdomen and more especially in one or other iliac fossa or in both fossæ. It may be in the flank or in the upper abdomen, also in the back, in sacral or coccygeal regions and in hip and thigh. Discomfort or even acute pain during defæcation. These aches and pains increase before and during the periods and as a result of any exertion and when examining if the cervix is touched acute pain or nausea may be felt. This is one cause of dyspareunia. Frequency and dysuria may be due either to sympathetic reflex or by the infection spreading directly or by blood stream.

3. *Menstrual troubles* :—Menorrhagia and Polymenorrhoea are common and premenstrual and menstrual aggravation of pain in the abdomen and back is frequently complained of. This is due to the general pelvic congestion which accompanies the primary cervical disease or to an involvement of the ovary in an inflammatory spread from the cervix. Or to influences reaching the ovary by way of the sympathetic.

4. *General ill-health* : –The chronically infected cervix is a focal source of sepsis and hence a not infrequent source of systemic disease. This is seen by the improved general health and sense of well-being that many women experience after treatment. Arthritis has been produced in rabbits by artificial injection of anærobic streptococci cultured from the cervix.

Physical signs and diagnosis—On vaginal examination the erosion is felt as a roughened area usually completely surrounding the external os and with a surface that is soft and velvet like. Scattered over it, the small hard nabothian follicles may be felt. The cervix may be much thickened in an old standing case and it may be fixed by scar tissue. In this case if the cervix is moved the patient cries out with pain and the fingers may be stained with blood derived from the congested and eroded surface. With a speculum the annular deeply red " erosion " is recognised and where there are present the pale spots denoting the follicles.

Because of its wide distribution this pain of cervical origin is apt to be a source of confusion in diagnosis. Tubal or ovarian

mischief is wrongly suspected and in the presence of a uterine displacement the pain may be easily attributed to this.

A common source of abdominal confusion arises from the frequent right iliac fossa, pain being mistaken for appendicitis.

The diagnosis in such cases rests on :—

(1) The presence of an accompanying leucorrhœa.

(2) Dating of symptoms from a preceding abortion or child birth or gonococcal infection.

(3) On pain response evoked by pressure of the cervix.

(4) On absence of characteristic features of tubal infection, appendicitis etc.

(5) The erosion on the external os.

In doubtful cases an examination under anæsthesia may be necessary to determine the absence of tubal disease. And in some cases careful examination has to be made to exclude appendicitis. It is important to note that tubal infection may be accompanied by chronic cervicitis when treatment should be for both.

Erosion from its roughened surface and the fact that it sometimes bleeds on being gently scraped may simulate malignant disease. To exclude it a piece of tissue should be removed for microscopic examination in every doubtful case.

Treatment.—As chronic infection of the cervix is a frequent legacy from child bearing, the ideal time for its recognition and treatment is during the post-natal period, before it has produced deep seated structural changes. Hence the importance of post natal examination of every woman at the end of four or six weeks after delivery.

1. Local applications of caustics or antiseptic medicaments and douching are not useful.

2% silver nitrate in glycerine, 2% aqueous solution of mercurochrome or better still, violet green ½% aqueous solution has been tried. But as patients usually come up in the later stages, this treatment has proved ineffectual.

2. In cases where the cervix is greatly enlarged and deeply disorganised amputation should be done.

3. A very useful treatment is dilatation of the cervical canal to full extent short of tearing the tissues. The mucosa and underlying structures of the cervical canal are then scarred

longitudinally with the short terminal of the electric cautery along its entire length from the internal to the external os. and including at its lower end the eroded area on the vaginal surface. Three such strokes of the cautery on the posterior wall, followed by a similar number on the anterior wall are usually sufficient. Any visible nabothean follicle should be punctured. This should be done under an anæsthetic. Curettage is usually neither necessary nor advisable.

If there is Ectropion a repair operation is indicated.

The cauterisation may have to be repeated once or twice. The patient is allowed to get out of bed within five or six days. Very little post-operative pain occurs. Hæmorrhage may occur immediately after or at the end of a week when the glands separate. Vaginal plugging should be resorted to.

4. *Diathermy* :—(*a*) Coagulation diathermy :—The patient is given a soda bicarb douche (3i to the pint) just before the treatment. Then the erosion is cauterised with the diathermy apparatus.

The patient is told to take the soda bicarb douche daily for three weeks to one month at the end of which she is seen again. If not healed the process is repeated. The erosion usually heals with one or two applications.

5. *Technique used by Cumberbatch and Robinson* : — An electrode is introduced into the urethra and by means of diathermy currents the tissues immediately surrounding the electrode are heated to a temperature of 115°F. This temperature is estimated by the patient's own sensation being taken as the point where the sensation of heat changes to that of pain. The cervix is then treated in a similar manner. The current used for the sensitive urethra being taken as the standard for producing the same temperature in the unsensitive cervix.

In cases of parametritis and salpingitis, this temperature may aggravate the condition and here a weaker current is employed.

6. *The intrapelvic electrode* is 1 inch in diametre. It is sheathed in Vulcanite except for 1½ inch at the end in cantact with the upper end of the vagina against which the instrument is placed.

This end is rounded so as to give an even distribution of heat. The indifferent electrode is placed on the lower abdomen

and consists of a lead belt 2½ inches wide. With these electrodes a current of 2 ampoules gives a temperature of 106°F. in the tissues in the immediate neighbourhood of the metal part of the vaginal electrode. The treatment lasts 20 minutes each and is given twice weekly. The duration of the treatment depends upon the response obtained. This treatment is indicated where arthritis is super-imposed.

7. In very resistant cases where pain is distressing, blockage of Frankenhauseis' sympathetic plexus with 85% alcohol helps to relieve the pain. This may last for only 2—3 months. The syringe with a long needle is used which is introduced in the lateral fornix and passed upwards along the side of the cervix for 1 inch ; from 5—6 c.c. of alcohol is introduced on either side. The solution should be kept flowing whilst syringe is being drawn.

The intra cervical diathermy is used for gonorrhœal cases.

In this hospital, out of 30 cases treated with coagulation diathermy only one case had to have two applications. All were cured.

Cancer of the Cervix and the General Practitioner

BY

Major P. C. Dutta, M.B., F.R.C.S., (E),
D.G.O. (DUBLIN), I.M.S.

Civil Surgeon, Gujrat, Punjab.

THE success in any sphere of life depends on being able to foresee the future and adopt measures accordingly. The application of knowledge and skill in anticipating a disease and the course it is likely to follow is of supreme importance in our profession. It is very often regarded that the general practitioner is hardly of any use so far as this disease is concerned. To a superficial thinker this may be so, but the role which the general practitioner may play in this disease is far more important than any specialist if we go a little deeper and explore the 'whole truth' of the disease. The general practitioner is the friend and adviser of the family and therefore is the more important person so far as the patient is concerned.

Apart from this, cancer, specially of the cervix, is not a disease that comes on suddenly nor does it occur in a day or two. It is generally superimposed on an injured or previously diseased cervix. This fact is the basis of the scope of the general practitioner in the field of cancer of cervix. What I mean is that in most cases it may be prevented by adequate treatment of what is generally known as the precancerous lesion. It is this aspect of the disease that I want to impress on the general practitioner. The specialist, to be frank, can only carry out a severe and mutilating operation with hardly 30% successful result. Even this will depend indirectly on the general practitioner, as he is the person who is likely to see the early cases and refer them to the specialist. If and when the patient consults the specialist herself, the disease is usually too far advanced for successful treatment, as very few patients go to the specialist direct for minor and trivial complaints and it is during the period when the complaints are minor that a fairly successful result can be expected from the treatment available at our disposal. Radiological treatment with or without operation although has given slightly better results in expert hands, is generally not available in this country.

So, I want to emphasise that by applying his knowledge and skill, the general practitioner can help his patients more than the specialist. But to attain this, he must view the disease from a different angle. He must firstly try to prevent the disease and secondly must be able to diagnose an early case. If he has to wait for the appearance of full fledged signs and symptoms of the disease for his diagnosis, when any layman can do it, he has certainly failed to reach his objective. These are the only rational means of tackling this fell and terrible disease and too much emphasis cannot be laid on these vital points in fighting the disease.

All precancerous lesions, that is, those which are likely to develop into cancer later on, should be properly and efficiently treated. All tears of the cervix carefully sutured, ulcers adequately treated and chronic inflammatory conditions thoroughly dealt with. These are simple and within the reach of every practitioner and no special instruments or highly specialised knowledge or skill is required for the purpose and if conscientiously carried out will prevent the majority of cancer. The importance of the other point, viz., early diagnosis, is obvious and it will be superfluous to discuss it.

So every general practitioner should be alive to these very vital facts in combating the disease and should dispel the idea from his mind that he is a mere onlooker and has no active part to play. On the contrary his position is of greater importance and value to the society than the specialist whose success ultimately depends on the skill and ability (to diagnose early cases) of the general practitioner.

Clinical Features.—It is the commonest malignant growth of the genital tract.

Predisposing cause.—Child bearing and laceration of the cervix.

Varieties :—1. Extracervical or arising from portio vaginalis. This is usually squamous celled cancer.

2. Intracervical or arising from the cervical canal. This is usually an adenocarcinoma.

The extracervical or squamous celled cancer is far more common than the other. As cell metaplasia is common in the cervix, one type may change into the other and it may not be possible to be absolutely certain of the exact type.

Naked Eye Appearance.—According to the situation, variety of the growth and age of the patient, it may be a nodule, ulcer or proliferating growth.

1. *Ulcerative* :—Less frequent of the two. It usually starts as an erosion, and so is always extracervical. It is a flat sore with shallow hard edges.

2. *Proliferative* :—This is of two types :—

(*a*) Extracervical—Cauliflower like growth arising from one or other lip of the cervix.

(*b*) Intracervical—Arises from the deep layers of the epithelium of portio vaginalis or the epithelium of the cervical endometrium. It appears as a spherical or nodular mass and the cervix is enlarged and irregular.

Symptoms.—Onset—Insidious.

Earliest symptom—Small amount of *bleeding*, usually painless and often occurring after coitus or examination.

Next symptom to appear—*Discharge*, of a thin yellowish or brownish colour, usually not fœtid.

Hæmorrhage alone or in company with discharge forms the earliest symptom in 65% of cases.

Later—Leucorrhœa-It is inoffensive in the beginning, but becomes fœtid when the growth is ulcerated, due to secondary infection. By the time fœtid discharge appears the growth is usually inoperable.

Pain—Never an early symptom. It comes on when the growth has extended into the cellular tissues, vagina or body of uterus, or due to secondary infection of the growth. It is of a dull aching character and usually felt at the lower part of the back and is worse at night.

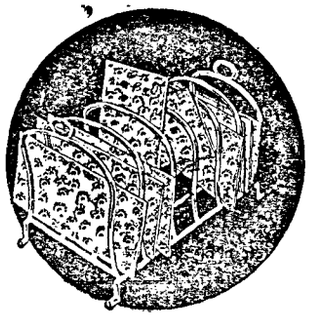
By the time the discharge has become fœtid and pain appears, the growth is inoperable and so these symptoms are of no use for early diagnosis.

Late symptoms. Cachexia and wasting—Due to anæmia from toxic absorption, loss of appetite, sleeplessness and want of rest.

Symptoms due to extension of the growth :—

1. Anteriorly—(*a*) Involvement of the vaginal wall and urethra—Painful micturition and retention of urine ; (*b*) Extension into the bladder—Vesico-vaginal fistula.

2. Posteriorly—Recto-vaginal fistula.



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Involvement of the rectum may cause obstinate constipation and other symptoms consequent to that.

Signs.—These depend on the nature and site of the growth and duration of the disease.

1. Extracervical or squamous celled cancer.

In the early stages it appears as a dark red indurated patch near the external os. It spreads upwards into the cervix or downwards into the vagina and usually looks like a cauliflower. It is *friable* and bleeds easily. It is of a more dull and darker appearance than the rest of the cervix and minute hæmorrhages may be present on the surface.

The vagina may be filled with the growth in advanced cases. The actual appearance of the lesion will depend upon the relative amount of proliferation and necrosis. If the proliferation is more pronounced, the result will be a fungating growth, whereas if necrosis is more predominant, cavities will be formed in the growth.

On bimanual examination the uterus may be found fixed. Fixation my be due to:—(*a*) Invasion of the growth into the cellular tissue. (*b*) Inflammation of the surrounding tissue, in which case it will usually clear up within a few days under ordinary treatment.

2. Intracervical.—This type arises high up in the cervical canal or gland and does not ulcerate quickly. It spreads outwards in all directions. On bimanual examination the supravaginal cervix will be found hard and enlarged.

Complications.—(1) Pyometra. (2) Pyosalpinx. (3) Hydronephrosis due to pressure on the ureters.

Mode of Spread.—The disease usually spreads by:

1. *Infiltration.*—Insinuation of the malignant cells between the muscle and connective tissue bundles causing their destruction. Squamous celled cancer usually spreads downwards and the columnar celled ones upwards.

2. *Permeation.*—The cancer cells grow along the lymphatic channels to the parametrium, external iliac, obturator and lumbar glands. The first gland to be affected is the one lying at the junction of the ureter and uterine artery. Cancerous glands are not much enlarged but are firm and may be hard.

3. *Blood stream.*—Metastases may occur in the lungs, liver, spleen and peritoneum.

Duration of the disease.—The average expectation of life after diagnosis is about an year and a half.

The commoner causes of death are :

(1) Exhaustion due to hæmorrhage, sepsis, pain, toxæmia, vomiting and starvation.

(2) Uræmia from involvement of the ureters.

Death may also take place directly from hæmorrhage, sepsis, pulmonary embolism, pyæmia, pyelitis, intestinal obstruction or secondary deposit in one of the vital organs.

Diagnosis.—As I have already pointed out, early diagnosis is essential for sucsessful treatment. So every case where there is any suspicion of the disease, must be thoroughly and carefully examined and the possibility of cancer must be excluded before treatment for any other affection is undertaken. Whenever there is any reasonable possibility of the disease being cancer a small amount of tissue from the edge of the growth must be excised and sent for histological diagnosis. By neglecting this simple procedure, the practitioner may lose the opportunity of saving his patient. This can always be done single handed under local anæsthesia and does not need any extra skill. While stressing these points, I do not want the practitioner to be an alarmist and send specimen for pathological examination from every patient who comes to him for bleeding or discharge, but must be able to use his discretion and skill and if there be any reasonable doubt of the lesion being cancerous after a careful clinical examination, taking into consideration the age and parity of the patient, he must insist on a histological examination before giving a final opinion. Only by doing this, he can safeguard himself as well as his patient.

Schiller's Test for diagnosis of early cancer of the cervix :— The cervix is washed with a solution of aqueous iodide (Iodine-1 part, Potassium iodide-2 parts and water-300 parts). The stratified squamous epithelium is stained dark brown, while the cancerous epithelium and the superficial cancer layer remain quite unstained and white. Normal epithelium will be stained dark brown in 20-30 seconds while the cancerous epithelium will remain white.

It must be realised that the non-staining is due to the absence of glycogen in the cancerous region (which is normally present in the cervical epithelium). In certain other conditions which cause disappearence of the glycogen from the epithelium, the same effects may be noticed, for example :

(1) Hyperkeratosis of the squamous epithelium

(2) Keratinisation developing after prolapse

(3) When the superficial layers of the glycogen containing epithelium have been rubbed off by inflammation.

The greatest value of the test lies in the detection of cancerous changes in the pre-ulcerative stage. Once the condition is suspected by the above test, further steps may be taken for the final confirmation of the diagnosis.

Differential Diagnosis.—Main points for differential diagnosis : (1) Surface is rough and *friable* (2) Edges are raised, rolled and everted. (3) Bleeds freely from one spot. (4) Parametrium may be indurated. (5) Histological examination.

1. *Cervical erosion*—It is of a bright red colour and spotted. The surface is velvety and smooth. It is not friable and there is no definite edge. After examination if it bleeds, the blood generally oozes from several minute points.

2. *Ulcer on the vaginal cervix*:—(*a*) Tubercular—Primary tubercular ulcer of the cervix is very rare. So tubercular disease in some other organ will be evident. It does not bleed readily and is not friable. The edges are undermined and on microscopic examination, giant cell system will be found. (*b*) Syphilitic—Syphilitic ulcer of cervix is very rare. It is not friable nor does it bleed readily. Wassermann reaction will be positive.

3. *Enlargement of Portio vaginalis*. (*a*) Cervical fibroid or other growths arising from the cervix—It is hard, smooth, not friable and does not bleed readily. It is encapsulated and can be readily enucleated. (*b*) Lacerated cervix with hypertrophy—Marks of old laceration will be present. The tissues are hard and do not bleed readily. It is not friable and in case of doubt histological examination will settle the diagnosis.

4. *Swelling projectingthrough the external os*.

In the case of a sloughing fibroid, vaginal cervix will be healthy. The external os is normal. The growth is hard and not friable.

Prognosis. This is usually bad, and the younger the patient, the worse it is. Earlier the diagnosis is made, better the prognosis.

Treatment.—It is not intended to describe the treatment as it is more or less known to all and is beyond the scope of the general practitioner. Radiotherapy in expert hands has given better results than operative treatment. But the latter is

the only method of treatment possible in most cases in this country. Best results have been obtained by combining radiotherapy with operation.

Diagnosis of Operability.—A case is operable when there is reasonable chance of removing the whole of the disease by radical operation. In doubtful cases an exploratory laparotomy may be done and the judgment revised. Although examination under anæsthesia is preferable for the average general practitioner and has certain obvious advantages, a more definite idea can be gained by exploration, and by itself it is attended with very little or no risk, in expert hands.

Points for consideration in deciding whether a case is operable or not.

1. *General health.*—Advanced age, much wasting, anæmia cachexia. irregular fever are contraindications for operation.

2. *Local condition.*—This is judged by the degree of infiltration of the growth as found out by vaginal, rectal and bimanual examinations.

3. *Involvement of vagina.*—(*a*) If the vaginal extension is due to surface extension of the growth from the cervix, it is operable. (*b*) If the involvement of the vagina is via the lymphatic channels, metastasis extends along the anterior and posterior vaginal walls and feels like a string of pearls, one bead after the other. In these cases the carunculæ hymenales are infiltrated. These cases are inoperable.

4. *Mobility of the uterus.*—If this is freely mobile, the case is operable. Slight impairment of mobility does not contraindicate operation ; when the mobility is much impaired, infiltration of the surrounding tissues is usually marked.

If the immobility is due to inflammatory swelling of the surrounding tissues, it usually clears up in a few days under ordinary antiseptic treatment.

5. *Rectal examination must always be done*—The condition of the utero-sacral ligaments and bases of the broad ligaments should be determined. This can best be done by a combined recto-vaginal examination. In advanced cases induration can be felt to extend on one or both sides. By rectal palpation if the finger cannot reach the upper edge of the infiltration, it is inoperable.

In the following conditions the case is definitely inoperable:

(1) When there is profound anaemia and general cachexia.
(2) Cervix is fixed.
(3) Great amount of induration in the surrounding tissues.
(4) When there is adhesion or fistulous communication with the surrounding organs.
(5) Metastasis in other organs.

In the following conditions the case is definitely operable :

(1) General condition of the patient satisfactory.
(2) Cervix is freely movable.
(3) Ligaments are very little thickened.

Symptomatic treatment in inoperable cases :—

(1) *Bleeding* :—Hot douche or plugging the vagina with some styptic *e.g.*, adrenaline. Insertion of radium always stops bleeding in a few days.

(2) *Offensive discharge*:—Douching with lysol—a teaspoonful in a quart ; Tinct. Iodine—two teaspoonfuls in a quart ; eusolor hydrogen peroxide—1 in 10.

(3) *Pain* :—Opium should be postponed as long as possible and other analgesics used. When the effect of one wears off, another may be tried, but sooner or later morphia in some form or other will have to be used.

(4) *Pruritus* :—Keep the vulva clean. Carbolised vaseline 3% or a mixture of paroline and zinc ointment may be used.

Injection of cobra venom has been claimed to relieve the pain and putrefaction of the growth. (Preparation—Coratoxyl).

Some Simple Conditions of the Cervix Uteri

Which can be treated by the General Practitioner

BY

Alice B. S. Smith, M.D., D.P.H., D.T.M., L.M.,

Pulicat, Ponneri Taluq,

Introduction.—It is not uncommon for the general practitioner to be consulted by married women who complain that they have not been in their usual health for some time; they find they are lacking in energy, have a tired ache in the small of the back, epigastric discomfort and so on.

Too often, such patients' statements are taken at their face value, and they are sent off with some such diagnosis as peptic ulcer, tabes mesenterica or neurosis. They may even be persuaded to part with teeth, tonsils, appendix or gallbladder in the doctor's valiant efforts to eradicate a "focus of chronic infection."

A little judicious questioning of such a patient would probably elicit the fact that her symptoms date from a confinement, and that recently white discharge has been more copious than usual.

The normal cervix.—In order to understand the pathology of the cervix, its anatomy and physiology may be revised briefly. The essential points to be remembered are fortunately few and simple.

The endocervix is lined with tall columnar epithelium laid down in a single layer; at the internal os, this layer merges into the flat ciliated columnar epithelium lining the body of the uterus; at the external os, it meets the many layered squamous epithelium lining the vagina. Thus, squamous epithelium covers the vaginal portion of the cervix, but it ends at the spot where it meets the columnar epithelium, there being a definite line of demarcation between them.

The glands of the cervix are not mere tubules as are those of the uterine endometrium, but extend down to the fibromuscular tissue, branching right and left as they go. They are formed from the columnar epithelium and are lined by it. Their secretion is an alkaline, translucent, white fluid of glutinous consistence.

The loose cellular tissue which underlies the peritoneum of the abdominal cavity continues down into the pelvis, and is found abundantly at the sides and anterior aspects of the uterus and cervix where it is called by the distinguishing name of "parametrium". From it are formed the sheaths of vessels, ureters and round ligaments, and through it pass vessels, lymphatics, ureters, nerves and other structures.

The cervix takes no active part in the physiological processes of menstruation and gestation.

Strictly speaking, it has no anterior and posterior lips until the termination of a pregnancy brings them into existence. The products of conception cause injury to the cervical canal during their passage through it. In some cases, the trauma may be severe, in others slight—but at least sufficient to alter the shape of the os and differentiate between anterior and posterior lips.

The pathological cervix.—If a laceration does not heal immediately, the edges become everted and present an œdematous and hyperæmic appearance. Any pathogenic organisms present in the neighbourhood are able to gain entrance there, and can pass thence to the parametrium or even further afield by way of the cellular tissue. Quite commonly, however, an irritable condition of the cervical mucosa is set up with which is associated some general inflammation of the cervix.

Nature attempts to heal the lesion from the vaginal or from the cervical side. If the vaginal mucosa claims the area, spontaneous healing takes place, and for the time being further trouble is averted. If, on the other hand, the endocervical mucous membrane quite logically considers the damaged area its responsibility, it spreads in a single layer over the exposed surface and also over any places on the vaginal side of the os externum which have been deprived of their protective layers of squamons epithelium during the period of inflammatory reaction. Wherever it advances, it is actively employed in sending new glands into the underlying tissues.

This imperfectly healed area is exposed to conditions to which the endocervical type of mucosa is unaccustomed—in the shape of friction from adjacent vaginal surfaces or during coitus; constant moistening with acid vaginal fluid is a further source of irritation. A red, susceptible area therefore persists, to which the name "erosion" or "catarrhal patch" has been given.

