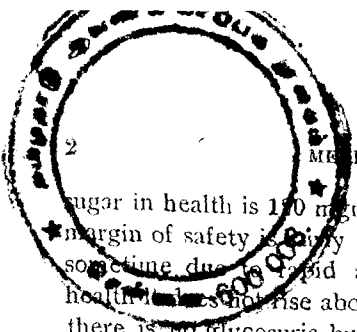




sugar in health is 100 mgm. and the renal threshold is 180 mgm.; so the margin of safety is fairly wide. After meals the blood sugar rises for sometime due to rapid absorption from the alimentary tract, but in healthy individuals does not rise above the renal threshold level and consequently there is no glycosuria but occasionally it may go high and one gets a "lag type" of curve when the absorption from the intestines is unduly rapid. One also encounters this "lag curve" in certain liver deficiency cases. In this type blood sugar returns to fasting level within 2 hrs. The follow up of such cases has suggested that there is no tendency for them to develop of diabetes in future.

Renal threshold is not a fixed point and varies with different individuals and in the same individual at different times. Thus a diabetic with 300 mgm. sugar may have no glycosuria while other non-diabetics may pass sugar in urine even with blood sugar at fasting level. It is possible that the threshold is under the control of a neuro-hormonal mechanism (hypothalamus?). Low renal threshold glycosuria may follow certain hypothalamic lesions. Abnormalities in renal threshold are commonly encountered during the disturbances of endocrine system, e.g., high in diabetes, low in pregnancy.

The fixity of glucose threshold is due to a steady rate of glomerular filtration and a fixed rate of tubular reabsorption (i.e., so many gms. to be absorbed per minute and not more). A reduction in glomerular filtrate from any cause (e.g., diabetic coma) with a normal tubular reabsorption will change the threshold with the result that no sugar may appear in the urine even with a hyperglycemia.

The blood sugar is maintained at a constant level through the interaction of at least four ductless glands, viz., pancreas, (islets of Langerhans), pituitary, adrenal and thyroid, the action of the first being a major one. Insulin, the secretion of the islets, causes a fall in the blood sugar while the secretions from other glands just mentioned lead to a rise in the blood sugar level.

It has been shown by Houssay and Young that some at least of the metabolic disturbances associated with hyperglycemia may in fact arise from disturbances of the anterior pituitary gland. Certain crude extracts of the anterior pituitary have the power to antagonise the action of insulin and thus cause hyperglycemia. Further carbohydrate metabolism is possible in the absence of pancreas provided that the anterior pituitary is also kept in abeyance. (This resembles a "Houssay dog" i.e., a depancreatized animal in which pituitary is also removed.) Thus it appears that without the pancreas and hypophysis a basal sugar metabolism continues whose rhythm is governed in normal individuals by the antagonistic action of the pancreas and the hypophysis. But in that case it would be incapable of accommodating itself to the external circumstances.

The part played by the adrenal in carbohydrate metabolism is an emergency one. Its action is antagonistic to that of insulin in that it raises the blood sugar level; but compared to anterior pituitary its action is very short lasting. Some of the symptoms of hypoglycemia resemble those seen in healthy individual after an injection of adrenaline; and in fact it is nature's attempt to raise the blood sugar in hypoglycemia by secreting more adrenaline in general circulation.

The role of hypothalamus is still not very definitely known but it is presumed to have control over all the ductless glands. Experimentally, puncture of the fourth ventricle gives rise to glycosuria. Also pathological lesions round about the hypothalamus, e.g., infraction or some cases of head injuries, are associated with glycosuria.

Thus it will be seen that blood sugar is maintained at a constant level by a very complex mechanism which is dependent upon a host of either antagonistic or synergistic processes involving insulin, anterior pituitary, adrenaline and thyroid.

CLASSIFICATION

All cases of glycosuria can be classified into two major groups, viz., I. non-diabetic and II. diabetic. This classification is important as glycosurias belonging to group I are not dangerous, the amount of sugar passed though variable is not excessive, and when once carefully diagnosed, require to treatment by themselves.

I. NON-DIABETIC GLYCOSURIA

This can be subdivided into various groups: (1) renal glycosuria, (2) alimentary, (3) phloridzin glycosuria, (4) pregnancy, (5) adrenal, (6) nicotine, (7) hyperthyroid, (8) miscellaneous. A brief description of each variety will now be given.

(1) *Renal*.—This condition is attributed to a low renal threshold for glucose. Blood sugar may be within normal limits. The quantity of sugar eliminated is small being unaffected by carbohydrate intake. In contrast with true diabetes, there is no disturbance of carbohydrate metabolism and there is no ketosis nor ketonuria. The kidney may show gross lesion and the urine may contain albumin. This condition may be transient or permanent and the quantity of sugar may vary from 10 to 30 gm. per day. There are no symptoms due to glycosuria as such and the condition is discovered accidentally on routine examination of urine. The prognosis is excellent and the condition requires no treatment.

(2) *Alimentary Glycosuria*.—A transient glycosuria may occur after ingestion of enormous quantities of glucose, but it disappears rapidly after the blood sugar level is lowered. It is due to a temporary rise of blood sugar above the threshold level. It has no clinical significance.

(3) *Phloridzin Glycosuria*.—It is an extract from apple root and if it is taken by mouth it has the power of paralysing the renal tubules. Thus the function of reabsorption of glucose is hampered with and this

substance passes in urine in spite of normal blood sugar level. In diagnosing this condition, history of having eaten root or bark of such trees is necessary. The damage is only temporary and if the urine be examined at some other time it will be found to be normal.