In association with these erosions, there is usually some degree of cervical endometritis; if this is severe, the glands may

become blocked at their orifice; the secretion which gets locked up thus, collects in pockets which eventually push their way to the surface and appear as small cysts or "nabothian follicles". These follicles are formed in a similar manner when healing of a catarrhal patch occurs and squamous epithelium once more replaces columnar epithelum on the vaginal surface of the cervix. Glands which are not obliterated in the process become blocked at their outlet, then later on, the place where the erosion once was, is found to be studded over with these tense pellet—like follicles.

The hyperplastic condition of the cervical mucosa does not always subside, but may go a step further and form small polypi. These consist of very vascular stroma containing characteristic glands and are covered with characteristic columnar epithelium. They vary in shape and size, and when numerous, cluster round the external os in an irregular row, much as a cluster of young pappai fruits encircles the stem of the parent tree. Occasionally polypi arise from the upper parts of the cervix; their tip is then apt to be bulbous and congested and the pedicle elongated, giving them roughly the appearance of small red chillies.

The sequence of events outlined above may be accompanied or followed by such a degree of chronic inflammation, that the cervix eventually becomes utterly disorganised and little better than a bag of septic crypts from which profuse mucopurulent discharge constantly escapes and from which the patient is continually absorbing toxic products.

There are one or two other conditions which cause erosion or erosion-like lesions of the cervix.

That caused by chronic gonorrhœa differs in no respect from other erosions except that its production is not dependant upon previous trauma.

The primary sore of syphilis is apt to be mistaken for an ordinary erosion. It is really an ulcerative lesion, and is usually confined to one lip of the cervix. It is raised above the level of the surrounding tissues and has a ring of inflammatory reaction round it. In some respects it resembles also an early carcinoma at the prebreaking down stage.

An early carcinoma is usually found as a localised indurated area which softens and ulcerates before long. There is no areola of inflammatory reaction around it in ordinary circumstances.

In addition to the above mentioned conditions, the physician is sometimes puzzled by finding an irregular area with a rough

granular surface towards the inner side of the lips of the os externum. It has not the friable consistence of carcinoma with which it is sometimes at first confused. It is the type of lesion typical of nothing, yet having something in common with most other types of lesions of the cervix. It is caused by unskilled attempts at procuring abortion.

Diagnosis.—Subjective phenomena caused by lesions of the cervix may be local or general, more often a mixture of both.

Localising symptoms are sometimes so insignificant that the patient does not notice them, or else does not consider them important enough to mention.

Increased vaginal discharge is probably the most common of these. It is often profuse in catarrhal conditions and long standing cervicitis. Its character varies according to cause, retaining its adhesive viscid quality in conditions purely cervical. If it is a mixture of cervical and vaginal secretion, it has flocculent curdy appearance; if of uterine and cervical secretion it is watery and thin, with cohesive pellicles of mucous in it.

A yellowish discharge denotes the presence of micro-organisms—most often the gonococcus.

Discharge accompanied by a bad odour usually means tissue is breaking down, and it is detected where there are sloughing neoplasms or advanced malignant growths.

The discharge may be hæmorrhagic in character. Occasionally an erosion produces a slightly bloodstained discharge after coitus or vaginal examinations. The most likely causes however, are mucous polypi and malignant neoplasms.

Pain is perhaps the most interesting of the subjective phenomena, for the reason that it rarely refers to the neighbourhood of the cervix at all! When it does so, it generally takes the form of dyspareunia or dysmenorrhœa.

Dyspareunia is due to movement of, or pressure on an inflamed or irritable cervix.

Dysmenorrhœa may be explained by supposing that the menstrual flow is prevented free exit by swelling of the cervical mucosa. It may be regarded as a sort of uterine colic-comparable to the colic which occurs when any hollow muscular organ contracts against resistance.

It is quite common to find that pain is referred to the regions of the sacrum, sacro-iliac joints, pubis, or epigastrium; muscular and joint pains also occur. The explanation of such remote pain is not certain, but the possibilities are worth considering.

Painful stimuli may be transmitted to other regions via the intricate system of communication between the sympathetic and spinal nerves. In the pelvis this intercommunication is peculiar in that the 3rd and often the 2nd and 4th sacral nerves also give their rami communicantes directly to the sacral plexus without the intervention of any ganglion.

From the cervix, any infection can spread via the cellular tissue and the sheaths of the structures which pass through it, or by way of the lymphatics with which the cervix is richly supplied.

An abundant layer of cellular tissue continuous with the parametrium, covers the sacrum; some of the lymphatics from the cervix drain directly into the common iliac glands which lie in front of the sacrum; the hypogastric plexus of nerves also lies in front of the sacrum. So it is not impossible to account for a lesion of the cervix causing pain in the region of the sacrum.

The sacro-iliac joints are closely related to the ureters, the hypogastric vessels, the hypogastric lymph-glands and the lumbosacral nerve trunks all of which are connected with the cervix directly or indirectly; therefore pain felt in that region need not cause very great surprise.

It is quite conceivable that pubic pain, complained of most often in gonorrhœal cases may travel by way of the sheaths of the round ligaments which pass through the inguinal canal before spreading out over the labia.

The probable explanation of epigastric and abdominal pain, muscular and joint pains, as well as neurotic and other vague symptoms is that they are manifestations of chronic toxic absorption from infected foci in the cervix though abdominal symptoms might arise by way of the cellular tissue which lies between the layers of the mesentery of the pelvic colon.

In attempting to arrive at a diagnosis the importance of interrogating the patient should not be overlooked.

It is especially valuable to ascertain whether such symptoms as leucorrhœa, dyspareunia or dysmenorrhœa are of relatively recent origin.

When epigastric pain is complained of, it is significant to observe the manner in which the patient indicates the seat of the trouble. She uses the flat of her hand in a rather vague way, whereas were the case one of peptic ulcer she would almost certainly use the tip of one finger and plant it unhesitatingly on one definite spot in a manner which is in itself quite diagnostic.

In cases of attempted abortion, the patient's manner is often helpful, being nervous and defensive. It is best to avoid asking if she thinks she is pregnant; an overdone denial is the likely result. On the other hand, a casual question regarding the regularity of menstruation gives her the opening she welcomes, and she eagerly proceeds to describe irregularities and scantiness and finishes up either by asking for something to bring it on properly, or by evincing an insatiable desire for strong purgatives. One need never be misled by a negative finding per vaginum, for every now and then patients are met with who have become panic-stricken on missing two or three periods and make frantic efforts to terminate a pregnancy which is non-existent. Indeed, one has had experience of a case where the patient made a second (and this time fatal) attempt because, after a few weeks. menstruation still had not appeared although she had been assured there was no sign of pregnancy.

General examination of the patient usually draws a blank; the same may occasionally be true of bimanual examination, for the so-called velvety feel of an erosion is by no means self-evident.

A laceration, on the other hand, is not easily missed. It is usually felt on the left side of the cervix and, if deep, running out into the fornix and ending there in bands of scar tissue.

Sometimes the cervix can be felt moored in position by strands of adhesions-the result of inspection of the parametrium.

Thickening of the cervix can be recognised in all but the mildest degrees of cervicitis.

Shotty rounded excrescences on the lip of the cervix denote the presence of nabothian follicles.

A circumscribed area of thickening is suspicious of early carcinoma.

A raised area with slightly irregular surface is likely to be luetic.

Polypi have a smooth surface and easily elude the examining finger, for they slip aside like small blood clots for which they are sometimes mistaken.

The lesions left by attempts to procure abortion vary according to the method which has been employed. What is usually felt is a slightly scooped out area round the external os with an irregular granulating surface. When the condition is suspected a careful search should be made for any sign of pregnancy-uterine or tubal.

When bimanual examination causes pain or tenderness, the distribution of the pain should be noted.

As many practitioners have to make their diagnosis without the benefit of bacteriological examinations, it is a wise precaution before withdrawing the examining finger, to run it along the anterior vaginal wall in the line of the urethra and note if the urethra is unnaturally thickened and cordlike, or if any bead of pus can be expressed from its orifice. This manœuvre may afford valuable corroborative evidence where an erosion is suspected to be of diplococcal origin.

Finally, on withdrawing the finger, the character of any discharge upon it should be carefully noted.

The physician should never be satisfied with bimanual examination alone. A speculum should be passed, and the cervix scrutinised in a good light. Erosions are then readily recognised by their bright red appearance ; polypi can usually be seen if the pousing lips of the cervix are drawn apart with vousella : tense, grey, smooth-surfaced nabothian follicles can be made out on thickened, but otherwise fairly normal looking cervical lips ; an elevated patch with slightly roughened surface and a dull red areola of reaction round it, suggests luetic sore : the passage of kutchies or instruments, or the application of irritating drugs is generally found to have left some tell-tale excoriations or abrasions which can be observed ; the source and character of any abnormal discharge can also be determined.

Treatment.—Lacerations which have not been dealt with at the time of parturition, may require to be repaired if excessive ectropion and presistent cervicitis are causing relative sterility. The operation can be undertaken in such mofussil dispensaries as have a nurse to assist and a compounder to give the anæsthetic.

Cases of uncomplicated cervival catarrh may be treated locally by touching the endocervix and swollen mucous membrane at the os with pure carbolic followed by spirit, every 2 or 3 days. It is quite common to find that patients who have complained of pain on manipulation of the cervix, cease to do so after the first application of carbolic ; in these cases there was probably a small breach of surface—analogous to the crack or fissure sometimes found at the base of a hæmorrhoid.

If uterine and cervical endometritis co-exist, the curette may be used with advantage, and it should be remembered that the cervix is in just as much need of curetting as the uterine endometrium ; yet one has often seen a uterus thoroughly well

scraped and then the curette removed through the cervix in a gingerly manner as if something dreadful might happen should it receive even a scratch !

Mucous polypi also may be treated by the curette. If not plainly visible, they are liable to slip aside out of the way of the curette and be left in situ. Those whose point of origin can be detected may be clamped at their base with artery forceps and then twisted off, and the raw surface swabbed with Tinct. Ferri Perchlor, or Tinct. Iod. Mit.

If an erosion is present, cotton wool tampons moistened with Iodine or Ichthyol in Glycerine 10 oz. may be applied and left in for about 8 hours. (Patients who use the charka may be shown how to utilise their waste cotton ends and broken threads for the purpose of preparing tampons ; these, though inelegant in appearance, prove quite satisfactory substitutes.) The hygroscopic action of the glycerine draws fluid from the hyperæmic and œdematous tissues, and if this treatment is preceded and followed by a really hot douche, any inflammation of the cervix tends to subside also. What is added to the douche is of little consequence.—the heat is the important factor.

A douche of alum ℥ i to the pint helps to harden the tissues.

Soda Bicarb ℥ i to the pint is useful in removing adherent mucus.

Silver nitrate 1 in 8,000 is the favourite douche for gonorrhœal cases.

Hydrarg Perchlor 1 in 8,000 is suitable for syphilitic lesions.

Potassium Permanganate 1 in 3,000 and boric solutions ℥ i to the pint being mildly antiseptic are suitable where there are abrasions, excoriations etc.

Erosions often do well if dried carefully and then dusted with dermatol (bism. subgallate). Where a lesion is believed to be luetic, a dusting powder of calomel may be substituted.

Tinct. Ferri Perchlor is another useful drug and any red, angry—looking surfaces may be painted over with it every now and then.

The majority of infections of the cervix are by organisms susceptible to the Prontosil group of drugs *e.g.*, the gonococcus, various types of streptococci, and B. Coli ; therefore, local treatment may be supplemented by giving sulphonomide P. by mouth. It is particulurly satisfactory in chronic gonorrhæal infections.

Nabothian follicles are best punctured with the point of a sharp scalpel and then thoroughly swabbed with Tr. Iodine ; no anæsthetic is required.

Nearly all types of infection and inflammation are influenced favourably by the exhibition of Iodine intravenously ; it is easily prepared as follows.

℞ Iodine	...	gr. v.
Pot. Iod	...	gr. v.
Aqua Dist.	...	ad. 3 i.

Of this, up to 4 c.c. may be used, at the time of administration, made up to 10 c.cs. with warm distilled water. The injection may be given twice a week for 2 weeks. The solution is irritating if it escapes into the tissues.

Cases of long standing cervicitis are not likely to respond satisfactorily to drug or local treatment though these may be given a preliminary trial. As few practitioners have facilities for carrying out treatment with electric cautery as advocated by Young, is is fortunate that amputation of the cervix is not a very difficult operation and can be undertaken in dispensaries where the light is good and 2 assistants are available.

It should be stressed that the patient's progress towards normal health will be hastened if general treatment is combined with the local and specific treatment.

The patient should be advised regarding suitable amounts of rest and exercise. She may be guided regarding her diet which should be as nourishing and digestible as she can afford and from which such stimulating things as pepper, chillies, arrack and toddy should be excluded. For those who can afford it, "marmite" may be prescribed ; it is a purely vegetable preparation, and therefore need not offend even the most orthodox Hindus. In addition, any good tonic may be given and, as soon as the local condition permits of it the patient should be advised to "go to her mother's house" for a while—a remark which the patient will understand to mean that sexual intercourse is best avoided for some time.

Conclusion.—It is said by Strachan that "in almost all cases of early cervical carcinoma some signs of preceding cervicitis are to be found."

The medical practitioner needs no further incentive than knowledge of this important fact to make him anxious to diagnose and treat cervical conditions as early and thoroughly as he has opportunity.

Vaginal Discharges

BY

Capt. A. R. Poduval B.A., L.R.C.P., M.R.C.S., M.D.,
Civil Surgeon Trichur.

Most women understand what a vaginal discharge is, called in popular language "the whites." Some of them, especially those who are habituated to live unclean lives, without proper washing and bathing,regard 'the whites' as much an inevitable part of a woman's existence as lice and nits in the hair. Others, more delicately tuned to a more æsthetic life complain of the slightest discharge and make much fuss over it. A woman, living an average life, naturally would complain about the presence of any vaginal discharge, which she rightly considers as abnormal. It is a symptom, of rather universal prevalence, following certain morbid conditions ; but I believe, certain sects of people are more liable to have 'the whites' than others. This may depend on diet and habits. Among the Native Christian women of Kerala, this symptom is so common, that they almost believe every woman in the community is subject to a vaginal discharge. Although, this is a very exaggerated idea, there is no doubt that leucorrhœa is exceedingly common among a very large section of women in that community. It is only when the discharge is excessive, and soils the clothing ; or gives rise to irritation and discomfort ; or is accompanied by other bodily disorders that these women ask for any treatment of the condition. Most of them think that moderate leucorrhea is a symptom of no consequence.

Among the lay public there is an idea that "the whites" are the result of some constitutional malady in which the bones get dissolved or disintegrated and flow out through the vagina in this fluid form. What is still more astonishing is the fact that many doctors in this country regard these discharges as mainly due to gonorrhœa, and treat these women with douches and tampons, and vaccines even going to the extent of dilatation and curetting these women, with the full belief that the discharge is due to gonorrhoeal infection ! It is a strange medly of diagnosis and treatment. Certain people in certain localities excepted, Gonorrhœa as the cause of these discharges, is probably the last thing I would think of among the women of Kerala. I must however, say that among communities in which the women were

particularly free from gonorrhœa ten or twelve years ago, the disease is becoming much more common. And in ninety-nine cases out of a hundred, the infection is transmitted to the wives by their husbands who get it beyond the ghats where they go very often as merchants, or wandering agents of commercial people. I feel justified, therefore, in having gonorrhœa in mind, when investigating a case of leucorrhœa in a woman whose community a few years ago was comparatively free from that infection.

What is Leucorrhœa?—Generally speaking, all abnormal discharges from the vagina, whose ætiology is to be sought at various levels of the genital tract, are known by the name leucorrhœa. It is very easy to find out leucorrhœa in a patient; it is exceedingly difficult to find out the cause of the leucorrhœa. Leucorrhœa can be a symptom of all sorts of diseases of the genital tract, at some time or other in their course; but its cause may also be Extra-genital.

1. A vaginal discharge may be the periodical emptying of a hydro-salpinx, the discharge in the case being profuse, watery, and appearing only at certain times. The condition is rare; I observed it twice in Hospital practice here.

2. Tumours in the Pelvis, giving rise to venous congestion, and transudation of fluid into the vagina.

3. Pyometra is another rare cause of vaginal discharge. I have seen it among the hospital patients, though not more than half-a dozen times in 20 years.

4. Other uterine causes are:—(*a*) Retro-displacements: (*b*) Sub-involution; (*c*) Foreign bodies in the uterus; (*d*) Fibromyomas; (*e*) Polypoid and senile endometritis; (*f*) Malignant disease of the uterine body; (*g*) Rarely tuberculosis of the endometrium.

5. *Cervical*:—The commonest of causes:—(*a*) Endo-cervicitis; (*b*) Cervicitis: (*c*) erosion, of the congenital or acquired type; (*d*) Cervical lacerations; (*e*) Carcinoma of the cervix.

6. *Vaginal*:—Various forms of vaginitis, vulvitis, or infections involving the vulva, vagina and spreading up to the cervix. Mechanical irritants, such as by pessaries; chemical irritants as by irrigations with strong antiseptic solutions; in modern days, various contraceptive measures used indiscriminately.

Constitutional conditions:—Such as: (1) The Various kinds of anæmias. (2) Debilitating infections—such as Tubercle.

(3) Wasting diseases such as cancer elsewhere. (4) Endocrine disturbances.

Causes relating to circulatory deficiencies:—(1) Heart disease with vascular stasis. (2) Disease of liver and Portal stasis. (3) Cardio-Renal decompensation.

And finally a large number of infective and parasitic causes: Most of the pus-producing organisms; Specific infections such as Gonorrhœa; Infection by Tricho-Monas; Micrococcus Catarrhalis; Strepto-Coccus Faecalis; and several parasitic fungi—such as the Torulu in Diabetic patients; various forms of Monilia.

Among the so-called 'Bazaar-Women' I have repeatedly been able to detect the eggs of ollyuris verunicularis in the discharges, as well as to discover the adult worm crawling in and out of the vagina.

The Normal Biology of the Vagina.—Soon after birth, the vaginal epithelium is found to be thick and the cells contain glycogen. Doderlein's bacilli are found in the vagina. These appearances are due to the action of oestrin present in large quantities in the mother's blood being supplied to the child also. After birth, the vaginal epithelium becomes thin, there is no glycogen and the bacillus of Doderlein gradually disappears *i.e.*, with the exhaustion of the oestrin already present. Then other organisms invade the vagina, such as the staphylococcus albas and streptococci; and sometimes, diphtheroids, B. Coli, Bac. Proteus etc.

Lactic acid is found in small quantities in the vagina of the new born child. It is the one of the products of the action of D. bacilli on glycogen, and the acidity is therefore found to be highest on the 2nd and 3rd days after birth.

The vagina of the child after the first few weeks, like that of the woman after the menopause is only faintly acid. At puberty when ovarian activity commences, and œstrin (folliculin) is again being secreted in large amounts, the vaginal epithelium again becomes thick and the cells contain glycogen. D. bacilli gradually displace the other organisms, and the secretion of the vagina is strongly acid. This continues with slight variation right through the period of sexual activity of the woman. After the menopause, when the ovarian hormone dwindles down, involution of the vagina takes place, and D. bacilli considerably decrease in number. Lactic acid also diminishes. The strongly acid reaction of the vagina between the period of adolescence and menopause, is a protective mechanism because

the acidity of the vagina prevents its being invaded by other organisms. After the menopause, when the acidity becomes very low, other organisms invade the vagina and this is an important factor in the production of that common complaint—senile vaginitis. It is rather interesting in this connection to note, that during the first half of pregnancy, the vagina contains a mixed culture of various organisms. In the second half, however the acidity of the vagina increases considerably and contains almost a pure culture of D. bacillus.

Normally, the interior of the uterus is sterile. The cervical mucus is alkaline in reaction, but it has no influence on the acidity of the vagina. Just within the external os a few organisms are occasionally formed. The cervical plug of mucus acts as a natural protection entangling in it any organisms trying to make way higher up.

Sometimes, the normal vaginal discharge is increased. The process is non-infective.

Hypertrophic endometrium and endometrial polypi may produce excessive vaginal secretion. Both these conditions are most probably endocrine in origin. Excessive mucous secretion from the vagina, is a more common cause of leucorrhœa. Though often caused by infection, it is also seen in virgins and is then to be attributed to the action of œstrin on the cervical glands. Very often, in such cases, a congenital cervical erosion is also found on examination.

Infective vaginal discharges.—It is as well to examine the discharge with the naked eye as well as with the aid of the microscope. A non-infective cervical discharge is practically all clear mucus, which on contact with the vaginal secretion, becomes whitish and coagulated. An infected cervical discharge is muco-purulent, and in the case of gonorrhœa, the discharge is greenish-yellow and abundant. Puerperal lacerations of the cervix erosions acquired or congenital, sometimes tuberculosis, are other cases of cervical discharge.

A non-infective vaginal discharge may be white and granular or thick and caseous. When infected, the discharge from the vagina is yellow and more fluid. In such cases, D.' bacilli dwindle down considerably in number, and the vaginal secretion is found to consist largely of various forms of cocci and bacilli and pus cells in large numbers.

Gonorrhœal leucorrhœa.—This requires special mention. Although gonorrhœal infection, as a whole, is much less common

in India, compared to its prevalence in the West, there is a growing tendency in this country also, to grow more and more venereal, as civilization grows among the people. The recognition of a gonorrhœal infection is very important; and although in the present state of our social Pseudo-culture, it is almost impossible, except among a few of the educated, to make much use of this knowledge of venereal infection, the medical practitioner, will be well-advised to have a full bacteriological knowledge of the infective nature of the patients who seek his or her advice.

Nothing perhaps is more indicative of slovenliness of medical habits, loose thinking, and intellectual ennui, than the stale, weary and old conception or misconception that every leucorrhœal discharge in women or the larger number of such cases is gonorrhœal. I have made rather careful bacteriological investigation of several hundreds of these cases, that we see in hospital practice, and in the consultation room at home or in the patients' house and my own experience is that of all these cases of leucorrhœa, not more than 15 per cent can be pronounced as gonorrhœal, at least on this coast of Kerala. Even this, I think, is a pretty high figure. We know that in a certain grade of society and among women who live in a particular quarter of the town, gonorrhœal infection may be expected. When I find that a woman whose husband has been out at Colombo, or Burma, or Singapore or the Malay States, suddenly develops Vaginal discharge soon after the husband returns home to his wife, I sharply look out for gonorrhœa. When a native Christian woman, who has a husband, travelling about in several parts of the country either as a merchant or as a merchant's agent, develops vaginal discharge, I am on the alert watching for signs of venereal infection. Indeed, I know, respectable men and women do get infected by Neisser's gonococcus or the T. Pallidem or both, irrespective of their respectability. But allowing for all these accidents, I still believe that there is no justification whatever, for doctors (male or female, to dub every discharge as gonorrhœal and to treat these patients with douches and tampons and vaccines, with, in the majority of cases, no satisfactory results at all.

In an acute case, especially when the urethra is invaded, a diagnosis of gonorrhœa can be very easily made. Infection of Skene's ducts is almost always gonorrhœal; but every Bartholinitis, need not be gonorrhœa.

It is in the chronic cases, however, especially those in which

there is no clear history of an acute infection in the back-ground, that all the difficulty arises.

In acute cases of gonorrhœa, the discharge is mainly pus; but in the chronic cases, the discharge becomes mucoid and is indistinguishable from the other forms of discharge.

It must also be pointed out that in chronic cases, it is not at all easy to detect the gonococcus by a simple film examination, under the microscope. Nevertheless, I have seen practitioners proclaiming the discovery of gonococci in films stained with a single stain, in chronic cervical infections. I do not mean to say that it is not a bit of cleverness to do so, but it is very unreliable. Even differential stain (Gram's method) is unreliable. Gonococci during the several stages of their growth, involution or evolution may take a very puzzling staining reactions. Under the microscopic field, streptococci or staphylococci, lying-in-pains are mistaken for gonococci, and there are several kinds of diplococci that may be so mistaken. I have seen several positive results announced, by doctors, men and women, and by some reliable pathologists of "typical intra or extra-cellular gram-negative doplococci" which after a more thorough scrutiny happened to be from patients who never had any gonorrhœa at all! Hence it is not advised that the diagnosis be made from films alone. These should be checked by cultures and complement fixation tests before one pronounces a cervical discharge as gonorrhœal.

It is a very serious thing that a woman who has had no gonorrhœal infection should be pronounced to have a gonorrhœal endocervicitis on the mere findings of a casual micriscopic slide examination; it is equally serious not to be able to discover gonococcal infection when it actually exists.

Vaginitis.—Gonorrhœal vaginitis in children due to transmission of infection from handkerchiefs, closets etc. is very common in Europe and America; and I am told, is getting much more frequent in this country also. I have seen very few cases of the sort in Kerala. Vaginitis may be a primary infection, in which case, the vaginal wall is red and hot. The discharge is more fluid than in those cases of Secondary Vaginitis, in which the infection spreads down to the Vagina from above-*i.e.*, from the uterus or cervix. As for the organisms involved, they are so mixed up that it is very difficult to say what particular organism is involved in a case.

Vaginitis due to the Trichomonas has been looming very largely on our attention recently. Except for the fact that the

Trichomonas is found in certain cases of Vaginitis, no conclusive evidence has been produced to show that the vaginitis is entirely due to this organism. For the secretion in such case is found mixed up with several other organisms including some non-hæmolytic streptococci.

I do not know to what extent this Trichomonas infection prevails in this country. I do not happen to possess any reliable data of the incidence of this infection in other parts of Kerala. Among the patients whom I have seen in the Cochin State, Trichomonas infection is certainly not rare. But I suppose many cases go undetected. For the discovery of this organism, it is necessary to dilute a drop of the discharge with normal saline and make a hanging-drop preparation. Examination of a drop fresh from the vagina placed straight under the microscope is probably one of the best ways of missing it; for in that confused microscopic field of clusters of cells and debris, the Trichomonas may very often escape detection.

Donne first described this flagellate Protozoon in 1836. Till very recently it was considered a very harmless saprophyte, living in sparse numbers in the vaginas of women who have no vaginitis and purely any vaginal discharge.

Under the microscope, the T. Vaginalis is found, to be not much bigger than a leucocyte; is irregularly ovoid in shape, and is found to be vibrating and moving in a jerky manner. The flagella are sometimes made out, very often they are not seen. In stained specimens the flagella can be made out easier and better. It is still called the "Mystery organism". Its life history is unknown. Organisms apparently very similar to the T. Vaginalis have been isolated from the prostatic secretion of men, and even the rectum, the mouth and the bladder. Women generally give a history of coitus before the onset of the discharge due to T. Vaginalis and it is presumed that the infection takes place from the prostatic fluid of the man.

The clinical picture of T. Vaginalis is rather typical and fairly uniform. The patients complain of a persistent profuse discharge, which is accompanied by soreness and irritation of the vagina and vulva, and excoriation of the adjoining skin. The discharge is thin, profuse, yellow, frothy, and often has a disagreeable smell. A white thin, non-offensive discharge is also found in certain cases. In old cases, the vaginal vault has the feel of a nutmeg grater, when the secretions are removed, with cotton, minute hæmorrhages are seen. The resemblance of

the discharge to gonorrhœal discharge is often very close and a wrong diagnosis is very common.

Treatment.—When we recollect that we still have in our midst patients who have been having leucorrhœa for years, several of whom have been under treatments also, it is obvious that the problem of the treatment of the condition is yet to be solved in a satisfactory manner.

As leucorrhœa is not a disease, but only a symptom, its treatment depends entirely upon what it is due to.

The first thing to ascertain is, from which particular part of the genital tract, the leucorrhœa arises. Ignorance of this results in much useless treatment and the discrediting of methods that have been found effective in other hands.

The principle underlying the treatment is to restore to normal the secretory condition of the vagina—to bring the vaginal flora to normal, to change the alkaline reaction of the vaginal secretion into acid. It is also necessary to consider whether the leucorrhœa is due to diminution of the self-cleaning property of the vagina, through endogenous infection—made possible by the presence of latent organisms.

Senile vaginitis is often successfully treated by injections of œstrin. Leucorrhœa due to mechanical, chemical, and constitutional causes, must be treated according to the nature of the ætiology of the condition in question. Thus a close examination might detect a pessary in the vagina which causes the leucorrhœa. I have already mentioned about the discovery of thread-worms and their eggs in the vaginal secretion of certain women. Certain women are in the habit of using strong antiseptics for douches, which set up a continuous irritation and discharge. Constitutional conditions such as anæmia, diabetes etc., and vascular disorders, such as cardiac decompensation, very often cause leucorrhœa, and these conditions will have to be treated accordingly.

Then we have a large number of cases of non-infective leucorrhœa of vaginal origin where the discharge consists only of desquamated Epithelial cells and Doderlein's bacilli. These cases often prove intractable. The cause is probably to be found in extreme activity of the ovary, and over-production of œstrin. In women beyond the child-bearing age, X-ray treatment of the ovaries may be instituted; but in young women this is generally not admissible. Mr. Norman White, F.R.C.S. of the University College Hospital recommends occasional douching of the vagina with 0.5 to 1 per cent lactic acid solution and pessaries of 5 per cent lactic acid in Glyco-gelatin. It has been found that in many of these cases, the quantity of the discharge varies from time to time, and may sometimes undergo considerable diminution without any treatment at all. Attention to constitutional conditions, as for example anæmia, and a proper diet containing enough of vitamins and calcium are also very essential.

Sometimes the practitioner is called upon to treat an *acute case of leucorrhœa*, in which a woman apparently well, begins to complain of excessive discharge from the vagina. The cause in such cases is mostly a gonorrhœal infection or a Trichomonas infection. Trichomonas leucorrhœa has a tendency to be very profuse, frothy in appearance and very irritating to the vulva. In these acute cases, the palliative treatment is essentially one directed to cleanliness. The douche entrusted to the patient herself or to an untrained nurse is practically of no value, and may sometimes be harmful. A cleansing irrigation, containing a mild sedative antiseptic, such as boric acid may be very comforting to the patient if given by one who knows. In Trichomonas infections, thorough scrubbing of the vaginal wall with a tuft of cotton-wool, and Tr. of Green Soap is advised. I do not know if women will stand this operation with an acutely inflamed vagina. Several sitz baths in the day are advised. Rest is essential.

As soon as the acute stage is passed, a speculum is inserted, the vagina carefully dried with pieces of sterile cotton pledgets, and the mucosa thoroughly painted with a 5% solution of Mercurochrome solution; or with Tr. Benzoin Co. I have found the latter to relieve the irritation for two or three days. Tampons of glycerine or medicated are of no value. The cervix should not be touched at this stage, for fear of disturbing the plug of mucus that blocks the canal and effectively prevents infection higher up the genital tract.

Congenital erosions, and ectropion of the cervix are best treated by the electric cautery or the diathermy cautery. (For the technique the reader is referred to special literature on the subject). The treatment may take four to six weeks, and may have to be repeated. The results are remarkably good. It is surprising how an extensively eroded and everted cervix assumes under this treatment its normal contour and shape. This treatment can be instituted as an office procedure; an anæsthetic is very seldom necessary.

Palliative treatment of the condition consists of the lactic acid Glycogelatin pessaries already mentioned with or without lactic acid 0.5 to 1 per cent solution as a douche.

Gonorrhœal Lecorrhœa is to be treated by a thorough cleaning of the vagina and cervix, after introducing a speculum. First of all, all the discharge is carefully mopped out with sterilised pledgets of cotton wool; and then the cervix and vaginal walls are painted with an antiseptic such as ten per cent protargol, or mercurochrome, or 1 per cent picric acid or 2 per cent flavine. Douches are not advised; they are considered dangerous. Rest is very essential.

The above mentioned treatment is to be carried out daily or at least for five days in the week, either by the doctor or his

assistant or by a thoroughly trained nurse. Everything must be done very gently. There is always the danger of the infection spreading higher than the cervix by harsh and forceful treatment and this danger must be avoided at all costs.

Treatment must be suspended during the menstrual period.

During the post menstrual period smears must be made as the gonococci have a tendency to appear in the discharge after a menstrual period.

If after a month of the treatment, the complement fixation test still shows a positive result, Mr. Norman White, of University College Hospital, London, advises a course of Corbus Ferry Toxin, manufactured by Messrs.Parke Davis & Co. He says, this Toxin has given him better results than the ordinary gonococcal vaccines. Personally, I am very sceptical about the action of any vaccine for gonococcal infection. I have used all forms of the manufactured stuff with no opinion for them ; and for the last 8 or 10 years, I have used none at all. If there are any infected Skene's duct or Bartholin's gland, they must be properly dealt with ; for they are capable of keeping up the infection and discharge.

The treatment of a vaginitis and leucorrhœa due to Trichomonus infection, is often very protracted ; for recrudescences are exceedingly common. Any mild antiseptic will kill these germs, but they make their re-appearance pretty quick. Recently Bayer & Co. have introduced Devegan tablets which are very effective. I have also found May & Baker's Stovarsal vaginal tablets effective in these conditions. The manufacturers say that douching is not necessary. I find however, that when a tablet is introduced twice a day—morning and evening—certain masses of debris are left in the vagina which do require removal by douching.

The general health must be built up. Lt. Col. Green-Armytage advises giving these patients Radiostoleum (Vit. A and D), a small teaspoonful twice a day for at least 6 weeks.

With regard to those vaginal discharges that are caused by tumours innocent or malignant, they must be given their appropriate treatment. It is a most dangerous habit, treating a woman past 35 years of age suffering from a vaginal discharge, without a thorough examination. If the examination is refused, no conscientious doctor should undertake the treatment of such a woman.

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Leucorrhœa in its Commoner Aspects and its Treatment

BY

Mojor R. G. Dani, I.M.S., (Rtd.), M.B., B.S., (LOND.) M.R.C.S., (ENG.),

Surgeon and Specialist in Diseases of Women and Midwifery, Nasik.

LEUCORRHOEA is defined as a symptom in which there is an excess of vaginal discharge of pathological nature.

To understand its pathological nature, a knowledge of the normal secretion as it is present at different stages of life of a female, is necessary. These stages or periods can conveniently be divided into following periods :—

(1) Infancy to Puberty.
(2) Puberty to Menopause.
(3) After Menopause.

In clause (1) The discharge is scanty, and contains a few Leucocytes. Vaginal epithelial membrane is usually thin. In clause (2) In virgins, due to onset of Menstruation, the discharge is abundant. It is of a whitish nature and appears like curdled milk, and is strongly acid in reaction. The Doderlein Bacilli are found in abundance. As a protection by nature, during reproductive stage. *i.e.*, from puberty to menopause, Vaginal epithelium becomes thickened by many layers and acts as buffer to infection. In clause (3), the condition gradually reverts to that in infancy and girlhood. Vaginal mucous membrane gets thinner and gradually atrophies, and discharge gets scanty and thinner, disappearing eventually.

The cervical discharge generally appears after puberty, with full development of uterus. It is of tenacious consistency like the white of an egg, and is alkaline in reaction. After puberty Leucorrhœa may be due to cervical secretion as well.

Thus, taking into consideration the normal state of vaginal and cervical secretion, we now come to the consideration of the causes which increase the vaginal or cervical discharge, which constitutes Leucorrhœa.

The commoner causes may be classified as follows :—

(1) Cases in which discharge is of normal character but excessive.

(2) Cases due to infection with micro-organisms except gonococcus.

(3) Cases in which gonococcus is the causative agent.

(4) Cases which are due to Neo-plasms of generative organs.

(5) And lastly abnormal factors such as presence of fissures and fistulæ opening into Vagina.

The infection of vaginal canal and cervical canal may be due to :—

(1) Commoner micro-organisms.

(2) Specific organism of gonorrhœa.

(3) Fungus of Monila group.

(4) And lastly Protozoa Trichomonas Vaginalis.

As Monila grows best in acid media, Leucorrhœa due to this fungus is usually found before menstruation and during latter period of pregnancy, as at these periods there is high lactic acid percentage in cells of vaginal mucous membrane.

Different fissure and fistulæ cause Leucorrhœa due to irritation caused by the escape of contents of such fistulæ such as urine, fæces etc. and discharge of large pieces of tissues of new growths.

After the above considerations of the pathology of Leucorrhœa, we now come to the clinical aspect of the affection.

1. *Non-infective Type* :—The increased discharge is found in virgins. This is usually due to endocrine dysfunction, obesity, dysmenorrhœa malnutrition etc. Such Leucorrhœa is usually associated with glandular hyperplasia of corporal endometrium.

2. *Infective Type* :—With infection by ordinary micro-organisms of the genital tract, there is increase of discharge, and the cervical glands are the most efficient source of supply. This is due to erosion with laceration of cervix.

3. *Gonococcal Infection* :—In acute gonorrhœa the discharge may come from the urethra, Bartholinian duct, Vagina, cervix, and also from the body of the uterus, and no special description is necessary for this type of Leucorrhœa.

4. *That due to Trichomonas* :—Discharge due to infection with Trichomonas Vaginalis owing to its acidity causes certain well known symptoms such as itching of Vulva and Vagina with pain, dysuria, and dyspareunia. The discharge is thin—frothy and yellowish, with acid reaction. Due to the irritation lacerated patches are found on Vulva and lining of Vagina. The symptoms are aggravated after Menstruation.

5. *New growths* :—Discharges due to new growths etc., are easily diagnosed by other symptoms of presence of Neoplasms. The discharge is usually of fœtid nature, and coloured.

Now we come to the question of Diagnosis. From the description given above and the nature of discharges, a definite diagnosis should not be difficult to make. On broad principle, diagnosis should be based on two principles, (1) in which there is no lesion to explain for discharge and (2) in those cases where local lesion can be found by examination. This should also be aided by examination of minute processes in which discharge may remain pent up. Examination of urine, blood etc., and a general systematic examination should be made.

Treatment:—Considering that nature helps towards maintenance of normal state of health, the question of treatment resolves to one thing, and, that is, to make the conditions as natural as possible. Thus in cases of non-infective Leucorrhœa our aims should be diverted towards maintenance of internal secretion balance by the use of suitable hormones. Such hormones are found in various preparations now-a-days, and each individual has a different choice to make. I have personally found Promulier of Loucatos & Co., very effective. Along with the hormone deficiency treatment, general symptomatic treatment should be resorted to.

I do not intend giving any detailed treatment for gonorrhœal leucorrhœa as it can be referred to in books in this subject.

NON-INFECTION LEUCORRHŒA.—When there is only an excess of discharge but no alteration in its composition, no local treatment should be given except keeping genitals clean, and glandular therapy started; general treatment should also be resorted to, to increase general tone of the body.

TRICHOMONAS VULVA-VAGINALIS.—Persistent and thorough cleaning is needed to eradicate Trichomonas. Vagina should be cleaned up with some antiseptic lotion such as Dettol and glycerine tampon instilled in Vagina. After 24 hours the tampon is pulled out and soft soap douche is given. This should be repeated every 3rd day. Efforts should be made to increase acidity. Douches of lactic acid should be given. I have found Devegan very useful in this type of Leucorrhœas. These are used as per instructions.

MONILA VAGINALIS.—Monila Vaginalis is best cured by daily alakaline douche such as soda-bicarb. I have found insertion of Stovarsol Vaginal Comp. Tablet, of Messrs May & Baker very useful in this type of Leucorrhœa.

FISSURES, FISTULÆ ETC.—Necessary surgical treatment should be resorted to.

Tumours of the Uterus and its Appendages

BY

Dr. S. C. Das Gupta,

Surgeon Superintendent, Bir and Town Hospitals, Katmdandu, Nepal.

TUMOURS, in the female sex, of uterus and its appendages are too many; they are of:—

I. Body.
II. Ovary.
III. Tubes.
IV. Broad ligament.

I. **Uterus.**—1. *Benign Growths*:—(*a*) Polyps—Fibroid; Mucous; Nabothian; Placental. (*b*) Fibro Myoma. (*c*) Adeno Myoma.

2. *Malignant Growths*:—(*a*) Epithelioma of Cervix:—Usually Chorion—epithelioma arising from epithelial layers of the chorionic villi. (*b*) Carcinoma of body or cervix:—(i) Adeno-carcinoma or (ii) Papillary squamous celled cancer. (*c*) Sarcoma—(i) Cystic myxosarcoma of the cervix. (ii) Spindle celled sarcoma of muscular coat. (iii) Round celled sarcoma of the endometrium. (*d*) Endothelioma of uterus wall or cervix, latter arising from the lymph canals. Perithelioma—originating on the cells lining capillary vessels.

II. **Tubes.**—1. *Tuberculous*:—Salpingitis; Pyosalpinx.

2. *Growths*:—Cyst; Solid tumours; Papilloma.

3. *Inflammatory diseases*:—Nodular; Salpingitis; Hydro-hemato-pyo salpinx.

4. *Pregnancy* (*tubal*).

5. *Combined Tubo-ovarian cyst.*

III. **Ovary.**—The classification of Munro Kerr and Ferguson is as follows:—

(*A*) OF INTRINSIC ORIGIN.—1. *Epithelial origin*:—(*a*) Benign Tumours—(i) Serous Cysts-(usually unilocular of moderate size.) (ii) Cyst adenoma-(about 80 p.c.) growing to an enormous size and often multilocular. (iii) Pseudo myoma ovarii (rare). (iv) Papillomatous—often malignant in nature. (v) Simple granulosa-cell tumour (arising from Graafian follicles). (*b*) Malignant

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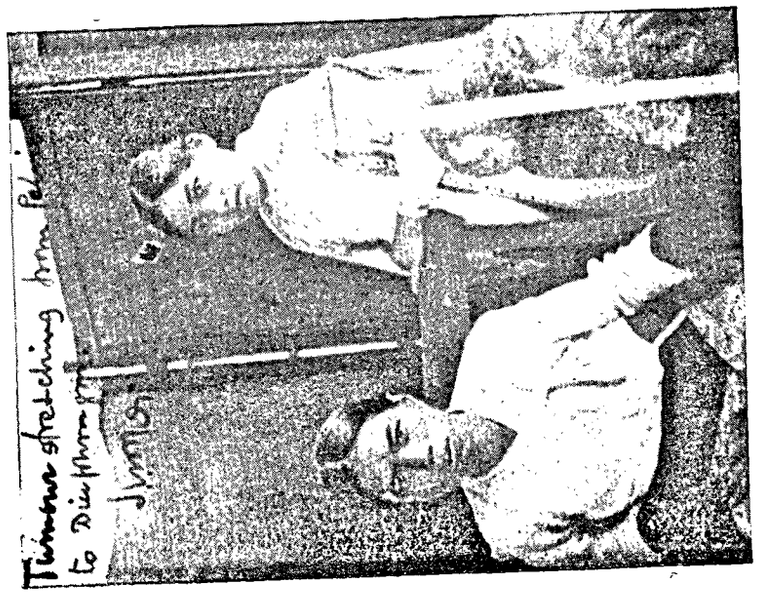

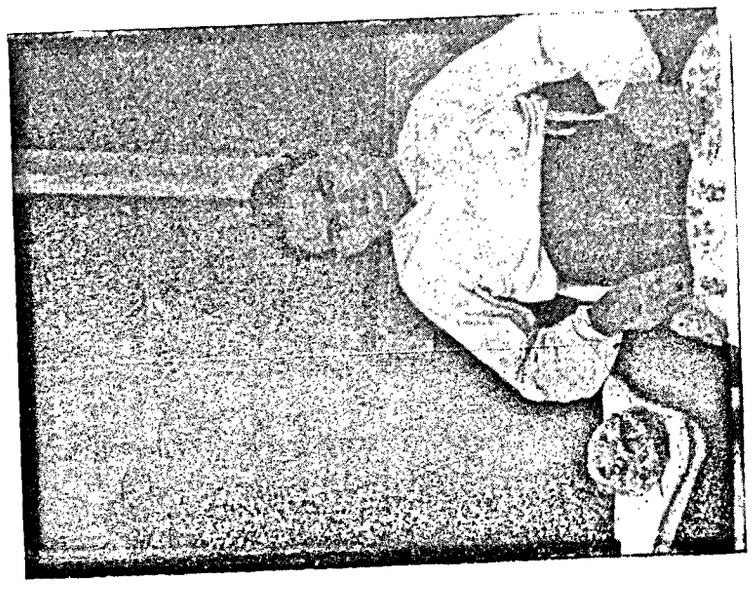

Tumours—Papillomatous carcinoma, adeno-carcinoma and granulosa-cell tumour (solid or semi-cystic and malignant).

2. *Embryonic Tissue origin* :—(*a*) Benign—(i) Dermoid. (ii) Teratoma-(arising from all the three embryonic layers) : more the solid, more liable to be malignant). (*b*) Malignant—(i) Sarcoma. (ii) Endothelioma.

(*B*) OF EXTRINSIC ORIGIN.—1. *Direct invasion of genital Tract* :—Carcinoma ; Sarcoma ; Chorion-epithelioma.

2. *Metastases* :—Secondary to, usually from a primary focus in the alimentary tract.

IV. **Broad Ligament.**--

(*A*) PRIMARY :—

1. Fimbrial cyst.
2. Parovarian or epoorphoron cyst.
3. Gartner cyst.
4. Cyst of Kobelts' tubes.
5. Hydatid of Morgagni.
6. Lymphatic cysts.
7. Fibro-myomate.

(*B*) SECONDARY :—Ovarian tumours and uterine fibroids growing into the broad ligament.

Physical Signs and Clinical Diagnosis.—Age of the patient is of great help sometimes in diagnosis. Embryomata are met with at all ages from childhood to very old age. I saw a huge dermoid cyst in a girl of only sixteen years. Irregular and intermitting hæmorrhage in a woman after forty will point towards malignancy in absence of other symptoms ; there is usually accompanying offensive discharge, emaciation and cachexia.

About 75 per cent cases of sarcoma occur in nullipara and in the body of uterus generally, while cancer is very common in the cervix. Papillomatous growths in ovary occur in very early age also, which later on may become malignant. I saw a case with an ovarian tumour associated with an accumulation of fluid in the abdomen and with pregnancy too.

The rate of growth in ovarian tumours is more rapid than fibroids, but not as rapid as pregnancy. If the tumour grows from ovary or broad ligament, it is found to be more or less lateral in the early stage, while uterine ones grow usually in the centre. I have seen a cyst of broad ligament pushing its way and locating just behind the uterus.

Percussion note is dull over an ovarian tumour and resonant in the flanks, the dullness does not alter as it does in ascites on changing the position of the patient. Cyst of the broad ligaments have slow growth, and is not as freely movable as an ovarian tumour. In a pelvic tumour one must eliminate a distended bladder and fœcal accumulations. The presence of Hydro-or pyo salphinx or even tubal pregnancy should be borne is mind before giving any definite diagnosis.

Renal or hydatid tumours, or tumours of omentum, mesentery, pancreas, spleen and kidney are also to be carefully differentiated before arriving at a definite diagnosis.

The condition of sterility is a suitable ground for the growth of ovarian tumours, but not always; in my operation cases I found ovarian tumours also in unmarried girls and as well as multiparas. As a rule ovarian unilateral tumours have practically no effect on menstruation, and I know two cases having regular but scanty menstruation with huge cysts of both the ovaries, which I removed later on.

But it is rather usual with uterine tumours, that hæmorrhage occasionally occurs profusely.

Pain is only perceived when there is too much stretching of the sensitive tissues and also during a torsion or twist of the pedicle.

Munro Kerr and others say that "An absolute diagnosis can sometimes only be made after the abdomen has been opened". Ovarian tumours are often associated with some accumulation of fluid in the abdomen—and it is specially so, if there is any malignancy. In very doubtful cases with great distension of abdomen I draw a little fluid with a syringe before operation; if the fluid is jelley like or of a chocolate colour—then most likely it is an ovarian cyst. In uterine malignancy, microscopic examination of the material obtained by curettage is the only certain sign.

Treatment.—Early removal is the safest and easiest method; besides there is less adhesion and complication too. Even in doubtful cases an exploratory operation may be done for a diagnostic purpose. Some gynæcologists have found, by X-Rays and radium treatment in early stage that the results are vary encouraging; but in advanced stage the treatment is not so effective.

The technique of operation is given in almost all the text books, and I too described the operation in several of my articles (*vide* Antiseptic July 1924, January 1926 and June 1936 and

Medical Review, October 1928, Sind Medical Journal, June 1936). So, there is no need for repetition of the same. If it be a pedunculant tumour, the operation is quite easy; but if sessile, or tumours of the broad ligament, it requires very careful dissection and separation of the tumour. If there be adhesions, they must be separated without injury to vital organs or structures; rather a portion of the tumour may be left out instead of attempting a complete removal. Again, if there be a cluster of vessels in the pedicle, it is better to deal with each of them separately instead of applying a ligature haphazardly over a bunch of vessels including the tissues in which they are buried. All raw surfaces within the peritoneal cavity should be peritonised as completely as possible. All bleeding points should be perfectly secured.

If the cyst be a very big one and even the longest incision from the ziphoid to the symphisis would not allow sufficient space for delivery of the tumour, it is better to carefully tap it in order to reduce the size fit for removal. I did so several times and there were no complications afterwards. The Round ligament should neither be injured nor included in the ligature of the pedicle.

In hysterectomy or ovariotomy, the three most serious accidents are hæmorrhage, injury to ureter and shock. Kelly advises that all big vessels should be secured first with the broad ligament, and then the open mouths of the vessels be ligatured again. Too much exposure and handling also cause shock. Removal of the tumour by a slow and inexpert operator involves additional shock. Every precaution should be taken to maintain the body-heat during and after operation.

If you open the broad ligament, you may expose and even divide or include in ligature the ureter, so in order to avoid it you should persistently keep the knife touching against the lateral border (hard on the uterus) and push the bladder with the ureter low down by gauze dissection, there is practically no danger. In Wertheim's operation—it is a good plan to open up the broad ligament, isolate the ureter and then ligature the uterine vessels by sight. If the ureter be divided accidentally the cut ends of the ureter should be sutured at once. (*Vide* Sind Med. Journal, June, 1936).

In order to control hæmorrhage—it is advisable to apply reinforcing ligatures again in suspicious parts. When the operator is tightening the ligatures, the assistant should loose the clamps otherwise the vessels would not be sufficiently compressed, and there would be possibility of hæmorrhage (Dudley).

There are cases on record, where the urinary bladder was divided during exposure of the tumour on account of too many adhesions (*vide* Antiseptic, June 1936).

So you should remember all possibility of errors, and try to use as less of a knife as possible, and carry on blunt dissection with gauze, or blunt instruments such as the handle of a knife or blade of the scissors.

Sterilised catgut is the best form of ligatures and suturing material within the abdomen, while silkworm gut is very suitable for the apposition of skin.

Toilet of the peritoneum should be done carefully, the Omentum should be replaced as before; any accumulation of fluid soaked out, and finally peritoneum should be apposed and then 3 or 4 tension sutures applied through all coats of the perietes except the peritoneum, and lastly the wound closed by three layers of sutures.

Uses of X-Rays in Obstetric and Gynæcological Cases

BY

Dr. M. D. Joshi, J.P., M.B., B.S., F.C.P.S., D.M.R.E.,

Hon. Radiologist to Wadia Maternity Hospital, Bombay.

I. **X-Rays in the Diagnosis of Obstetric Cases.**—Now-a-days X-rays are used to confirm the clinical diagnosis in Obstetric cases. Pregnancy can be detected as early as four months. Face, Shoulder, Breech and Transverse presentations can be detected and manupulations if required can be done and checked with X-ray examination. If there is any gross disproportion between the fœtal head and the pelvic inlet, this can be made out. In cases of Breech presentation if there is extension of the legs, that also can be made out. Twin and multiple conception are also easily diagnosed with X-rays. Fœtal abnormalities such as Hydrocephalus, Anencaphaly and Lithopædion can easily be detected. Mole pregnancy can be diagnosed by the absence of fœtal shadow. Sometimes Tubal pregnancy may have a medial position in pelvis and it is very difficult to diagnose clinically from the uterine pregnancy, but this can be done with X-rays with the aid of Pneumoperitoneal technique.

In taking a few skiagrams for diagnostic purposes there is no danger to the fœtus or mother from X-ray exposure. Woman in labour is X-rayed and this method of examination is throwing more light on mechanism of labour.

II. **X-Ray in the Diagnosis of Gynæcological Cases.**—Examination of Uterus and Tubes can be made by Intrauterine Injection of Lipiodol. It gives the outline of uterine cavity and Tubes and the patency of Tubes can be studied with precision. Generally 2 to 5 cc. of Lipiodol suffices. The strength of Lipiodol should be 40% and should be made slightly warm before injection. The best period of examination is intermenstrual period. Anaesthetic is not required. Aseptic precautions should be taken while injecting Lipiodol. Patient should be kept in Trendelenburg position. Vulsellum should be introduced and the posterior lip of Cervix should be grasped with forceps and Lipiodol should be injected through cannula on which metallic olive is fixed 2 to 3 cms. from the tip to prevent the reflex of Lipiodol. Generally, there is no pain after the injection, but in

some rare cases there may be slight rise of temperature and some pain for a few days. There is some reaction of peritoneum after intra-uterine injection of Lipiodol and no operation should be performed for at least a week. Lipiodol is very slowly absorbed and it takes two or three months for absorption. It is not absolutely necessary to keep the patient in the hospital, but wherever possible it should be done. Patient should be asked to keep in bed for a few days. Contraindications for uterine injection of Lipiodol are uterine hæmorrhage and infection in Tubes.

Interpretation of skiagrams:—Normal shadow of uterine cavity is inverted triangular in outline. Normal Tube shadow is seen streaklike running laterally to the uterine shadow in the skiagram taken after the injection of Lipiodol. If there are any congenital anomalies of uterus or displacement of uterus they can be readily made out. Cancer of the body of uterus or submucous polypus can also be diagnosed. The former gives rugged outline, while the latter is regular in outline. In normal tubes Lipiodol leaks into the peritoneal cavity but if there is any obstruction in the Tubes or any tumour of uterus, the tubes are not properly shown and Lipiodol does not pass into the peritoneal cavity. When obstruction of the Tubes is caused by peritonitis, tubes are seen to be twisted and dilated. If the obstruction in the tubes is at its distal extremity, dilatation of the tube is seen at that point. Uterine cavity may be seen displaced by the ovarian cyst, cyst of broad ligaments and ovarian tumour. If the tumour surrounds uterus, it should be taken that it belongs to uterus, but if palpable mass is separated from the uterus, it should be taken as one of the things mentioned above. In Fibromyoma uterine cavity is enlarged in size, and generally deformed by the pressure of submucous nodules. The existence of Hydrosalpinx is often detected by the intra-uterine injection of Lipiodol. The oil penetrating the cavity takes the shape of "Raspberry", oil drops falling in watery fluid. Old placental retention can also be diagnosed. Lipiodol seems to exert therapeutic effect in some cases. Normal pregnancy has taken place in women who had not conceived previously to the examination by Lipiodol injection.

III. **X-ray as a Therapeutic agent in Gynæcological Cases.**—1. X-ray gives good results in the following benign conditions: (*a*) Menorrhagia or irregular hæmorrhage associated with Menopause. (*b*) Certain cases of Hæmorrhage in young girls. (*c*) Irregular Hæmorrhage caused by Fibroid. (*d*) Tubercular

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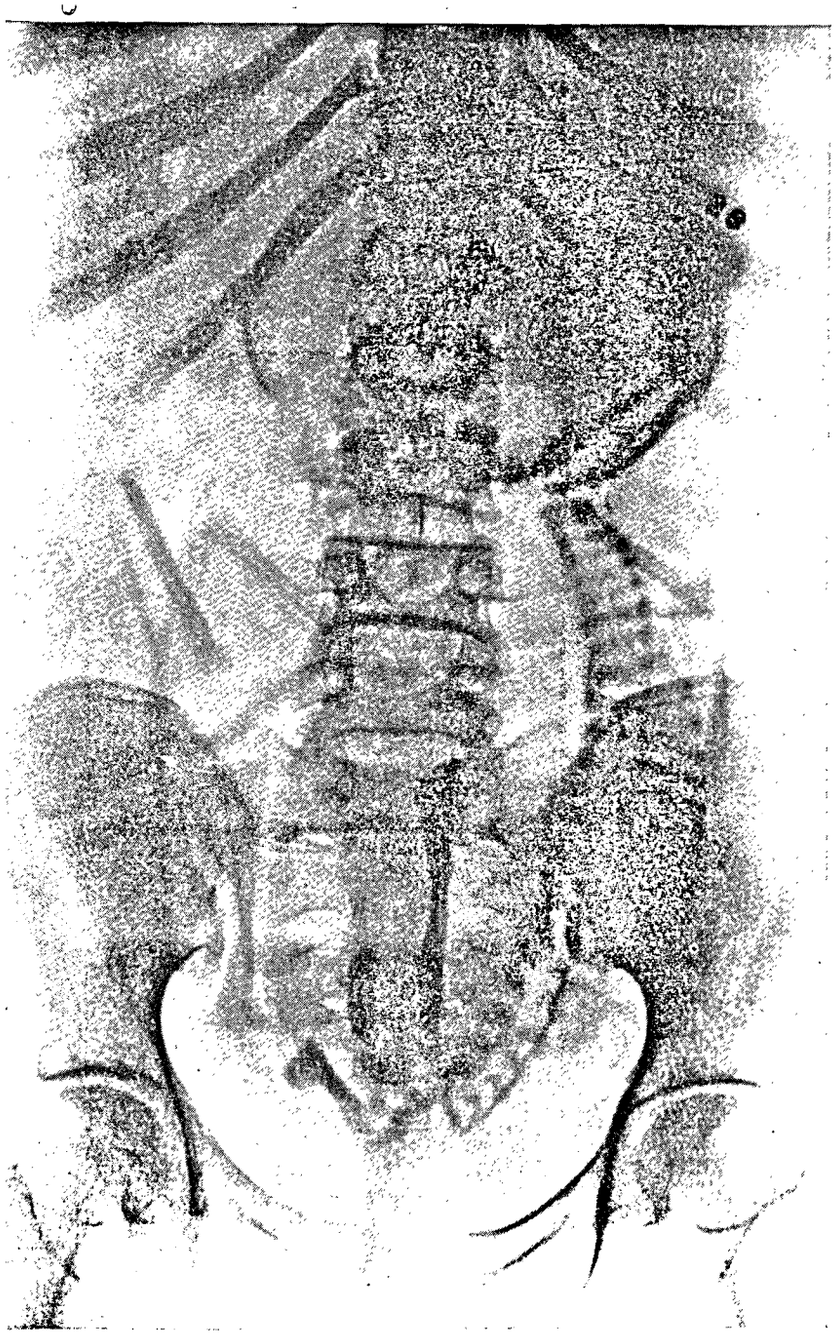

Fig. 1. Breech Presentation with extended legs.

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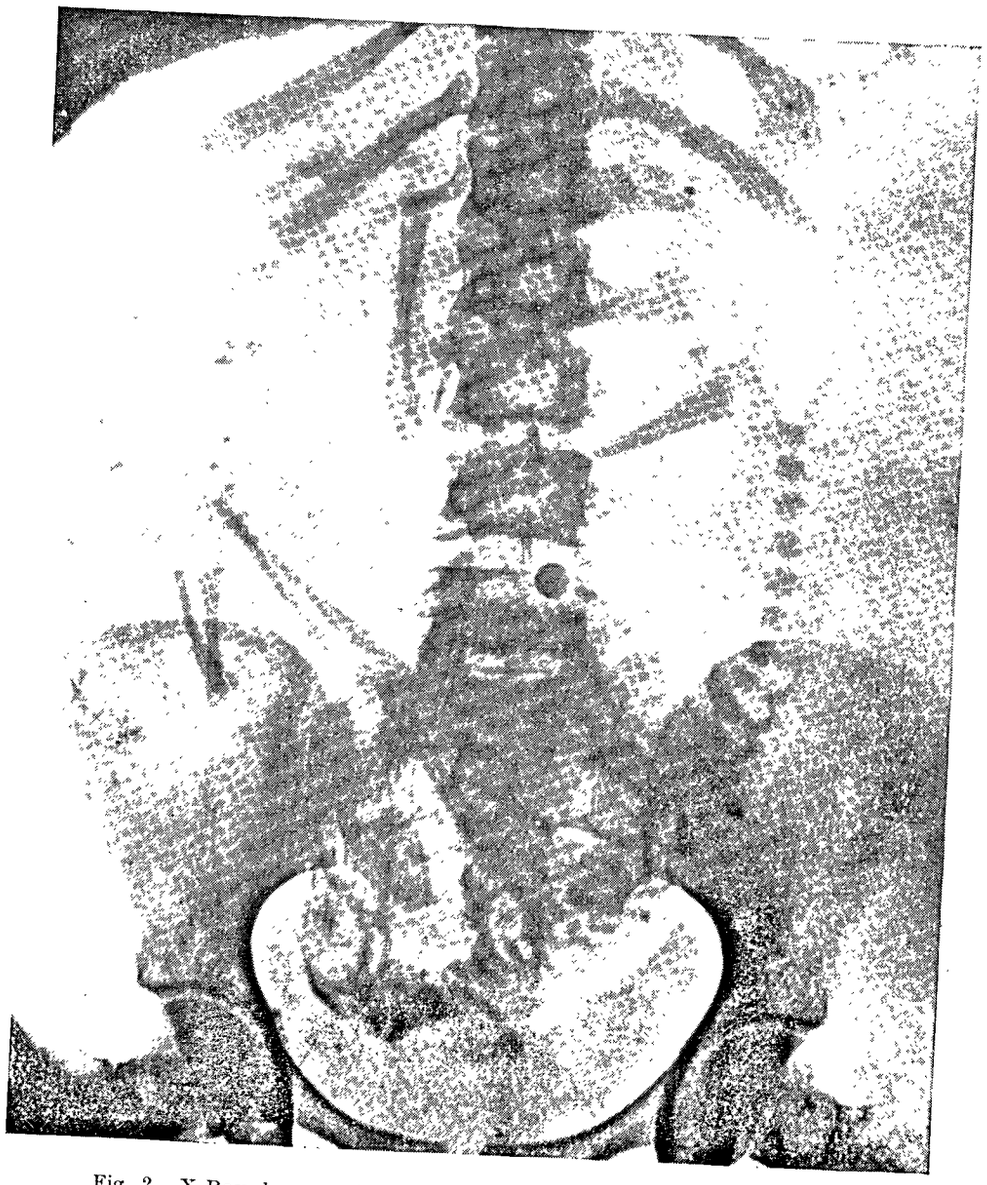

Fig. 2. X-Ray shows an Anencaphaly. Note the absence of cranial bones.

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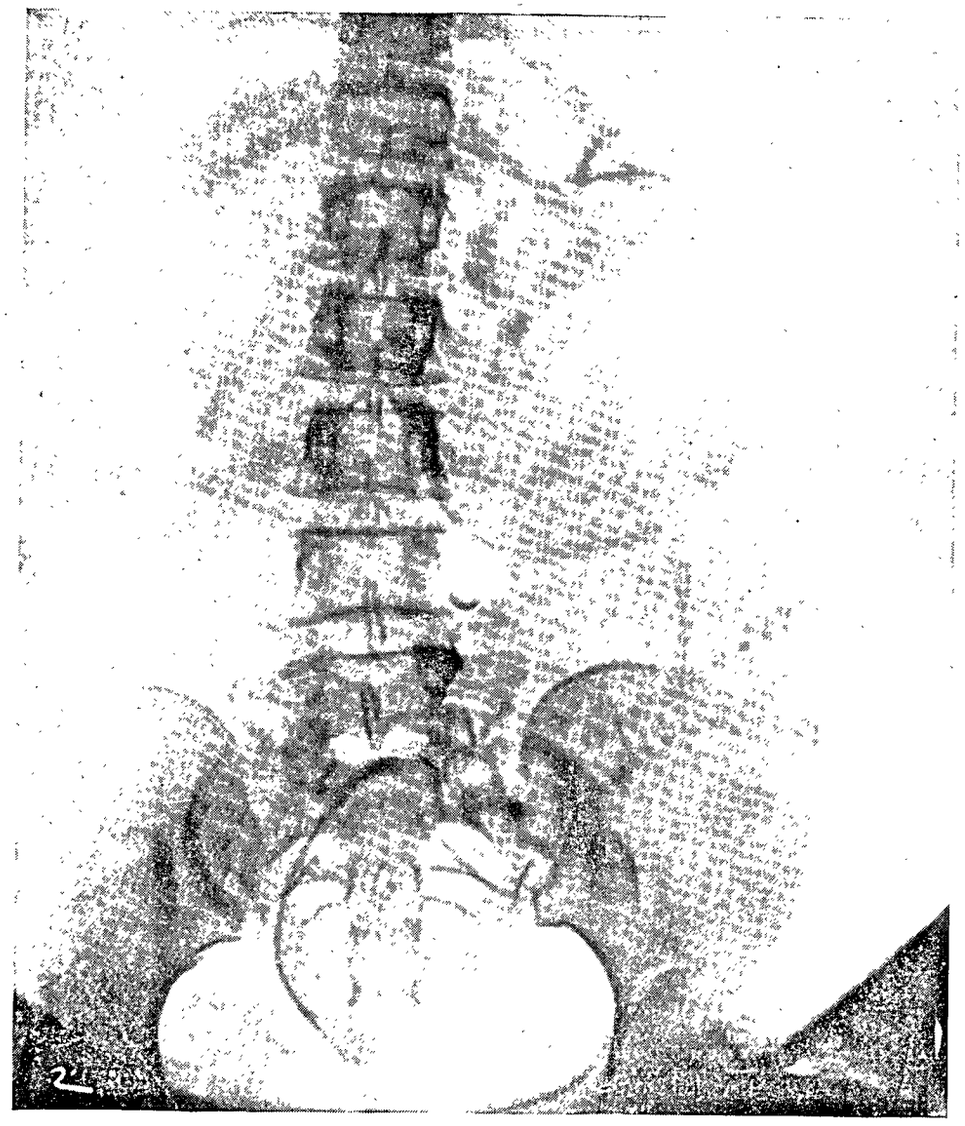

Fig. 3. Suspected breech from the size of the head; but two heads and parts could not be defined as the head of one was covered over by breech of the other.

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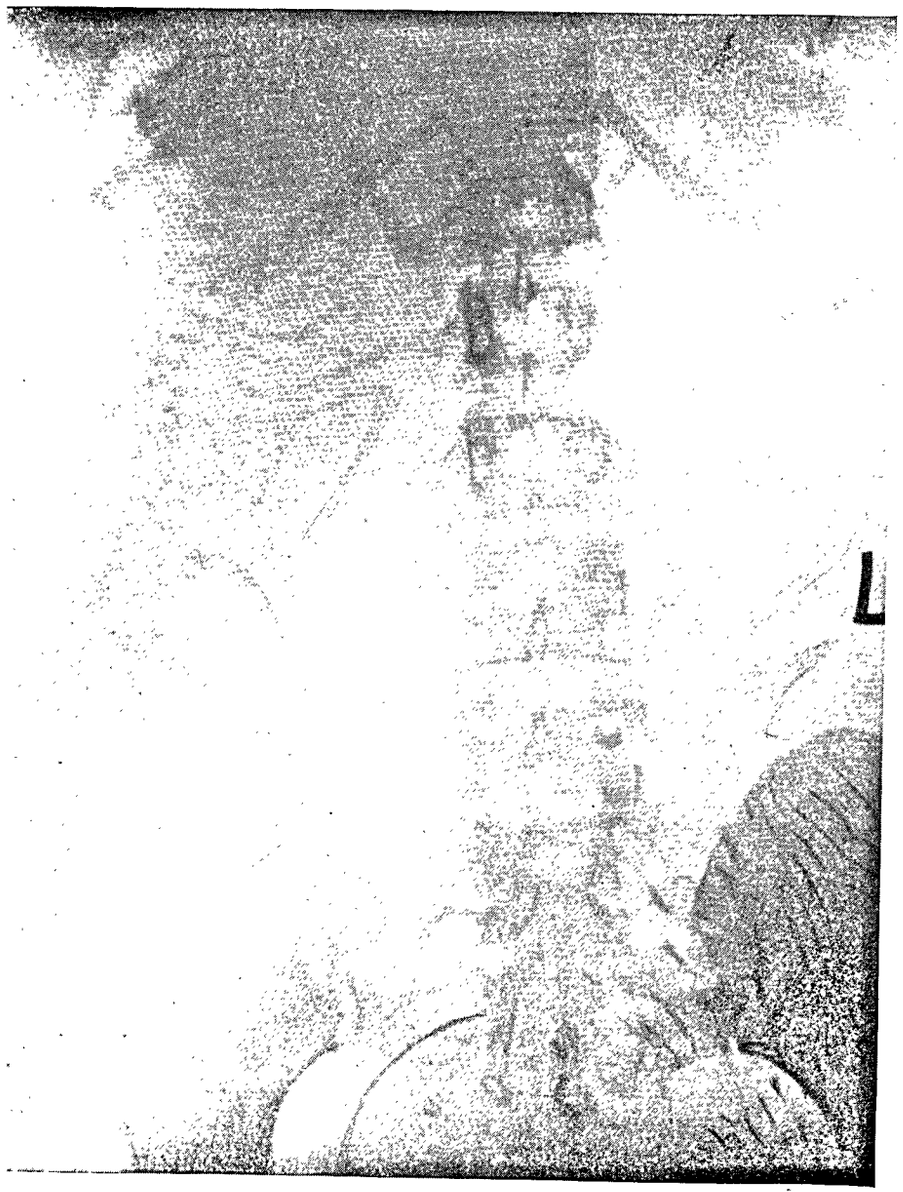

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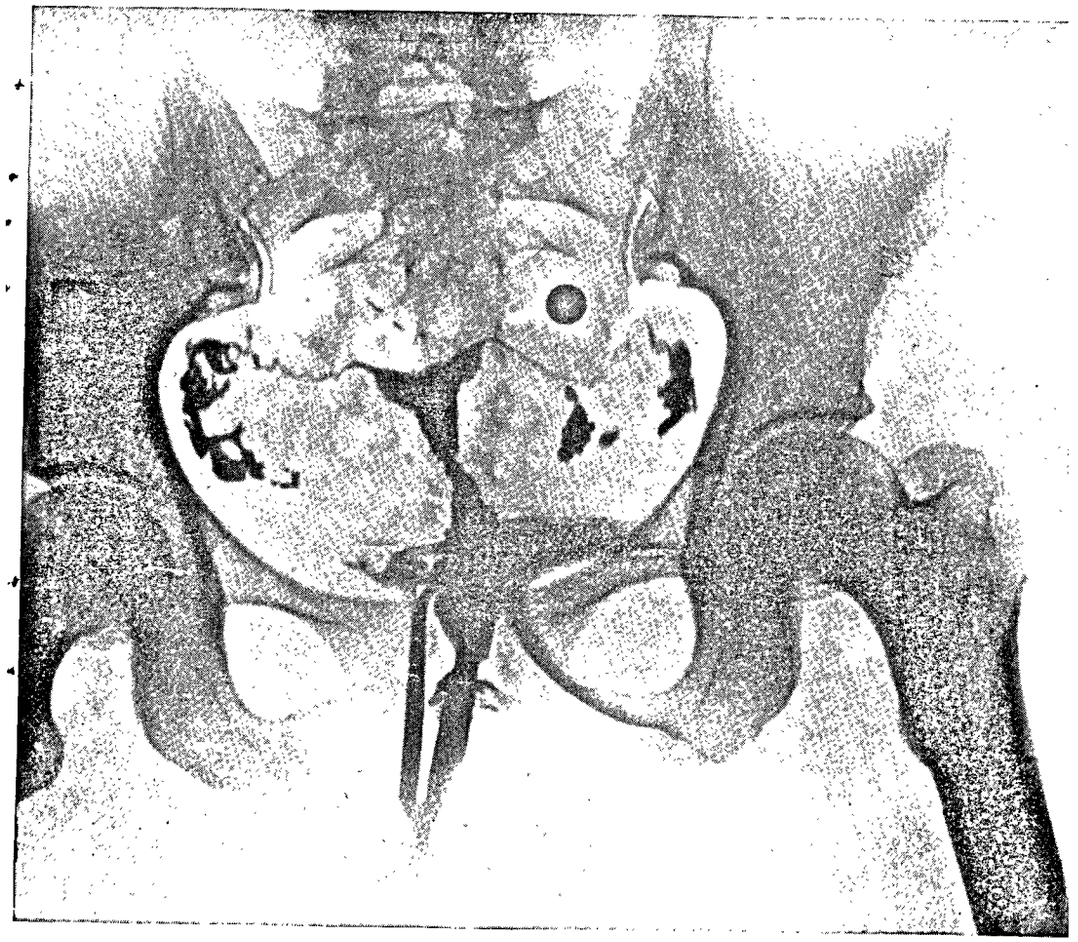

Fig, 5.

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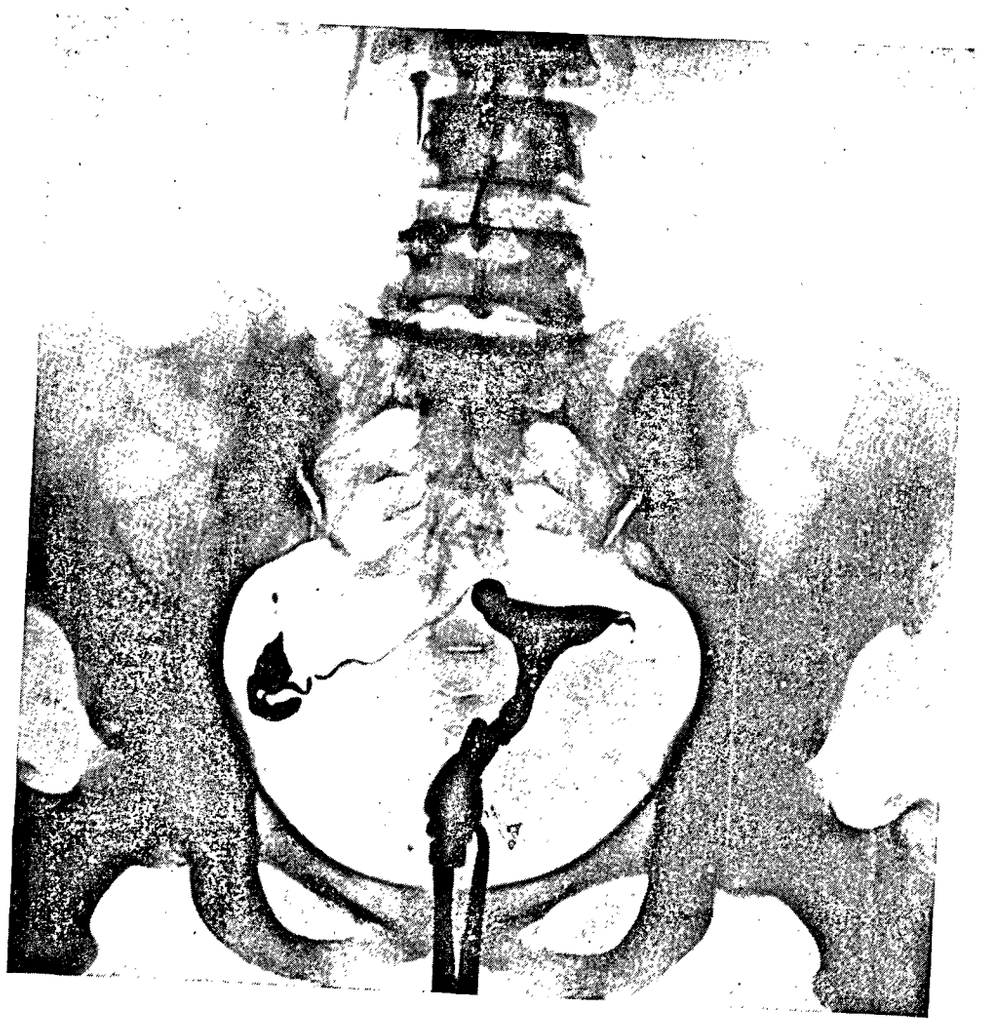


Fig. 6. Obstruction in Left Tube.

disease of Cervix and Vagina, (*e*) Lucoplakia of Vulva. The abovementioned conditions are also well treated with Radium if available.

The following conditions give symptoms of Uterine Bleeding and so great care should be taken in coming to a diagnosis.

1. (*a*) High Blood Pressure, (*b*) Back Pressure due to Heart disease or lung condition, (*c*) Diseases of Blood, such as primary anæmia, (*d*) Hyperthyroidism, (*e*) Tumours such as Fibroids, (*f*) Carcinoma of the body of the uterus, (*g*) Cancer of Cervix.

Artificial menopause can be caused by Radium or exposures of Deep X-rays, but in women less than forty years old, these methods should not be adopted as far as possible. In cases of menopausal Hæmorrhage Radium is better than X-rays, as it prevents occurrence of Cancer.

2. *Malignant Conditions*: *Cancer of the body of Uterus* :— Operation is the treatment of choice if early diagnosed, otherwise Deep X-ray Radiation to the Uterus and Aortic Glands.

Carcinoma of Cervix :—Radium should be used locally and Deep X-rays should be given to the Lumbar Glands. Early cases give fairly good results. Carcinoma of Vagina is generally secondary to the Chorion Epithelioma. Cases of Chorion Epithelioma should be kept under observation for two years.

Treatment.—Deep X-rays should be given to the Pelvis, and Vagina should be treated with Radium. Sarcomata are rare and do not yield to X-rays or Radium Treatment. The dissemination is by blood and the patient generally succumbs to the disease.

Carcinoma of Ovary :—Generally both Ovaries are affected. They are hard, nodular, fixed and grow rapidly. Oedema is seen on legs. Uterus, Tubes and Ovaries should be removed by operation and prophylactic dose of Deep X-rays is given. Lumbar and Aortic Glands are treated with X-rays. Results are fairly satisfactory.

3. *X-ray Treatment of Sterility* :—Small doses (80 r) of X-rays are given to the ovaries to stimulate them.

Diathermy in Gynæcology

BY

Capt. N. Ahmed, M.B., B.S., L.M., F.R.F.P.S.,
Divisional Medical Officer, E. I. Ry,, Tundla.

THIS article is contributed to remind the general practitioners in India of the value and efficacy of diathermic treatments in diseases of women. It is meant to be a guide for prescribing diathermy and not a stimulus to buy a machine and use it indiscriminately.

Value of Heat in Gynæcology.—Heat has been, from time immemorial, the sheet anchor of gynæcologists for the conservative treatment of inflammatory and spasmodic conditions of female pelvic organs. Hot water bottles, hot vaginal douches and rectal enemas, medicated vaginal tampons and plugs have all remained in vogue as an effort to heat up internal pelvic organs to relieve pain and spasm and to produce hyperæmia and rapid circulation in order to suppress inflammation and to aid absorption of exudatory masses. Those long and tedious conductive heat treatments yielding slow and unsatisfactory results have been revolutionized by the introduction of thermic treatments through high frequency currents. The old conventional diathermy machines and the modern short wave apparatus are capable of heating through each and every cell and fibre of deep pelvic organs and tissues.

Old Diathermy Machines.—Produce 600 to 300 metres waves having a frequency of half to one million per second. They prove very efficient in relieving pain and spasms and in inducing hyperæmia and absorption and also in directly attenuating or killing bacteria which have lethal temperatures within the range of diathermic heat production. The great drawback of old diathermy is that it is likely to promote absorption of bacteria and their toxins into the blood and lymphatics if applied to acute infective and suppurating foci. Diathermy with 600 to 300 metre waves is, therefore, not indicated during the acute and suppurating stages of the diseases manifested clinically by the febrile and irritative symptoms.

Short Wave Apparatus.—Recent advances have now evolved short wave machines which could generate 30 to 3 metre waves with so high a frequency as 50 to 150 millions per second.

These short waves have made diathermy not only applicable but of definite value to even those acute and suppurating processes which remain unsuitable for conventional diathermy. The only contraindication to diathermy with any wave length is its application to a site hæmorrhaging or liable to hæmorrhage, but so far as gynæcology is concerned even this is not an absolute rule, for diathermy is indicated and is of great value in uterine hæmorrhages of inflammatory and climacteric origin. We thus possess in old diathermy machines and now short wave apparatus a complete range of heat therapy appliances for very successful conservative treatments of inflammatory, congestive, spasmodic, climacteric and gonorrhœal conditions of female pelvic organs and tissues in whatever stage of infection they may be found.

Relation of old Diathermy to new short waves.—We have seen that an old diathermy machine produces 600 to 300 metre waves with a frequency of half to one million per second and a short wave apparatus generates 30 to 3 metre waves, having a frequency of 50 to 150 millions per second which means old diathermy provides treatments with long and medium hertzian waves (600 to 300 metres) and short wave apparatus with short (30 to 10 metre) and Ultra Short (10 to 3 metres) waves. And just as in a radio receiving set we know that long, medium short and ultra short waves all have their individual utility and do not replace each other and that the range of short waves is wider and the reception on it is less liable to atmospheric and other disturbances so we find that short wave therapy apparatus does not replace an old diathermy machine which in fact is superior to it for treatments of chronic inflammatory conditions and as an analgesic to external and superficial structures and for electro-coagulation of extensive areas. The range of short wave therapy is certainly wider and includes all acute infective and suppurative processes as well for which old diathermy is definitely contra-indicated. It is also a quicker and surer analgesic, produces early and more lasting hyperæmia and is far more æsthetic and easier to apply than the 600 to 300 metre diathermy. The ultra short waves (3 to 6 metres) also appear to have selective action on bacteria but this point is not yet conclusively produced. A gynæcologist with a short wave apparatus does not now wait for fever and other acute symptoms to subside before giving diathermic applications. He can start treatment unmindful of whether there is pus in the pelvis and tubes or not. He would bring the pain, spasms and fever under control with certainty and at once. With old conventional diathermy one would

have to wait for subsidence of acute febrile stage with has to be first treated with infra-red or strong radiant heat therapy. My experience however is that an old diathermy apparatus with infra-red or efficient radiant heat arrangements would serve the purpose if short wave apparatus is not available. Old diathermy machines have reached a well established standard in the refinement of construction, are cheaper than the short wave apparatus of equal capacity and are in fact more suitable for the treatment of cases that one gets as a routine in general practice in India. Short wave should, of course, be indispensable for gynæcological clinics of the specialists and public institutions.

How Diathermy differs from other Heats.—It should be clear that diathermy or through and through heat is not conveyed to the tissues from outside as in the case of hot water bottles through conduction or radiant heat and infra-red lamps through radiation but is produced in and by the tissues themselves through offering a resistance to the passage (between the two electrodes) of the high frequency currents of 600 to 300 metres wave length in the case of old conventional diathermy and of 30 to 3 metres in that of short waves.

For the convenience of describing diathermy treatments a gynæcological pelvis may be divided into :—

1. *Gonorrhœal pelvis* :—Including infection of urethra and all the organs and tissues of the pelvis—diathermy is a specific in all stages.

2. *Inflammatory pelvis* :—Puerperal and of other origin—short waves give excellent results in acute and purulent stages and old diathermy in sub-acute and chronic ones.

3. *Non-inflammatory pelvis* :—Including spasmodic and painful conditions like dysmenorrhœa, dysperunia and metrorrhagia of climacteric origin—diathermy is superior to many other methods.

Gonorrhœal Pelvis.—Gonococcus thrives at 93° F. to 98° F. Its lethal temperature is 100° to 101°F. and it is instantly killed at 106° to 108° F. The temperature of female urethra is generally 99.2°F. and of vagina 98.6°F. and of cervix uteri 99°F. It is, therefore, easy to kill gonococci if the parts where they are lodged could be heated to 105°F. or 106° F. It was not possible to do so before the introduction of diathermy but now we could raise the temperature of the urethra without injuring the tissues to 115°F. and of cervix uteri and vagina to 106°F. and of rectum

to 112°F. with a fluctuation of a degree or two according to individual heat toleration. The cervix uteri has been heated up to 116°F. to 117°F. without harm in recent years (Gorle and O'Conor).

In an experiment heat was applied through various sources to the thigh muscles for 20 minutes and it was noted that with hot water bottle, a rise of 0.50° F. with old diathermy 2.25° F. and with short wave 4.75° F. was recorded. This experiment shows the relative value of the intensity of heat produced by various sources under similar conditions but rise of temperature is not all. Some observers have noted that certain strains of gonococci may be killed by temperature of a degree and duration tolerable to the patient while other strains resist it. It is, therefore, evident that the results obtained with diathermy in case of gonococcal and other pyogenic infections are not only due to direct action of heat on the bacteria but of more value is the indirect action of heat or the thermic effects on the tissues increasing hyperæmia, phagocytosis and above all, the power of absorption and elimination of bacteria and the products of their activity. Moreover, there is no escape for the bacteria and their products causing mischief from the high frequency current which traverses all parts and in fact each and every fibre and cells of the tissues which lie in the field of action between the two electrodes. Every particle of tissue, however deep and of whatever complicated structure it may anatomically be, is bound to receive the beneficial effects of heat that it produces itself by offering the resistance to the high frequency current passing through it. We thus have four diathermic methods of dealing with gonorrhœa in female pelvis :—

I. Therapeutic fever.
II. General pelvic diathermy—external and internal.
III. Local pelvic diathermy—of organs.
IV. Electro-coagulation of erosions of cervix and of granulized tissues in the cervical canal.

I. **Therapeutic Fever.**—This is induced by a good type of diathermy machine preferably with multiple spark gaps or short wave apparatus. A temperature of about 104° F. on which blood supply is supposed to reach at maximum or any other desired temperature is maintained from five to fifteen hours. The fever therapy has proved a great success except in cases of acute urethritis of less than two weeks' duration and in certain strains

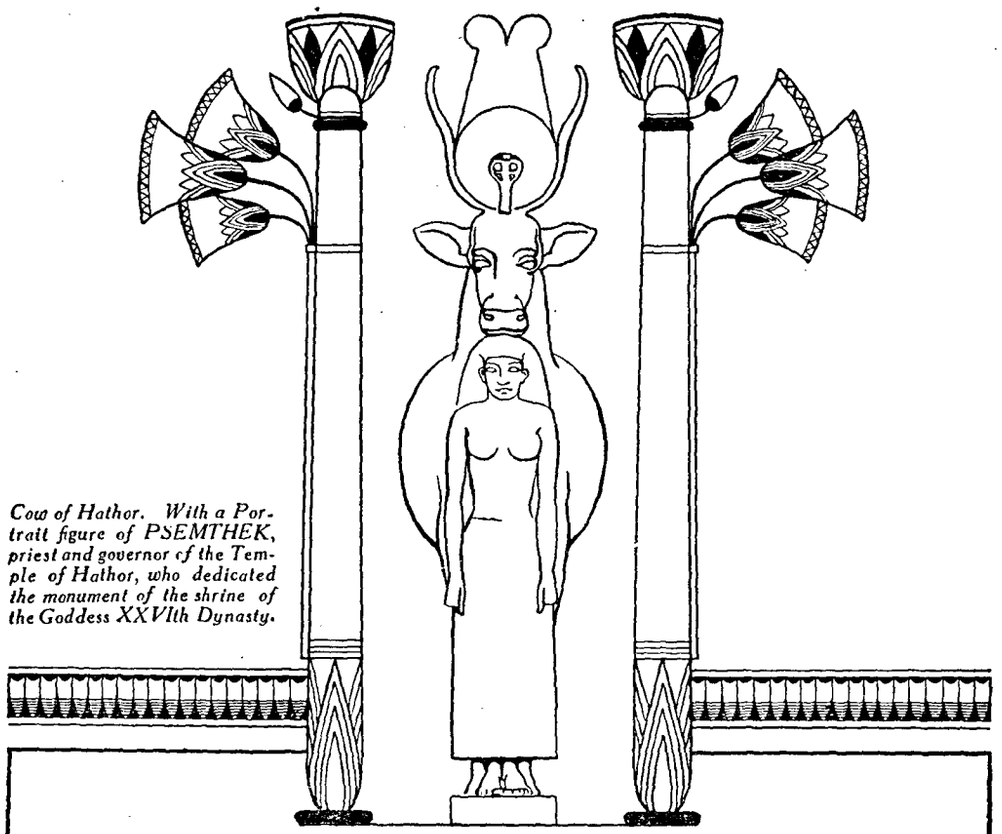
of gonococci not yielding to high temperatures. It is a hospital procedure and needs great care and experience. It strictly belongs to the domain of specialists with complete equipment and hospital facilities and should not be directly prescribed by general practitioners.

II. General Pelvic Diathermy.—Is meant to heat the pelvic organs and tissues generally. It is employed in two ways :—

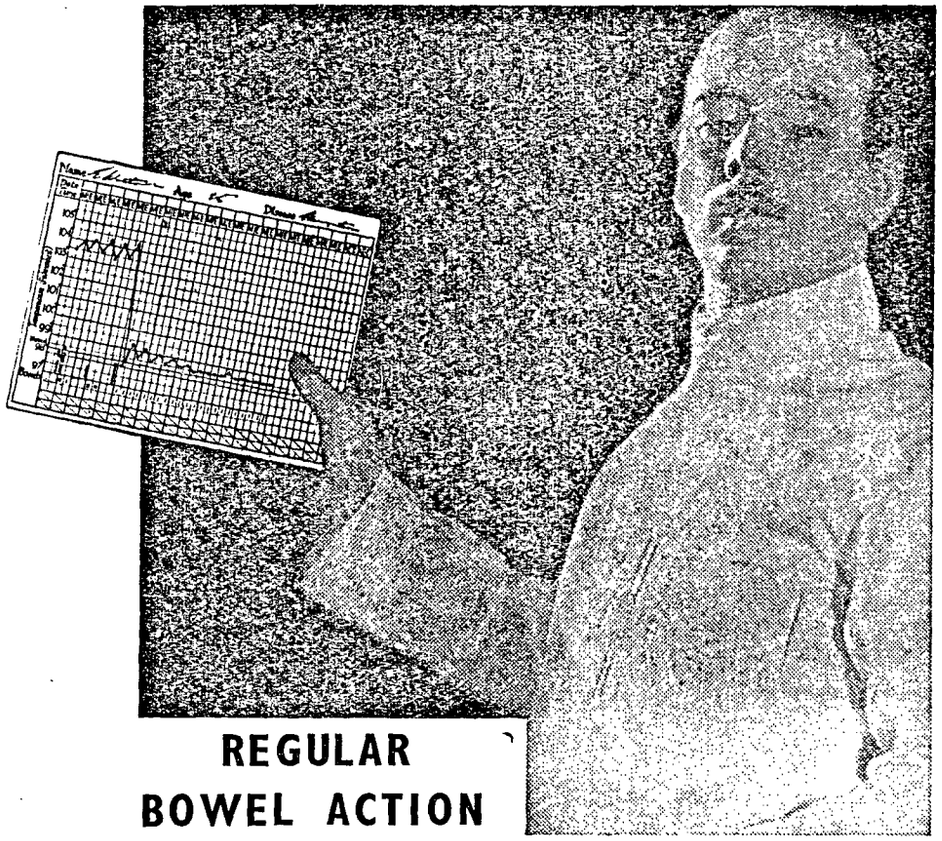
1. *External* :—With sheet electrodes one on the sacrum and the other on pubic region. It is found good to relieve pain and spasms and also in cases of para-and peri-metritis and general inflammatory conditions of pelvic tissues and peritoneum. It is also given as a preliminary to local diathermy of the pelvic organs.

2. *Internal* :—With a belt electrode round the body at the level of groin and a vaginal or rectal electrode locally. The vaginal electrode placed in the posterior fornix concentrates the heat at the fallopian tubes, ovaries and the uterus. The rectal is used when concentration is specially needed in the body of the uterus. It is suitable for virgins and also when the introduction of the vaginal electrode is not advisable due to pain or spasm of vagina. Generally eight applications with two sessions per week of 20 minutes' duration each are given. External and internal pelvic diathermy relieves pain, spasms and dysmenorrhœa, reduces discharges and absorbs the exudates and the inflammatory masses felt in the Douglas' pouch. It is indicated in salpingitis, oopharitis, pelvic cellulitis and peritonitis of subacute and chronic nature. Recurrence is common if local diathermy to the urethra and cervix or entire uterus is not given. In my cases recurrences invariably occurred within a year in acute and subacute cases and no recurrences, now, for 5 years in chronic and mild type of cases. Treatment of husband along with the woman is absolutely necessary. Insufficient treatment of husband is liable to cause re-infection if sexual intercourse happens to be just before or after the menstruation.

III. Local Pelvic Diathermy.—It is employed as a specific cure for gonorrhœal urethritis, endocervicitis and endometritis. Urethra and cervix or whole uterus are treated together at each session. Urethral applications should always precede the cervical and uterine treatments irrespective of whether the urethra is apparently normal or diseased. Five or six applications of ten minutes' duration twice a week prove enough for a cure.



Cow of Hathor. With a Portrait figure of PSEMTHEK, priest and governor of the Temple of Hathor, who dedicated the monument of the shrine of the Goddess XXVIth Dynasty.



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URETHRAL DIATHERMY.—A special urethral electrode is passed for a distance of one and half inches into the urethra and a belt is used as an indifferent electrode. The 'Critical temperature' for female urethra is in the neighbourhood of 114° F. to 115° F. but one has to go with the feeling of the patient which should not be disregarded, if damage to the urethra is to be avoided.

CERVICAL DIATHERMY.—A special cervical electrode is used and is generally passed about ¾ inch into the cervical canal. As the mucous membrane of the cervix is insensitive to pain the treatment is given just after the urethral application using approximately half the strength of the current needed for the urethera and raising the temperature to not more than 106° F. to 107° F.

UTERINE DIATHERMY.—If electrode passes easily into the body of the uterus it may be assumed that the body is also infected (Cumberbatch) and needs local treatment. An electrode curved to suit the direction of the uterine cavity is introduced internally for about three and half inches and application is given as in the case of cervix.

I personally use Fenton's uterine sounds which have been adapted by me to serve as cervical and uterine electrodes and find them handy, cheap and quite satisfactory.

The results of local diathermy are almost specific. The cervix assumes normal colour and appearance, discharge disappears altogether, burning sensation during micturition subsides, dysmenorrhœa and metrorrhagia if present before, go away, the constant pain at the small of the back and loins are not complained of; the general lassitude and sallow "muddy" appearance of the patient changes to healthy looks and it is noted by many workers and myself that fibrositis and arthritis of cervical origin also get cured. The recurrence if any is entirely due to re-infections which are often due to ineffective treatment of the husband or refusal of the patient to take local cervical and urethral treatments.

IV. **Electro-Coagulation of Cervical Erosions.**—Erosions generally disappear after the discharge ceases but if the erosion on the lips of cervix or granulized tissues in the canal persist a single or at the most two touchings with a single or double active needle electrode with an indifferent plate at the sacrum or under the buttocks coagulates the tissues sufficiently enough for the

erosion or the granulized tissue to disappear and whatever discharge is left to cease altogether.

INFLAMMATORY PELVIS.—The infection of pelvis due to other pyogenic organisms such as B. Coli, Diphtheroid Bacilli and Streptococcus fæcalis and hæmolyticus causing endo-cervicitis, endometritis, salpingitis, oopharitis, para-and peri-metritis and pelvic peritonitis is generally puerperal or could be easily traced to badly managed puerperium. General pelvic diathermy for majority of the cases with the addition of a few local cervical and uterine applications for the rest give much more satisfactory results than could be obtained by old conventional douching and such other messy treatments. Dysmenorrhœa and metrorrhagia of inflammatory origin get definitely benefited by diathermy and one could hardly find a case of this nature to be labelled unsuccessful after a course of 8 to 12 treatments.

PNEUMOCOCCAL PERITONITIS IN GIRLS.—There occurs a sub-acute type of pelvic peritonitis in girls below 12 years of age due to pneumococcus. It sometimes begins with alarming symptoms. It is generally treated on conservative lines and causes prolonged invalidity. General pelvic diathermy given through a belt and rectal electrode is highly successful and cures the child in 5 to 8 bi-weekly or alternate day sessions.

VULVO-VAGINITIS.—High frequency currents given with vacuum and non-vacuum glass electrodes produce counter-irritant effects on the skin and mucous membranes through stimulation of skin-cell metabolism and activity of the glands. They also liberate ozone in good quantity. These properties are utilized for treating vulvo-vaginitis and for general disinfection of vaginal canal.

DIATHERMY AS A PREOPERATIVE MEASURE.—Cherry believes that a course of diathermy prior to undertaking an operative procedure on the pelvis "will eliminate many of the technical difficulties in the removal of large pelvic masses and thereby contributes to a smoother convalescence". I have no experience of such cases.

NON-INFLAMMATORY PELVIS.—Analgesic, anti-spasmodic and vaso-motor effects of diathermy are utilized in the treatment of non-inflammatory conditions.

DISPERUNIA.—The results are uniformly good. A rectal electrode is used in the beginning and as the sensitiveness diminishes vaginal electrode is just placed at the orifice and slowly

pushed in during the application as far as it could go without pain. I have not yet had sufficient number of cases to enable me to express definite opinion on the question of recurrences.

DYSMENORRHŒA of spasmodic type needs variable time for treatment. Some cases yield to a course of bi-weekly sessions of 20 minutes each while others need two or three such courses during intermenstrual periods. Attention to regulation of bowels and a rest in bed a day or two before the commencement of the period and during the first two days of flow help the treatment greatly. Rectal route should be preferred and is quite satisfactory in cases of virgins.

METRO AND MENORRHAGIA.—of climacteric origin yields very satisfactorily to belt and rectal electrode. Local treatments are needed only in very exceptional cases. Organo-therapy, of course, should not be withheld. Radio-therapy is, of course, more potent and almost always succeeds in cases not yielding to Diathermy.

VILLOUS TUMOURS OF URETHRA.—could be very conveniently destroyed by electro-coagulation. Turrell believes this to be the "only justifiable procedure."

CANCER OF PELVIC ORGANS.—Diathermy has acquired a definite place in the treatment of operable and inoperable cancers because of its power of destroying the affected tissues without hæmorrhage and fear of metastases due to operative interference. The subject is too specialized to be of much use to the general practitioners and I therefore refrain from discussing it here.

HOW TO PRESCRIBE DIATHERMY.—Divide your cases for whom conservative treatment is decided into two groups :—

(1) Acute febrile cases with signs of irritation and suppuration.

(2) Chronic cases with or without hectic temperature.

1. *Acute Febrile Cases* :—(*a*) Advise short wave therapy if available or ; (*b*) First give infra-red at 36 inches for 20 minutes twice a day or radiant heat 4 to 8 carbon arc 16 c.p. lamps or one 500 watts tungsten arc bulb at 12 to 6 inches for 20 to 60 minutes twice or thrice a day for about 4 to 7 days or till pain and acute symptoms subside and then give :—

(1) General Pelvic Diathermy External—2 exposures of 20 minutes on alternate days.

(2) General Pelvic Diathermy Internal—6 to 8 exposures of 20 minutes twice a week or on alternate days or even daily if necessary.

(3) Local Urethral and cervical or Uterine Diathermy—4 to 6 exposures when necessary.

2. *Chronic Inflammatory and Non-Inflammatory cases* :—

(1) General Pelvic Diathermy External—2 exposures of 20 minutes bi-weekly.

(2) General Pelvic Diathermy Internal—6 exposures of 20 to 30 minutes bi-weekly.

(3) Electro coagulation—if there is any erosion on the cervix or granulized tissue in the cervical canal.

(4) Local Cervical or Uterine Diathermy—if general, does not succeed.

(5) Repeat a course of 8 applications on alternate days during intra-menstrual periods for a few months in very resistant and obstinate cases.

As an illustration to the therapeutic powers, the importance of judicious prescription and the value of suitable and correct applications of diathermy, I present the following interesting case.

Case : *Acute Gonorrhœal*.—Robust young girl of 22 years. Married 3 years. Got dysmenorrhœa after the marriage. Husband had gonorrhœa of 7 years standing,and was treated and cured (?), but had a recrudescence a month before the intercourse which occurred just after her menstruation. She got spasmodic pains in back and lower abdomen, profuse yellowish irritating vaginal discharge and frequency of micturition for a fortnight starting immediately after the intercourse. Then she had a rigor ; temperature rose to 102° F. abdominal pain became very severe and burning in urination intolerable. Examination showed total W.B.C. 13,000, Poly 80%, Lymphs 16%. Boarding of muscles and extreme tenderness below umbilicus present. P.V. showed hard bulging mass in posterior fornix. Tubes felt full and baggy. Treated by a well-known gynæcologist in Calcutta. Got very hot vaginal douches 4 pints (Dettol), morning and evening, hot fomentations to abdomen and rectal enemas. Prontosil 1½ grams. daily. Pot. citras mixture every 4 hours. No drug including Eukadol relieved the pain except Eupaco which did afford relief but for a few hours only. Treatment continued for 15 days. Nausea, vomiting and signs of rectal irritation were added. P. V.

showed a threatening big mass bulging in vagina. Rectal examination showed dangerous pressure on the rectum. W.B.C. 22,000, Poly 80% ; question of posterior colpotomy was considered. Another prominent gynæcologist of Calcutta was consulted. Conservative treatment was decided. I gave 500 watts bulb exposures at 6 inches 20 minutes B. D. increasing the time to one hour. All other treatments were stopped except 1½ grams. of Prontosil daily to combat any added streptococcal mischief.

Pain diminished after first exposure, disappeared after 4 days. Fever touched normal in the morning and tenderness gone by the 7th day. P.V. made by attending gynæcologist showed the mass localizing and inflammation subsiding. Four external and four internal pelvic diathermy exposures for 30 minutes daily were given by me in 8 days.

P. V. showed the mass practically absorbed. Negligible thickness left. Another course of 8 applications of 20 minutes duration bi-weekly. Patient was perfectly well. Sat for her University examination after a month. Urethral and cervical diathermy was refused. Had dysmenorrhœa after 4 months. General pelvic diathermy was given again. First two exposures brought profuse discharge and then everything got on well again. Local diathermy was still refused. Had severe pain, profuse discharge and fever 102°F. again after 10 months. Same Calcutta gynæcologist examined and declared it a relapse. This time no other treatment was given but was sent straight to me. Four days exposures to 500 watts bulb at 6 inches brought pain and fever down. General pelvic diathermy was given and patient now agreed to urethral and cervical diathermy. Husband took Diathermic and Gonoderm treatment but could not complete the course last time. To be thoroughly treated again.

This typical case is specially quoted from my recent series of about 200 cases of all varieties to show the power of thermogenetic waves and diathermy when all other conservative methods fail in a gynaecological and particularly in a gonorrhœal pelvis and also to impress upon you that unless local urethral and cervical applications are made and husband thoroughly treated in a case of gonorrhœa, relapses would not be prevented.

I make bold to say that in diathermy we have the most powerful weapon in the field of conservative treatment to combat inflammatory conditions of pelvis and a recognised specific for gonorrhœa in the female.

I strongly recommend a true appreciation, a keener attention and a far more extensive use of diathermy by the gynaecologists and general practitioners in India than has hitherto been the practice.

Purdah Factor in the Diseases of Women in India

BY

A. Singh, M.B.,

Benares.

NATURE herself has provided the fair sex with certain internal secretions or endocrines that go to a certain extent in making them lovelier, less ferocious and thus deserving of greater comforts and lesser exposure to the usual rigours of life. In all societies whether ancient or modern, Eastern or Western, up till now, there has always been a custom known under etiquette to spare the female as far as possible and the little moral tinge in or behind the "Purdah" is traceable to this very universal decorum. But Purdah, as we know it in its very highly developed form, is a mighty edifice having only a brick of the said moral tinge at its bottom, the visible structure being built up in centuries since the early mediaeval times through man's unjustifiable and sometimes reactionary sentimentalism specially during the days of Islamic spread, invasions and conquests.

For Muslims, there is something like a religious sanction or obligation behind it but for Hindus, there is nothing of the kind. As far as the evolution of purdah in India is concerned,we can see elements of mediaeval sentimentalism worked up to extremes through fears of abduction, kidnapping, of forced marriage so common and so disgusting in the pages of its shameful histories for several centuries before the advent of the British rule. Again, after the consolidation of Muslim rule in India, the factor of "blind imitation" for prestige began to prevail among the non-purdah-wala Indians, the high caste Hindus and the aristocracy with the result that it became impossible later on to realise in Northern India, that purdah is a non-Hiudu custom foreign to the spirit of real Indian culture.

Three Types of Purdah.—Purdah as observed in this country at present, can be described in three distinct types. (1) Religious Obligation or "Pukka Muslim Type". (2) Ignorant Hindu or Rural Type. (3) Semi-Modernization or "Waning-influence" Type.

I. Religious Obligation or Pukka Muslim Type.—This is the worst type of Purdah and is the least vulnerable to modernization. Its age period for the victims also is the longest—extending from

the 9th or 10th year to the 50th or 60th year or the whole life up to death. It is common with practically all the religious minded Muslims not only in the North but also in the South. Certain aristocratic Hindu families of North or Central India also practise it. In Peshawar, Lahore, Delhi or Lucknow, the sight of some figure in "Burka" (a covering veil) in Bazars, at Railway Stations or even in moving trains will at once lead you to think that the victim is a Purdah woman of this type who has been compelled somehow or other, usually under some economic pressure, to move about rather unwillingly.

In the families of the observers of this type of Purdah, a doctor's business sometimes becomes very difficult and annoying. When in the absence of a suitable lady doctor, a male physician or surgeon is called, he is usually asked to diagnose and do everything for the patient by feeling the pulse alone. A detailed examination or thorough treatment is seldom allowed. Most of the diseases of such victims remain undiagnosed till it becomes too late for them to be properly treated, when, in view of the preciousness of the life at stake, the barrier of prejudice and evil tradition is allowed to be broken partially or wholly but to no purpose.

II. Ignorant Hindu or Rural Type.—This type is gradually becoming more and more vulnerable to modernization. It is common in rural or semirural parts of U. P., Behar, Central India, Rajputana etc. The victim is usually a married girl-woman after 11 or 12 up to 40 or 45 years of age. Instead of Burka, it is usual to find excessive use of *Ghunghat* in this type. The victims are usually uneducated and the least cultured. Their *Ghunghat* works not only in the presence of strangers but also sometimes in the presence of fathers-in-law, brothers-in-law or uncles and other intimate relatives too. The climax of their Purdah-ridden mentality is allowed to reach during deliveries or confinements of the victims for child-births. Usually a dirty, most uncared-for nook of the house is selected for her shelter and she is treated as if she is a sinner under expatiation. The victim is denied not only a good company, good air or surrounding but also usually a good bedding is forbidden to her.

The ignorant Hindu type of Purdah is also found very often with rural Muslims of the above tracts specially when they are not Arabized or Persianized in remote villages.

III. Semi-modernization or "Waning Influence Type".—This type of Purdah can be seen at present practically all over India

excepting perhaps certain parts of Madras and Bombay. In Northern India it is easy to see even a graduate wife—Hindu or Muslim—coming under this category. The age period of this type of Purdah commences from 13 or 14 and goes up to 25 or 30 years. In this type the display of the "Burka" or "*Ghunghat*" remains at the minimum and that also only on special congregational occasions. It is usually a case of compromise of common sense with traditions or religious obligations and is found both among Hindus and Muslims with various shades of modernization and culture, particularly in Northern India.

Effects of Purdah on the Normal Physiology of the Victims.—The first noticeable feature from enforced Purdah in its victims is their marked anæmia and diminished resistance to infections of all kinds. The R.B.C. count is much lower than the normal standard though W.B.C. count may remain normal or more than normal. There is a well marked hypotonus of all the musculature, plain or striated. The endocrines are as a rule more irritable and the metabolism of calcium becomes specially defective with the resultant defects in the bony framework and allied parts of the body. Voluntary muscles are poorly or irregularly developed and fat is deposited in undesired or unusual situations.

When enforced Purdah is combined with poverty, dietetic errors, and instances of avitaminosis, hypo-vitaminosis or endocrine disturbances become too common. The liver function is specially liable to be upset and a malady-complex under "Purdah Liver" can sometimes be pointed out with all the above physiological peculiarities jointly producing metabolic disturbances.

Owing to diminished resistance to infections, the very germs that normally inhabit our mucous passages, tubes and canals in the body—living as innocent commensals in the "healthy" become turbulent or ferocious in the Purdah victims giving pathogenic symptoms every now and then. Thus respiratory catarrh or B. Coli troubles become something like normal features with Purdah prisoners.

Transmission of Hereditary Disabilities.—The trend of thinking in Immunological studies at present is that both—"resistance against infections" and "susceptibility towards infections" are transmissible from the mother to the offspring according to the condition of the immunological state of the mother at the time of conception and during pregnancy. Thus Purdah women living with the above physiological abnormalities cannot but give

a bad beginning to their issues namely a marked susceptibility towards infections with tinges of certain biological abnormalities as acquired by themselves.

Effects of Purdah on the Incidence of Diseases in Women.—1. *Tuberculosis* :—It is practically accepted by almost every thinker on the Tuberculosis-problem of India that our ordinary Hospital Statistics are in no way a reliable index to the actual realities regarding this disease in India. A special investigation carried on by Dr. Wazir Singh in a part of Lahore bears out this conclusion. Tuberculosis is much more common in Purdah women than in men or non-Purdah women. Purdah influences the incidence of tuberculosis not only by devitalizing the mother but also by helping hereditary transmission of tubercular diathesis to the future generation.

2. *Diseases of bones and joints* :—Osteomalacia and other abnormalities of calcium metabolism are decidedly more common in Purdah women than in non-Purdah women.

3. *Infectious diseases in general* :—Usually Purdah women are more protected from catching fresh infections owing to limitations in their movements. But when an epidemic becomes endemic or localised, they die more easily than others. Thus respiratory catarrhs (Influenzal, etc.) or Leprosy which are usually house infections become very common with Purdah women.

4. *Mental disorders or Psychoses* :—These are decidedly more common with Purdah women than with non-Purdah women.

5. *Neoplasms* :—These also appear to be more common with Purdah women than non-Purdah women.

6. *Venereal diseases* :—The Purdah factor is expected to be a check upon the acquisition and propagation of venereal diseases provided the morality and the habits of the husband are unquestionable. But it retards proper diagnosis and treatment n time. So, in practice one finds that Purdah victims offer inexhaustible reservoir of sources of venereal diseases.

7. *Accidents and physicochemical diseases or disabilities* :—While accidents from extremes of heat and cold or similar natural agencies are less common in Purdah women than in non-Purdah women, undiscovered and undiscoverable deaths from suicides or homicides are more usual with these victims. Thus it may be wrong to say that Purdah lessens death from accidents in its victims.

8. *Sterility* :—It is sometimes believed that Purdah ladies conceive more easily, owing to their more passiveness after the sexual act. This may or may not be true but miscarriages and abortions are more common under the Purdah than outside it. Sterility on the whole can seldom be less common in Purdah women than in non-Purdah women.

The Purdah Problem from the Point of Race Culture—The present is the age of scientific adaptations everywhere and even in the manufacture of one's progenies one has to see that he produces the best ones—the virile and useful ones—from the social and national criteria. If Purdah helps transmission of susceptibilities to infections or diatheses to diseases into future generations it must engage the attention of the supporters of the old tradition who after all may be in no way less social or national minded.

Summary :—1. Three distinct types of Purdah in India are described. These are usual obstacles to proper diagnosis and treatment of diseases of women in India.

2. The Purdah factor disturbs the normal physiology of its victims producing anomalies in blood, digestive organs, bones, endocrines and other tissues.

3. The Purdah factor helps transmission of diatheses to diseases from generation to generation.

4. The Purdah factor helps the incidence and seriousness of many diseases in its victims like Tuberculosis, diseases of bones and joints, malignant tumours, etc.

5. Purdah is an obstacle to the proper race-culture and regenerated man-power of the future generations of our country and requires radical removal.

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Anæmia of Pregnancy in Indian Women

BY

Hemendra Nath Chatterjee, M.B.,

AND

Charu Chandra Basu, M.B.,

Department of Pathology, Carmichael Medical College, Calcutta.

In India, the "Idiopathic" Anæmia of Pregnancy has peculiar features of its own. Apart from its large incidence, it has got a rapidly changing type of blood picture, starting as a normocytic type of anæmia and ending into a macrocytic hyperchromic type. (Chatterjee and Basu 1938). The usual causes which produce the secondary anæmias in this country such as Malaria, Kala-azar, Ankylostomiasis, etc., can be excluded from its "raison de etre" apart from being concomitant aggravating factors (McSwiney 1927 ; Mehta 1930 ; Mitra 1931 ; Chatterjee 1938).

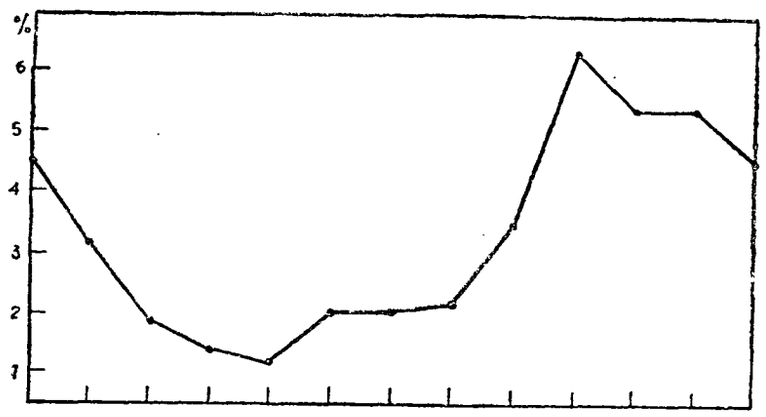
Syphilis has also been excluded (Gupta 1932 ; Chatterjee 1938). Therefore, pregnancy is the central causative factor round which the condition goes on evolving. There is a great tendency for a spontaneous cure after the termination of pregnancy with or without treatment except in the very advanced case. This type of anæmia is not met with in non-pregnant women.

Incidence and Seasonal variation.—In Bengal, there is a definite relation between the onset of rains and the number of pregnancy anæmia cases.

It is a peculiar fact that in this part of India three diseases, which are associated with œdema and swelling occur in a somewhat epidemic like incidence in the latter half of the year after the onset of the rains. These are, Epidemic Dropsy, Eclampsia and Anæmia of Pregnancy. In one of the biggest Maternity Hospitals of Calcutta, special Anæmia Wards and Eclampsia Wards have got to be opened during this part of the year. The cases of anæmia of pregnancy begin to come in by June and July and then the number begins to get higher, reaching the highest point in the month of September ; the number remains fairly constant upto December when it again falls and the cases become very few in February, March and April.

Chart I shows the percentage of Anæmia of Pregnancy of the total number of pregnancy cases for 5 years (1930–34) in two of the biggest Maternity Hospitals, Calcutta, Bengal.

CHART I



Percentage of pregnancy anæmia cases amongst obstetric admissions for 5 years.

In Bombay, Balfour (1927) and Wills (1931) found this disease to be more prevalent during the second half of the year.

Mudaliar and Rao (1933) in Madras found the maximum incidence to be in June, the hottest part of the year.

Age incidence.—The cases have been found between 15 and 43 years. Balfour (1927) in Bombay, Mudaliar (1933) in Madras and Chatterjee (1933) in Calcutta found the maximum age incidence between 20 and 30 years. Chowdhury and Mangalik (1938) at Lucknow and Mitra (1937) in Calcutta found the maximum incidence between 20 and 25 years.

Race and Religion.—The condition has been found practically amongst all races and religions in India, *viz.*, Jews, Buddhists, Christians, Mahammadans and Hindus (McSwiney, 1927; Mudaliar and Rao, 1934; Gupta, 1932; Chatterjee, 1938).

Relation to parity Incidence—Gupta (1932), Chatterjee (1938), and Chowdhury and Mangalik (1938) found the greatest number of cases amongst the primiparæ. The incidence gradually decreases with further pregnancies.

Relation of period of pregnancy to Anæmia.—Chatterjee (1938) has shown that the anæmia has been seen to start before the 3rd month of pregnancy and many of the cases can carry up-to the 9th month.

Relation of blood groups.—There is not much relationship between the blood groups and anæmia although patients belonging to group B are most numerous (Chatterjee 1938).

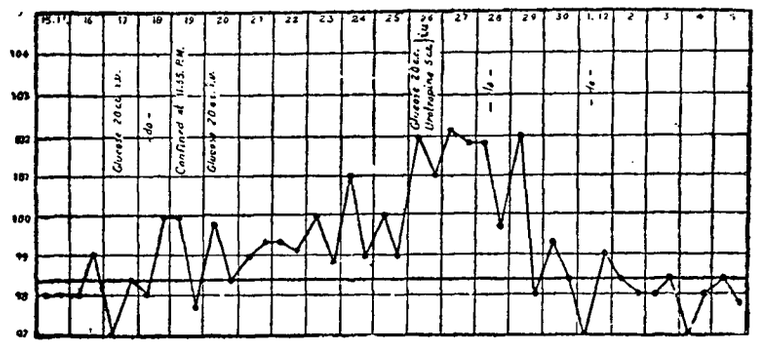
Matching of the infant's blood with that of the mother.—Chatterjee (1938) found that the mother's corpuscles were quite compatible with the infant's sera and *vice versa*.

Clinical aspects.—*General appearance* :—Unless dark coloured, the patients have a peculiar lemon coloured tint of the skin. There is swelling of the extremities and face and the facial markings and contours are obliterated. Owing to the œdema of the face the patients look like so many Mongolian sisters and in the wards during the height of the rainy season, it is usual to see the beds occupied by patients looking very similar.

Temperature in Pregnancy.—A very large proportion of cases exhibit a febrile temperature before confinement which is irregular and intermittent (Chatterjee 1937). This tendency to febrile temperature persists after confinement.

Malaria and Kala-azar have been excluded as being the cause of this fever in the vast majority of cases (Chatterjee 1938).

A typical temperature chart is given.



Temperature chart. A typical chart in pregnancy anæmia.

The temperature however can be controlled by glucose (20 c.c. intravenously every day or every alternate day with or without urotropine (5 c.c.).)

Fever and Leucocytosis.—There was leucocytosis immediately before and during the febrile attack in the majority of cases. The different aspects of the leucocytic blood picture have been studied in detail by Chatterjee (1937).

Oedema.—Is present in the great majority of cases in nearly half of whom the condition may be that of general anasarca.

Albuminuria and Urinary out-put.—Albumin may be present in a few cases, although it may be absent in the majority. One of the associated conditions is the marked diminution of the urinary output (Chatterjee 1937). Glucose 20 c.c. given intravenously daily along with calcium diuretin greatly improves the urinary output. The kidney dysfunction is however a temporary phase and disappears after the termination of pregnancy.

Gastro-Intestinal system.—Digestive disturbances are as a rule present in a large proportion of cases.

Diarrhœa is very common. The tongue is flabby and white. There may be glossitis but this is not constant. Following the work of Balfour (1927), Emanuelov and Mehta (1927), stools were examined with ærobic and anærobic methods by Chatterjee but he failed to obtain any constant bacterial flora which might be responsible for the production of anæmia (1938). Besides the absence of any increased bilirubin content of the blood (Wills 1931–33; Chatterjee and Ghosh 1937) and of a similar increase in the urobilinogen of the urine rather goes against the idea of any hæmolytic destructive action on red blood cells.

Gastric Analysis in Pregnancy Anæmia.—There does not seem to be any relation between the anæmia and achlorhydria.

Thus low acidity curves were obtained in only 4 out of 15 cases of our series (Chatterjee 1937). There was no case of achlorhydria. Wills and Mehta have obtained hyperchlorhydria in their cases. Indefinite and divergent results have been obtained by various workers including Mudaliar and Rao (1934), Mitra (1937).

Cardiovascular system.—There is breathlessness and dyspnœa in the great majority of cases. Mitra (1937) has described an atonic condition of the heart under X-ray examination.

Maternal Mortality.—Somewhat varying figures have been obtained by different workers. The mortality would undoubtedly depend on the severity of anæmia, the different secondary complications and many other questions such as the previous condition of the mother's health, the season, and also on the newer methods of treatment now available such as the different preparations of liver etc.

McSwiney (1927) gives the figure for maternal mortality as 34.88%, Balfour (1927) as 52%, Mitra (1937) 17.7% in the Idopathic cases of anæmia of pregnancy and 31% in all the different types of secondary anæmias associated with pregnancy and Chatterjee. (1938) 12%.

Infantile Mortality.—McSwiney's (1927) figure is 55%, that of Balfour (1927), 68.3%, of Choudhury & Mangalik (1938), 39% and of Chatterjee (1938), 34%.

The divergent figures might be due to the newer methods of treatment available in the more recent years.

Hæmatological Findings.—Although the study of the individual red cell is of paramount importance in the study of Anæmias, there is the very unfortunate tendency to divide anæmias into water-tight compartments such as macrocytic, microcytic and normocytic and megalocytic as well as hyperchromic, normochromic, hypo-chromic etc. and their permutations and combinations.

This is all the more so if this division is made on the basis of single observations.

Chatterjee & Basu (1938) after following the cases for prolonged periods found that one and the same case may pass through the different phases of the blood picture. The type of blood picture at a particular date depends on the amount and severity of the anæmia. Thus they have shown that a case of anæmia originally starts as normocytic; it then becomes microcytic and ultimately it may deteriorate into the magalocytic type.

The colour index also varies. In the earlier stages it is normo or hypochromic; then it becomes hyperchromic (Chatterjee & Basu, 1938). These workers have shown that the justification of the above divisions lies in their therapeutic indications. In brief, iron is indicated in the earlier microcytic and normocytic types with the low or normal colour index. In the more advanced hyperchromic types the liver therapy is of immense help and can change the blood picture into those of the earlier types.

If untreated extreme grades of anæmias are developed which are of the " pernicious type "—macrocytic and hyperchromic.

It is peculiar that liver therapy in those extreme stages is hardly of any help but rather has a tendency to aggravate anæmia. The only thing which helps to prevent a fatal catastrophe in these cases is blood transfusion. This latter again is not without its special difficulties *viz.* a tendency to produce miscarriage etc.

However the study has brought home the necessity of a scientific study of the Hæmatology, whenever a case comes in. If proper treatment is instituted at the right moment it can definitely prevent the downward drift of these cases. For this purpose the most important data are those relating to each

individual red cell *viz.* the mean corpuscular volume,the diameter and the thickness as well as the mean corpuscular hæmoglobin.

The Biochemistry of Anæmia of Pregnancy.—Hæmatological studies of the anæmia of pregnancy by itself, can give very little idea about the central fact of pregnancy, although it can furnish much valuable information about the amount and the type of anæmia.

It has been shown by various workers (Lucy Wills, 1931. 1933 ;) (Chatterjee & Ghosh 1938) that the bilirubin content of the blood serum, the icterus index and the urobilinogen content of urine are within normal limits in these cases. This practically rules out hæmolysis as a case of anæmia. The anœmia is rather due to a deficiency in the formation of the red blood cell rather than to its destruction.

The findings of the different workers about the gastric acidity have already been mentioned. The same show that there is very little visible and significant changes in the acid contents of the stomach.

The deficiency of various vitamins has been regarded as responsible for this type of anæmia, including vitamins A, B, C and B_2. On actual administration of substances containing the above (such as marmite etc.) very little or indifferent therapeutic response has been obtained (Mudaliar & Rao, 1932 ; Mitra 1937 ; Chowdhury & Mangalik 1938 ; personal communications from different obstetricians of Calcutta). Consequently there is very little therapeutic scope for the above Vitamins except as necessary adjuncts of a well balanced diet.

The Proteins of the Blood.—Chatterjee & Ghose (1938,1939) obtained profound changes in the serum proteins in cases of Anæmia of Pregnancy. These consist of a marked increase of the globulins and a great decrease of the albumins in the blood serum so that in many cases their normal radio is actually reversed.

In the globulins again, it is the euglobulins which record a remarkable increase. Strauss (1935, 1938) obtained a very satisfactory improvement in the general condition of the pregnancy cases and diminution of œdema and other symptoms by giving a high protein diet.

The Sterol Metabolism in Anæmia of Pregnancy—In normal pregnancy there is a great increase in the cholesterol contents of the blood.

There may or may not be a decrease of the cholesterol in the other different types of secondary anæmias as has been seen by us. But in the anæmia of pregnancy a profound drop in the total cholesterol occurs. This is all the more significant in view of the fact that a marked rise is the rule in normal pregnancies.

This diminished quantity is found more in connection with the ester cholesterol fraction—the free cholesterol showing little or no change (Chatterjee & Ghosh 1939).

Following these observations, cholesterol was tried as a therapeutic measure in cases of anæmia of pregnancy with highly satisfactory results. There was a rapid rise of the red cells as well as in the reticulocytes; and even cases showing extreme grades of anæmia have come round by this treatment in our hands.

The follow-up of one case is given below.

Case No. 12.

Aged 24 Years, 3rd Pregnancy, Anasarca, and Diminished Quantity of Urine, 7 Months of Pregnancy.

Date of Examination.	Total red blood cells in million.	Haemoglobin.	Reticulocytes.	Remarks.
17-11-'38	.76	4 gm.	15.6 %	5% Cholesterol intramuscularly.
26-11-'38	1.69	5 gm.	9 %	Every alternate day.
28-11-'38	1.93	6 gm.	6 4 %	
29-11-'38	1.83	6 gm.	8.15 %	
3-12-'38	2.13	6.2 gm.	5.75 %	
5-12-'38	2.24	6.4 gm,	3.68 %	
7-12-'38	2.15	6.4 gm.	4.2 %	
9-12-'38	2.20	8 gm.	6 4 %	
12-12-'38	2.22	10 gm.	8.5 %	
14-12-'38	2.5	10 gm.	3.5 %	
16-12-'38	2.5	10 gm.	3.6 %	
19-12-'38	2.6	11 gm.	3.1 %	Patient voluntarily left Hospital.
21-12-'38	2.6	11 gm.	3.2 %	In good condition.
27-12-'38	3.2	12 gm.	3.1 %	Not confined.

Summary.—1. The study of recent work on the Anæmia of Pregnancy is summarised.

2. The therapy of the condition based on the Hæmatological and biochemical findings is given.

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Treatment of Pernicious Anæmia of Pregnancy

BY

T. P. Tiwari, L.M.P.,

Assistant Medical Officer, Dhamtari, C.P.

PREGNANCY is a physiological phenomenon and yet it is not uncommonly seen to have a large number of pathological associations. The resulting condition on many an occasion is menacing in the extreme and unless energetic treatment is immediately instituted, patient's life in many a case is seriously jeopardised. Pernicious anæmia of pregnancy is one such condition and the following few lines are intended to give a brief account of the same together with a few observations regarding its treatment.

Certain amount of simple anæmia probably due either to the destruction of red blood cells in the placenta or to an abnormal increase of blood plasma, is more or less a constant feature of pregnancy. It, however rarely causes any definite embarrassment and medical consultation on account of it is seldom if ever solicited. Pernicious anæmia of pregnancy is however a very serious condition. In clinical and microscopic manifestations, it is indistinguishably identical with true Addisonian anæmia and almost invariably ends fatally if proper and timely treatment is not undertaken.

The patient becomes extremely pale and her lips, conjunctiva and nails become paper white. The mouth becomes sore and there is a daily rise of temperature. Spleen is usually enlarged and palpitation together with a sense of discomfort about the præcardia is a constant feature. Hæmic murmur in the pulmonary area is always heard in all these cases. Prostration is marked and progressive and even a slight amount of exertion causes breathlessness. General anasarca and a certain amount of albuminuria are common. Blood shows a large number of immature red blood cells in the form of normoblasts and megaloblasts. The erythrocytes also show marked variations in shape. They may be shrunken, tailed or crenated. Cytometry reveals a large diminution in the number of red blood cells and the colour index is always more than one.

Destruction of red blood cells is a metabolic feature even in

health but the quality of blood in a healthful condition is maintained at normal levels by a constant manufacture of red blood cells in the blood forming organs. Whenever an impairment is brought about in the vitality of these organs either by deficient nutrition or by absence or deficiency of intrinsic hæmetenic principles in stomach and intestines (Castle) the equilibrium becomes upset and destruction begins to outweigh the manufacture. Result is a progressive diminution in the number of red blood cells. Presence of megaloblasts and normoblasts in the blood is an additional testimony to the diseased condition of the blood forming organs. A mature red blood cell is the outcome of a progressive process of development from the primitive reticuloendothelium through megoloblasts and normoblasts. A devitalised system often fails to bring about a perfection of this process with the result that immature blood cells are discharged into the circulation. Lucy Wills has done a large amount of research work in connection with this disease and has come to the conclusion that pernicious anæmia of pregnancy is in most cases due to absence of Vitamin B complex from the diet. This results in a generalised deterioration of the whole system. Nutrition of the blood forming organs also suffers and the output of their work both qualitative and quantitative is materially diminished. It should however always be remembered that this view does not altogether exclude the possibility of deficiency of intrinsic hæmopœitic factors contributing a quota towards its causation. How this deficiency is actually brought about is however a question, definite answer to which has not yet emerged from the realm of obscurity.

Treatment.—Early commencement of treatment offers the best chances of recovery. Examination of blood should therefore always be the rule in every case of anæmia during pregnancy. No sooner than the disease is recognised, energetic treatment must at once be instituted. Blood transfusion which used to constitute the only hope for these cases in days gone by is not quite necessary now if the disease is treated in its early stages. It is however still the only life-saving measure in cases which have been neglected for long and are consequently in advanced stages. Since now it has been established that the disease in most cases is due to deficiency of Vitamin B in the diet, treatment mainly consists of administration of Vitamin B. This is easily effected by giving Marmite (Yeast extract) in two teaspoonful doses two times a day with simple water. Several

proprietary preparations containing Vitamin B are now available in the market. Any of these in suitable doses can be used with advantage. In view of the fact that Intrinsic hæmetenic principles are almost always deficient in this disease, the vitamin therapy should always be supported by administration of liver and stomach extracts. Daily dose of these preparations should consist of 2 c.c. of liver extract by intramuscular injection and 40 grams of ventriculin by mouth. I have treated a number of cases on the above lines and the results have been remarkably satisfactory. The treatment must be continued till the blood resumes its normal characteristics. The patient should then be kept under close observation and any sign of relapse should immediately be followed by reinstitution of treatment.

Rest in bed, sunlight, fresh air and liberal quantities of fresh fruits and vegetables constitute an essential part of the treatment and must always be insisted upon.

Tuberculosis of The Female Genital Tract

BY

S. Krishnaswamy, M.B., B.S.,

Lately Hony. Asst. Physician,
Govt. Tuberculosis Hospital, Royapettah.

TUBERCULOSIS of the female genital tract is very rarely met with but for the affection of the Fallopian tubes which are very easily susceptible to tubercle.

In this article, I propose to deal with tuberculosis of the female genital tract beginning with the most common namely salpingitis, to the least common, Tuberculosis of vulva and vagina.

I. **Tuberculosis of the Fallopian Tubes.**—Salpingitis due to tubercle is fairly common.

Ætiology.—1. *Primarily* Salpingitis, if met with in a virgin or in a patient in whom gonorrhœa and puerperal sepsis can be excluded, is mostly due to tubercle except in those cases that may be traced to infection from the bowel.

2. *Secondarily* :—Tuberculous salpingitis may be due to infection which may occur in one of the three ways (*a*) from blood-stream which is difficult in any case to exclude with certainty (*b*) by direct extension from peritoneum above and (*c*) as an ascending infection from below which is extremely rare.

The second mode of infection is the most common. In all cases of abdominal tuberculosis, whether it is tuberculous peritonitis, tubercle of the cæcum or whether it is tabes mesenterica or tuberculous caries of the lower vertebra, when the internal genital organs are attacked, secondarily, the fallopian tubes are always attacked first.

Macroscopic.—*Pathology* :—Usually both the tubes are affected. They are enlarged and tortuous. The walls are thickened and miliary tubercles are usually seen on the peritoneal surface. The tubes are often distended forming a pyo-salpinx, the distension becoming greater according to the accumulation of tuberculous caseous material. In the walls caseous masses may also be found. The tubes are densely adherent to the surrounding parts

but particularly to the ovaries so that ovarian infection often co-exists.

Microscopically.—The usual features of visceral tuberculosis with giant-cell systems are seen in the mucosa as well as under the peritoneum.

In a considerable proportion of cases of tuberculous salpingitis, no other tuberculous lesion can be demonstrated although the rule is that it is associated with disease elsewhere.

In chronic cases, the organism tends to die out and as such is difficult of demonstration.

Symptoms.—1. *Pain*:—Is usual. It may be complained of as a constant ache over one or both sides of the lower part of the abdomen. Or, it may be occasional as at the time of menstruation in the form of dysmenorrhœa.

2. *Leucorrhœa*:—It is often very marked in the form of white thin discharge.

3. *Menorrhagia*:—It may not often be present as the patient may be run down in health and anæmic.

4. *Amenorrhœa*:—Is usual.

5. The usual symptoms of tuberculosis such as fever, anorexia, loss of weight, night sweats etc. may be present.

Blood examination may show leucopenia with relative increase of lymphocytes.

Diagnosis.—This cannot be made with certainty. If a mass can be felt in the posterior quarter of the pelvis in a patient who is known to be suffering from Tuberculosis of the Lungs or in cases where there are signs of tuberculosis of the cæcum or appendix or tuberculous peritonitis, or where caries of the lumbar vertebra or tuberculosis of the mesenteric glands are recognised, a correct diagnosis of tuberculous salpingitis is very probable.

The existence of definite signs of salpingitis in a virgin or in a patient in whom gonorrhœa and Puerperal sepsis can be excluded, is highly suggestive of either tubercle or infection from the bowel.

Prognosis—1. In those cases it is met with primarily with absence of disease elsewhere, prognosis is good, as the focus of infection can be completely removed by operation.

2. (*a*) In those cases complicated by advanced tuberculosis of lungs, kidneys or bad cases of Tuberculous caries of the spine, the patient's general health is considerably undermined. Prognosis

is certainly bad. (*b*) Where it is only complicated by Tuberculous peritonitis particularly with ascites, the cases often improve in a marvellous manner after operation.

Treatment.—Abdominal section is always indicated in the cases complicated by tuberculous peritonitis with much ascites. A simple laparotomy performed to evacuate the fluid, greatly benefits the patients.

In patients with salpingitis, there is a definitely localised focus of tuberculosis which can be removed by surgical procedures. The tubes should therefore be removed if they are not too intimately adherent to the intestine.

In patients with complicated Phthisis the improvement that can result from the removal of the tubes is dependent upon whether the lung disease is amenable to the modern methods of treatment of the disease such as Artificial Pneumothorax etc. as well as whether the general health and vitality of the patient is good.

Since the uterus is frequently affected side by side with the tubes, it must also be removed. If for any reason, it is not advisable to remove the uterus, the uterine ends of the tubes must be cut off very close to the uterus and the stumps covered in so as to avoid peritoneal infection.

Adhesions to the bowels require very careful handling, as the risk of fistula formation is considerable.

The abdominal incision should not be sewn up with sutures passing through the whole thickness of the abdominal wall to avoid extension of tuberculous infection through the operation wound to the skin.

Above all, sanatorium treatment is also specially indicated.

II. **Tuberculosis of the Ovary.**—It is practically always secondary to infection of the tubes as already mentioned. So, only the surface of the gland is affected. Very rarely, the substance of the ovary may be affected by infection reaching it via the lymphatics or through a ruptured Graafian follicle. On such cases the ovary is enlarged and may present caseous masses in its substance.

The symptoms, signs and treatment are similar to those of tuberculous salpingitis.

III. **Tuberculosis of the Uterus.**—Either (1) the body of the uterus or (2) the cervix may be infected.

1. When the body of the uterus is affected, it takes the form of Tuberculous endometritis. This is as a rule secondary to salpingitis.

Tuberculous endometritis has no distinctive symptoms. Rarely it is a cause of pyometra when the uterus gets filled by the caseous matter.

The diagnosis is usually made by finding giant-cell systems in the curettings.

2. The cervix is affected more rarely. It is of importance, as it clinically resembles cancer.

A purulent discharge which may or may not be blood stained is usually complained of by the patient.

On examination, the ulcer is not so friable as carcinoma. But this by itself cannot be depended upon. Only microsopic examination of the scrapings will decide and this procedure must be undertaken in every case.

IV. **Tuberculosis of the Vulva and Vagina.**—This is very rare except in children with advanced tuberculosis elsewhere. It is the result of infected discharges from a tuberculous uterus or bladder coming in contact with the vagina and vulva.

The lesion takes the form of fistulæ or chronic ulcers with overgrowth of the fibrous tissue in the affected part.

Treatment.—If the disease is primary or in those secondary cases where the primary lesions are not too for advanced, the diseased tissue should be excised as freely as possible. In the majority of cases this is not possible and in such cases, the parts should be kept aseptic with suitable applications.

Leprosy in Women—Some Peculiar Features

BY

Dr. G. R. Rao.

Member, International Leprosy Association.
(Formerly B. & O. Government Research Scholar in Leprosy) Dhanbad.

Introduction.—Leprosy, a chronic disease with protean manifestations in its different types and stages, is now regarded as an essentially systemic disease having a special predilection for certain tissues and organs and not involving vital organs. Its self-healing tendency, though not always apparent, further complicates the appearance of some of the lesions or of the affected tissues or organs or involves functional changes in them, the cumulative effect of which, is to render the life of the sufferer miserable. A decade back, it was taught that Leprosy was essentially a disease of the skin and the nerves. Now, with the shifting of the emphasis on to its essentially systemic nature, has come the realisation that the mutual influence of metabolism on the course of the disease and *vice-versa* is a subject well worthy of study. Consequently, the biochemistry of blood and tissues affected by the disease, is being studied with a view to assess the relative significance of changes in them, either induced by the disease or coincident with it. That metabolic changes profoundly influence the course of the disease, has been recognised ; and the different nature of metabolism in women induces certain peculiarities in the course and severity of the disease. Our knowledge of this aspect of the subject is still in its infancy and as an intensive study of it may throw light on some of the obscure points in the Pathology of Leprosy, it is deemed expedient to draw the attention of those who are more favourably placed to pursue such lines of investigation, by this admittedly sketching note, containing a few isolated clinical observations on some thousands of Leprosy cases that the present-writer has had to examine, in the course of 11 years of Leprosy work, done in different provinces of India.

Leprosy in Girls.—From infancy to pre-adolescence, no significant *difference* either in the course of the disease or in its manifestations, is seen in the case of boys and girls. But in the

adolescent stage, girls seem to suffer more than the boys. Probably alterations in the metabolism consequent to the establishment of the menstrual function, seem to usher in, a period of considerably lowered resistance to bacterial invasions in general and to mycobacterium lepræ, in particular. At this stage it is very common to find that quiescent cases begin to show a "flare up" of their old lesions, formation of new lesions or extension of old lesions both in depth as well as in extent, and the disease advances from a milder to a severer type. Lepra reactions are more frequent and generally coincide with the onset of the monthly flow, or with the cessation of the discharge. Cases of neural type advance to the cutaneous type, and previously "closed" cases become "open" cases. It is also usual to find the first clinical manifestations of the disease in girls who were exposed to the risk of infection, in the pre-adolescent period, at this critical stage. And such manifestations, have, needless to say, ruined the future of many girls. Nerve reactions are very frequent at this stage, and generally coincide with the menstrual period.

Leprosy in Women of the Child-Bearing Age.—Pregnancy and lactation impose a heavy strain on the feminine economy and it is to be expected that such additional demands would weaken the natural resistance in general and the specific resistance (if any) to M-lepræ in particular. During pregnancy, a quiescence is observed in all the active lesions and a false sense of security is engendered thereby. Several pregnant female lepers have even stopped their treatment during pregnancy in the belief that they have been cured! The explanation for this rather paradoxical quiescence seems to be the failure of the affected tissues to react to the presence of M-lepræ. Here, it must be remembered that the lesions of Leprosy are caused not by the M-lepræ, but by the reaction of the tissues to the presence of M-lepræ. When this power of tissue-reaction is apparently non-functioning, there is an illusory fading or inactivity of active lesions. Even a little resolutive change may be evident in some active lesions, but the presence of abundant M-lepræ, in fact, an evident quantitative increase in their numbers, will quickly put us on the right track, in coming to a definite conclusion on the activity of the disease-process.

In predominantly neural cases progressing on to the Acroteric or secondary neural or Atrophic-neural stage, the advent of pregnancy seems to put off the onset of gross deformities. But

lactation seems to hasten the onset of such deformities. Is it probable that the depletion of the calcium reserves in the lactating mother, leads to a rarefying osteitis which in combination with the Trophic factor, gives rise to gross deformities of bones? That such a supposition is not untenable, will become evident when one considers the frequency of various degrees of Tetany in lactating-mother lepers of the N_3 type, as well as of C_3-N_3 type. Several cases of pronounced Tetany affecting the hands especially, have been encountered by me, which have yielded to a combination of Calcium and Parathyroid. Plain calcium took a long time to act and plain Parathyroid extract did not show any marked improvement. But a combination of both, afforded the quickest relief. It is also a possibility that in such cases, the Parathyroid Hormone is unable to function owing to the absence in the system of the necessary threshold level of calcium. But the suckling babies did not suffer! Is this an attempt on the part of nature to give the new offspring a good start in life, at the expense of the mother? In a few cases, pronounced Tetany of a suckling baby has been noted, but whether it was pure Tetany or Tetanoid manifestations from reflex causes, arising from disturbed metabolism in the dentition period, is very difficult to say.

The highest period of sexual activity in a woman coincides with her period of Fecundity. But in women lepers of the C_3 type, though the sexual desire may remain unimpaired, yet *sterility* seems to set in very early. Recent evidence based on Autopsy findings, points to an infiltration of the ovaries with Leprous Granuloma or a massive infection of the ovaries with M-lepræ. It is not impossible that the chronic but mild type of inflammation induced by the massive infection with M-lepræ or the leprous granuloma induced by the presence of M-lepræ might cause a fibrosis of the Graafian follicles or a constriction or atrophy of the whole gland. It is a debatable point whether in the absence of ovulation, menstruation can occur? It is inconceivable that with a massive infection of the ovaries with M-lepræ, no adverse effect on ovulation would be noticed. Ovarian Hypofunction at least can reasonably be expected in such cases. In normal women, after ovariectomy, the menstrual function ceases altogether and even a partial reversion to masculine features, has been noted. But in some women lepers of the C_3 type, though we have no evidence to suggest that ovulation has stopped, yet, the continuance of the menstrual function with sterility,

points to an affection of the "Follicles". In these cases what is the stimulus to menses?

In adolescents of the C_3 type, even though the ovaries may be teeming with M-lepræ, neither sterility nor loss of sexual desire or even an impairment of it, is noticed. On the contrary, an exaggeration of the sexual impulse seems to be too common, leading to elopements! In such cases illicit intercourse proves too readily fruitful with the result that pregnancy and lactation follow, ultimately advancing the course of the disease. Is this exaggerated sex impulse due to irritation of the ovaries caused by the presence of masses of M-lepræ? It is probable that in the adolescent stage, M-lepræ cause a mild irritation of the ovaries and in the later stages, owing to the induction of a mild chronic inflammation, functional insufficiency or incompetence results. I have met with a few cases of even Nymphomaniacs in C_3 adolescent leper girls. It is a controversial point, whether Nymphomania was due to infection with M-lepræ or was merely a coincidence?

Leprosy in Women Approaching or Who have Attained the Menopause.—A reactivation of lesions, an advance in the course of the disease and the appearance of fresh lesions not noticed previously; and the manifestation of the first signs of Leprosy, especially in conjugal infections or even the onset of initial lesions during menopause, when the exposure to infection occurred much earlier, have all been observed. These are probably due to profound alterations in metabolism.

Child-Birth and Mental Disorder—A Clinical Study

BY

Dr. M.V. Govindaswamy, M.A., B.SC., M.B., B.S., D.P.M. (ENG.),

Superintendent, Government Mental Hospital, Bangalore.

I. **Introduction.**—Much attention has been directed in recent years to the part played by pregnancy and child-birth in the production of mental disorder and possibilities of its prevention, but no reliable statistics are available in India, either as regards its incidence or outcome. Puerperal psychosis is often the result of puerperal sepsis, but in a larger group of cases, it is found that the mental breakdown has no relation to sepsis. In this eminently practical subject, it is of importance to determine with some degree of accuracy, the part played by puerperium, normal and abnormal, in the production of these mental syndromes, and the other causal factors which convert a more or less physiological event like child-birth into a pathological one. If these factors could be determined a scheme of prophylaxis could be worked out.

The present paper is the preliminary report of an investigation proposed to be carried out in the Mysore Government Mental Hospital, Bangalore, on the inter-relationship between childbirth and mental disorder.

II. **Incidence.**—During the year 1938, 140 women patients were admitted into the Bangalore Mental Hospital, and in thirty-four of them, *i.e.* nearly twenty five per cent there was a history of child-birth in temporal relation. It is the study of these cases which has formed the subject matter of this paper. But there is no way of deducing from this figure however, the actual incidence of puerperal mental disorder in the community. Although it is reasonable to presume that only severe cases are hospitalised, and amongst the less severe cases, mostly indigent ones, we must remember that not every case is admitted. Many patients may not be treated at all, and some might be treated by private practitioners. Cases of psychoneurosis attend the general hospitals as out-patients, and if in addition there are associated gynæcological or surgical complications, they seek admission to the respective hospitals. It is difficult to collect them for statistics.

But as a rough approximation it might be taken that in a town like Bangalore with 10000 births a year, the incidence of

puerperal mental breakdowns is at least a hundred, that is roughly one per cent. This does not include cases of emotional instability associated with chronic invalidism after child-birth in those women who are either badly delivered, or who, for various reasons, are unfit to be mothers. This one per cent is a very rough and very unsatisfactory approximation but we have to be content with it, till we have something better to guide us.

III. **Diagnosis.**—It is perhaps preferable to restrict the term puerperal psychosis only to such cases which arise within six weeks of child-birth, although practically the large majority develop within a fortnight of that event. Even amongst them, it is difficult to decide sometimes whether child-birth is a causal or only a concomitant factor. From our cases, we have tried to exclude, as far as possible, these patients in whom child-birth was just an incident, and had but only a temporal relation to the developing psychosis.

About twenty of the patients showed signs of toxæmia, at some time or other of their clinical course. In only nine of them however the toxæmia was due to puerperal sepsis (Streptococcal and Coliform infections) as confirmed by blood cultures. In the other thirteen cases, the toxæmia was presumably secondary to exhaustion and altered nutrition of the tissue cells through-out the body. The psychiatric diagnosis was Toxic-Exhaustive States.

Four patients were depressive, seven Schizophrenics, and nine cases were diagnosed as acute mania. It is apparent from this that these diagnostic labels are merely descriptive terms. They only serve to emphasise, what is a matter of daily observation in psychological medicine, that the same stress in different individulas, might produce a variety of mental reactions, and the same clinical picture might be the resultant of a variety of causal factors. The deciding factor which determines the form and content of the psychosis is not so much the stress itself but the prepsychotic personality of the patient.

IV. **Ætiology.**—The ætiological factors have been studied under three heads :—

1. Hereditary and familial influences.
2. Organic factors.
3. Psychogenic factors.

In the majority of patients it was found that the psychosis was the resultant of interaction of all the three factors, the exact contribution of each factor, however, varying in different patients,

Out of thirty-four patients, hereditary predisposition was noted in thirteen, organic inferiority, such as avitaminoses, amæmia, syphilis, and sepsis in thirtyone, and marked psychogenic factors, such as mental shock in only three patients. This leads us to certain interesting conclusions.

1. However important hereditary predisposition can be, given certain conditions of physiological stress, every one can exhibit psychotic reactions.

2. Psychological stress alone can produce a psychotic reaction. Illegitimate pregnancy and child-birth in women who have been brought on strict conventional lines is an instance of such stress.

3. In India, organic factors predominate amongst the predisposing causes. The most important are the secondary anæmia and avitaminoses. Syphilis is also a factor to be reckoned with; but it is far less in importance than to the avitaminoses.

4. The greater the number of complicating factors, the greater are the chances of development of puerperal breakdown. Hereditary predisposition, malnutrition, overwork, domestic and marital stress, worry, fear and anxiety, infection, focal and general, acting at a time when a women is in profound biological exhaustion, induce states of disordered excitements, depressions, or disconnection, which manifest themselves as confusion, disorientation, hallucinations, delirium, Catatonic States and Stupors.

V. **Clinical course.** It must first be emphasised that child-birth has no qualitative specificity in its effects on the mental life, although a quantitative specificity is noticeable. It means that provided other conditions are favourable, puerperium is capable of influencing the production of a remarkable variety of symptoms. It might create a psychosis in apparently normal individuals. It might precipitate a latent tendency to psychosis in predisposed individuals, and it is possible that it might alter the type of pyschosis, in persons who are already abnormal.

The illness might start as a delirium, and progress on to a complete recovery, both physical and mental, or the mental clouding might lift, but the physical conditions of the patient become worse, or the physical condition might improve, but the patient left a permanent dement.

1. *Mental signs and symptoms* :—The Organic Reaction type which includes the puerperal insanities comprise the following changes :—

(1) In the intellectual sphere, comprehension is impaired, the registration of sensory impressions is chaotic, orientation is defective, attention is distracted, and there may be illusions and hallucinations.

(2) There is marked emotional instability, the patient laughing or weeping without sufficient cause. In addition intense restlessness, profound depression or disconnections might be present.

(3) Character changes in the form of conduct foreign to the patient's mental disposition : for example, a very respectable woman behaving in an obscene, indecent manner.

When the puerperal breakdown becomes chronic, the mental changes noticeable will be more in the sphere of comprehension and memory, with marked changes in personality and emotional responsiveness.

2. *Physical signs and Symptoms* :—The physical signs and symptoms are those indicative of intense exhaustion, fatigue, auto-intoxication and signs of septicæmia, if there is infection (Puerperal Sepsis). A dry skin, rise in temperature, a thick coated tongue, rapid pulse, alimentary disturbances, scanty urine, anæmia and wasting, are all to be found sometime or other during the illness.

VI. Treatment.—The following is the routine procedure adopted in the treatment of puerperal cases at the Bangalore Mental Hospital : –

(1) Continuous intravenous Saline and Glucose for the first twentyfour hours, continued if necessary.

(2) In suitable cases, Coramine fourth hourly, and two injections of strychnine 1/10 grain, in twentyfour hours.

(3) Enemata, small doses of calomel or salts. (no oil).

(4) Large doses of Potassium Citrate oz. 1 T.D.S., or as often as found necessary.

(5) Washing the stomach with dilute Mag. Sulph. solution, if the patient can stand it.

(6) With intravenous salines, the patient's restlessness generally disappears. Tipid sponging and paraldehyde might also be tried in addition. Barbiturates are badly tolerated. Omnopon or morphia should not be withheld, if the ordinary measures fail.

(7) Special Gynæcological or surgical procedures if indicated.

(8) A note of warning is necessary against the indiscriminate use of Prontosil, in such cases.

Prontosil must not be given unless there are definite evidences of sepsis. Where facilities for blood cultures are not available, reliance must be placed on clinical signs of septicæmia such as rigors, fever, coated tongue, white leg, abscesses or signs of infection of the urinary tract. Even if administered, Prontosil must be stopped after three days and the position reviewed.

(9) In such of those cases which are not acute, but which show a slight rise of temperature, daily injections of 2 c.c. of Omnadin with 2 c.c. of Campolan have been found useful.

(10) When the acute stage is passed, the patient is given large doses of iron and liver, with vitamin B and in a few cases small doses of Insulin in addition.

(11) Hydrotherapy in the form of continuous baths in excited or convalescent patients, might be tried at any time.

(12) When the patient's physical condition has improved, but the mental condition becomes either worse, or is stationary, and in stuporous and Catatonic conditions, convulsions induced twice a week by intravenous injections of Cardiazol yield very good results.

VII. **Prognosis and End Results of Treatment.**—Out of the thirtyfour patients admitted, six have recovered, in five there has been relief of symptoms, sixteen have shown definite improvement, and seven have become worse.

This emphasises the fact that the outlook in puerperal insanity, under early and intensive treatment is very good. It also emphasises that a puerperal psychosis may not always be benign or recoverable. When, however, there is permanent deterioration, other factors such as hereditary disposition, or inadequency of the pre-psychotic personality has to be taken into account. Puerperal or any other toxic psychosis cannot be exclusively interpreted by reference to the organic conditions which provoked them.

VIII. **Prevention of Puerperal Insanity.**—Puerperal breakdowns are the resultants of interaction of three groups of factors :—

(1) Hereditary and constitutional anomalies.

(2) Exceptional psychological stresses.

(3) Gross physical influences.

It is obvious that it is impossible to eradicate constitutional or hereditary tendencies. We can only attempt keeping them in check, that is, preventing overt manifestations. The measures to be adopted will probably be eugenic measures, measures which will include voluntary sterilisation, and legalised abortions in susceptible cases.

The reaction of illegitimate pregnancy on the future mental life of the mother is exceedingly important. We have had two such cases during last year. Readers must be familiar with the sensational case, reported in the medical press, some months ago, when Dr. Bourne called attention to the inadequacies of the law by inducing abortion in a girl, who became pregnant as the result of a criminal assault, and faced a trial. Induction of abortion in all cases of illegimate pregnancy in innocent girls of respectable families must be considered if a later psychosis is to be prevented.

From our cases it is seen that poor physical health prior to childbirth, is in most of the patients a major factor responsible for mental breakdown. All measures to improve general health and nutrition during pregnancy are necessary, to avert a breakdown.

Zillboorg and others have stressed unhappy marital relationships as responsible for puerperal psychosis. Frigidity, homosexuality, marriages of convenience, and father-fixations have all been blamed in turn. However important these might be in individual cases, they are insignificant when dealing with large groups; and in India, the social and family conventions are so framed that these are of secondary importance. But on the other hand, in India, the prevention of puerperal disorder depends on economic factors. With better food and with the raising of the average physical health of the mother, one can look forward to considerable diminution in the incidence of puerperal mental disorder.

Summary and Conclusions.—1. Thirtyfour cases of puerperal disorder admitted during 1938 to the Bangalore Mental Hospital have been studied, and this is the preliminary report of that study.

2. There is no separate clinical entity called puerperal mental disorder. It is the expression of a complex of mutually interdependent causal factors. The signs and symptoms represent an extremely variable series of psychic reactions due to both physical and psychological stresses.

3. Treatment, its end results, and prophylaxis are outlined.

Cases of Mental Disorder Associated with Child-Birth, Admitted to the Mental Hospital, Bangalore, During 1938.

No.	Name.	Age.	Hereditary and Familial Influences.	Nature of Behaviour Difficulties in Childhood.	Duration of Illness prior to admission.	Number of Pregnancies.	Body-Build.	Organic Factors.		Psychogenic Factors.					Diagnosis.	Result of Treatment.				
								Before Child-brith.	After Child-birth.	Economic and Social Factors.	Religion.	Sexual.	Marital.	Pre-psychotic personality.		Duration of Hospitalisation.	Treatment.	No change or worse.	Improved.	Relief of Symptoms.
1	Ling...	18	Cousin brother insane	Only child	18 Months	3	Aesthenic	Anæmia		Marginal	Hindu			Sociable	Toxic exhaustive Reaction	3½ Months	1. Salines 2. Anti-anæmic treatment		✓	
2	L-Mary...	25		Only child	20 Days	9	Atheletic		Toxic Symptoms+ve	Marginal	Christian			Sociable	Toxic exhaustive Reaction	5 Days	Hydro Therapy			✓
3	Thera...	22			25 Days	3	Aesthenic	1. Clinical signs of syphilis+ve 2. W.R+++		Marginal	Christian			Sociable	Toxic exhaustive Reaction	3 Months	1. Anti-syphilitic treatment 2. Malarial Therapy			✓
4	Guna...	33			18 Months	6	Aesthenic	1. Series of abortions 2. W.R++		Marginal	Hindu			Sociable	Depressive Reaction	3 Months	Anti-syphilitic treatment	✓		
5	Sree Rau...	35			3 Days	10	Aesthenic		Toxic Symptoms+ve	Marginal	Hindu			Sociable	Toxic exhaustive Reaction	7 Days	1. Salines 2. Quinine and Ergot 3. Tonics			
6	Shanth ...	19	Elder brother insane		2 Years	1	Aesthenic	Anæmia		Rich	Hindu			Sociable	Schizophrenia	1½ Months	Anti-anæmic treatment		✓	
7	Sree Seetha..	24	Sister abnormal personality		3 Months	1	Aesthenic	Anæmia		Middle class	Hindu			Sociable	Schizophrenia (stuperous)	3 Months	1. Anti-anæmic 2. Cardiazol Therapy			
8	Kuttia...	24	Sister hysterical	Physically very weak from child-hood.	6 Days	4	Aesthenic	Anæmia		Rich	Hindu	Periods Irregular		"Shut-in" Type	Toxic exhaustive Reaction	2½ Months	1. Hydro-Therapy 2. Anti-anæmic treatment			✓
9	Lakshm...	22	Mother insane		20 Days	4	Aesthenic	1. Anæmia 2. W. R + (clinical signs negative)		Middle class	Hindu		Not Harmonious (Husband having extra marital relationship)	Sociable	Toxic exhaustive Reaction	3 Months	1. Anti-anæmic 2. Anti-syphilitic treatment		✓	
10	Ananda...	36	Maternal uncle imbecile		2 Months	9	Pyknic	1. Anæmia 2. Abortions 3.W.R++(clinical signs absent)		Rich	Hindu	Periods Irregular		Sociable	Toxic exhaustive Reaction	2½ Months	1. Hydro-Therapy 2. Anti-anæmic treatment 3. Anti-syphilitic treatment		✓	
11	Parv...	15			20 Days	2	Aesthenic	Anæmia		Marginal	Hindu			Sociable	Toxic exhaustive Reaction	15 Days	1. Hydro-therapy 2. Anti-anæmic treatment			
12	Nagal...	18	Maternal uncle insane		1 Day	1	Aesthenic	Anæmia	Toxic Symptoms+ve	Marginal	Hindu			Sociable	Catatonic Stupor	2 Months	1. Hydro-therapy 2. Anti-toxic treatment (Prontosil) 3. Anti-anæmic treatment 4. Cardiazal treatment		✓	
13	Bhag...	35			1 Year	10	Aesthenic	1. Clinical signs of syphilis +ve 2. W.R++		Rich	Hindu			Sociable	Schizophrenic Depression	2 Months	1. Anti-anæmic treatment 2. Operation 3. Cardiazol treatment		✓	
14	Venkata...	42	One paternal uncle and one brother insane		4 Months	13	Aesthenic	1. Anæmia 2. Clinical signs of syphilis +ve 3. W.R+		Rich	Hindu			"Shut-in" Type	Toxic exhaustive state with Pellagra	4 Months	1. Anti-anæmic treatment 2. Vitamins 3. Anti-syphilitic treatment		✓	
15	Thivum...	20			11 Days	3	Aesthenic	Anæmia		Marginal	Hindu			Sociable	Toxic exhaustive Reaction	37 Days	1. Hydro-therapy 2. Anti-anæmic treatment			✓
16	Mahabubi...	16	Mother died of T. P.		15 Days	1	Aesthenic	Anæmia		Marginal	Muhammadan			Sociable	Puerperal Sepsis	20 Days	1. Hydro-Therapy 2. Anti-toxic treatment (Prontosil)			
17	Laksh...	24			7 Days (Instrumental Delivery)	2	Aesthenic		Toxic Symptoms+ve	Marginal	Hindu			Sociable	Puerperal Sepsis	25 Days	1. Anti-toxic treatment (Prontosil) 2. Hydro-therapy 3. Anti-anæmic treatment			
18	Ahanidi B...	18			8 Days	2	Aesthenic	Anæmia	Toxic Symptoms+ve	Rich	Muhammadan			Sociable	Puerperal Sepsis	1 Month	1. Hydro-Therapy 2. Anti-anæmic treatment			
19	Chan Be...	16		Only child (Backward)	4 Months	1	Aesthenic	1. Anæmia 2. Clinical signs of syphilis+ve 3. W.R+++		Marginal	Muhammadan			"Shut-in"	Schizophrenic	1½ Months	1. Hydro-Therapy 2. Vitamins 3. Anti-syphilitic treatment	✓ Still in Hospital		
20	Rama Su ..	18	1. Paternal grand mother insane 2. Father epileptic 3. Mother deid of T.P		4 Months	2	Pyknic			Middle class	Hindu			Sociable	Acute maniacal reaction (Puerperal)	40 Days	1. Hydro-Therapy 2. Salines		✓ Still in Hospital	
21	Miss Rad ..	22	Illegitimate child		7 Days		Atheletic		Toxic Symptoms+ve	Middle class	Anglo-Indian		Un-married illegimate Child	Sociable	Toxic exhaustive Reaction	1 Month	1. Hydro-Therapy 2. Prontosil		✓ Still in Hospital	
22	Padma...	26		Only child	2 Months	2	Aesthenic	Anæmia		Marginal	Hindu			Sociable	Toxic exhaustive Reaction	2 Months	1. Hydro-Therapy 2. Anti-anæmic treatment 3. Cardiazol treatment		✓ Still in Hospital	
23	Narasam ..	30	Paternal uncle insane		1 Year	5	Aesthenic	Anæmia	Toxic Symptoms+ve	Marginal	Hindu			Sociable	Toxic exhaustive Reaction	4 Months	1. Hydro-Therapy 2. Anti-toxic treatment 3. Anti-anæmic treatment	✓ Still in Hospital		
24	Safia B ..	16	Father insane		1½ Months	1	Aesthenic	1. Anæmia 2. Clinical signs of syphilis+ve 3. W.R+++		Rich	Muhammadan	Periods Irregular		"Shut-in"	Toxic exhaustive Reaction (Puerperal)	5 Months	1. Hydro-Therapy 2. Anti-syphilitic treatment 3. Anti-anæmic treatment			✓
25	Mrs. Kh...	30			1 Week	8	Pyknic	Anæmia	Toxic Symptoms+ve	Rich	Muhammadan			Sociable	Puerperal sepsis	9 Months	1. Hydro-Therapy 2. Anti-anæmic treatment 3. Prontosil 4. Thyroid 5. Vitamins		✓ Still in Hospital	
26	Mari...	24			2 Months		Aesthenic	Anæmia		Marginal	Christian			Sociable	Schizophrenic Paranoid	3½ Months	Anti-anæmic treatment		✓	
27	Pachay...	25			1 Year	2	Aesthenic			Marginal	Hindu			"Shut-in"	Schizophrenic Excitement	3½ Months	1. Hydro-Therapy 2. I. V. Mag Sulph 3. Cardiazol treatment	✓		
28	L...N...	18	Mother insane		4 Months	3	Aesthenic	1. Anæmia 2. Leucorrhœa		Middle class	Hindu			"Shut-in"	Depressive reaction	20 Days	1. Anti-anæmic 2. Benzedrine		✓	
29	Nagalak...	22	Grand mother and uncle insane		1 Year	2	Atheletic	1. Anæmia 2. W.R+ (clinical signs negative		Marginal	Hindu			Sociable	Toxic exhaustive Reaction	5 Months	1. Anti-anæmic treatment 2. Anti-syphilitic treatment 3. Cardiazol 4. Occupation		✓	
30	Ankam...	30			1 Year	2	Aesthenic	Anæmia		Marginal	Hindu			Sociable	Toxic exhaustive Reaction	8 Months	1. Hydro-Therapy 2. Anti-anæmic treatment	✓		
31	Christi...	32			6 Months	5	Aesthenic	Anæmia		Marginal	Christian			Sociable	Depressive reaction	6½ Months	Anti-anæmic treatment	✓		
32	Parvatham.	19			6 Months	2	1 Anaemia 2 Epilepti	1. Anæmia 2. Epilepsy		Marginal	Hindu			Sociable	Epileptic (Puerperal)	15 Days	Anti-anæmic treatment	✓ Still in Hospital		
33	Yesha...	13			10 Days	1	Pyknic	Anæmia		Pauper	Hindu			Sociable	Confusional reaction	10 Days	Anti-anæmic treatment		✓ Still in Hospital	
34	Indira ..	16			15 Days	1	Pyknic	Anæmia		Marginal	Hindu			Sociable	Toxic exhaustive Reaction	10 Days	Anti-anæmic treatment		✓ Still in Hospital	
																		7	16	5

Total = 34.

Total No. of Women Patients Admitted = 140

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