(4) *Pregnancy Glycosuria*.—A transient glycosuria may occur in pregnancy and it may recur in subsequent pregnancies. It is stated that pregnancy lowers the kidney threshold. The condition is not serious, but if it recurs in many pregnancies it may lead to true diabetes. As with other types it requires no treatment.

(5) *Adrenal Glycosuria*.—Injection of adrenaline leads to a transient rise in blood sugar level due to increased mobilisation of liver glycogen. The glycosuria seen in nervous people and during excitement or emotion is attributed to increased secretion of adrenaline. The fear of suffering from diabetes may lead to this type of glycosuria in a nervous subject; but this can be differentiated from true diabetes by examining the person at some other time when he is calm and quiet. He requires reassuring that his condition is harmless.

(6) *Nicotine Glycosuria*.—Nicotine stimulates the secretion of adrenaline and this type is in reality same as adrenal type. A transient glycosuria may occur after heavy smoking and it is to be attributed to the nicotine content of tobacco. This is also a transient condition and if the urine be examined when the person is not smoking it will be sugar free.

(7) *Hyperthyroid Glycosuria*.—The hyperthyroid state may lead to hyperglycemia and glycosuria because of the increased carbohydrate metabolism which occurs in this condition. This can be diagnosed by other signs of hyperthyroidism and B.M.R. examination. The glycosuria by itself has no prognostic significance.

(8) *Miscellaneous Group*.—Some cases of hyperpituitarism, e.g., acromegaly may show glycosuria and it is attributed to excessive secretion of anterior pituitary hormone, which as shown previously influences the carbohydrate metabolism.

Occasionally glycosuria may be met with after the administration of a general anesthetic especially ether, as these lead to increase in liver glycogen.

II. DIABETIC GLYCOSURIA

Now we come to the second group, viz., the diabetic glycosuria, the most important of all the glycosurias. The whole aspect of the case changes if the glycosuria is attributed to true diabetes mellitus. Here the hyperglycemia and glycosuria persistent and may go on increasing if untreated, ketosis and ketonuria usually follows, and may ultimately lead to a fatal termination. The course of diabetes is very rapid in young persons who show marked ketosis and wasting while in old age the progress is slower and the patient dies not of ketosis, but of complications of arteriosclerosis like gangrene, etc. Besides glycosuria the patient may

show other symptoms such as thirst, polyuria, emaciation, pruritus, delay in healing of wounds, etc., and these symptoms may lead to the examination of urine. In diabetes the glucose is not only formed from carbohydrates but also from proteins (58 per cent), and to a less extent from fats. This is the reason why a fasting diabetic shows glycosuria because he manufactures glucose from his body proteins in a vain effort to supply carbohydrate to the body tissues. Due to lack of insulin the tissues cannot utilise the glucose, and this in turn leads to hyperglycemia and glycosuria.

Having considered the possible causes of glycosuria, we proceed to investigate a case of glycosuria.

The usual tests that are employed to detect sugar in urine are: (i) Fehling's and (ii) Benedict's. Of these, Fehling's is not so reliable because besides glucose it reduces many other substances such as hippuric acid, creatinine, glycuronates, etc. Benedict's test is more reliable and so now-a-days it is the test which is most widely used. But there are certain fallacies here also because besides glucose it also reduces certain other sugars like pentose, lactose, maltose, etc., which may appear in the urine under some abnormal conditions.

Benedict's Test.—To 5 cc. of Benedict's qualitative solution 8 drops of urine are added and the mixture is boiled for two minutes. The change in colour of the solution which may vary from green to red depending upon the quantity of sugar, with a precipitate at the bottom indicates the presence of one of the sugars mentioned above. Exact quantities of the solution and urine must be taken and the boiling must be carried out at least for two minutes, otherwise false negative results might be obtained. When a positive Benedict's test is obtained further tests must be carried out to confirm that the reducing substance is glucose. These are (i) the osazone test, (ii) the fermentation test by yeast, and (iii) the polarimetric test. Of these the osazone test is simple for routine examination. The osazones of each sugar have characteristic appearances. The glucosozones are needle shaped. The fermentation test is also easy and glucose is the only sugar fermented by yeast with production of gas.

Having confirmed that the reducing substance is glucose the next question is whether the case is one of diabetic type or non-diabetic type of glycosuria. An examination of blood sugar will settle the diagnosis. A sugar tolerance test is necessary for this.

The Sugar Tolerance Test.—The patient is not given any food after 9 p. m. of the previous night. At 8 a. m. on the day of test a sample of blood (2cc.) is taken in an oxalated test tube. This is the fasting sample. He is then given 50 gm. of glucose dissolved in about 200 cc. of water and blood samples are withdrawn at every half an hour for about 2½ to three hours. In a healthy person the fasting sample shows a level of 80 to 120 mgm. per 100 cc. of blood; and the urine is sugar free. The patient is asked to pass urine every time when blood is withdrawn, and

examined for glucose. The blood sugar rises after ingestion of glucose and may reach a level of 150 to 180 mgm. per 100 cc. during the first hour, but reaches to normal limits within $2\frac{1}{2}$ to three hours. The urine remains sugar free throughout, provided the blood sugar does not rise above 180 mgm.—the renal threshold value.

In renal glycosuria the urine will contain glucose even if the blood sugar level be as high as only 150 mgm. In this the renal threshold is lowered. The curve resembles the normal curve in other respects.

In alimentary type the level suddenly rises above 180 mgm. within the first hour and the urine collected at this time shows glucose. This curve differs from the diabetic type in that it returns to normal limits within $2\frac{1}{2}$ to 3 hours. This is known as "lag curve" because the liver is said to lag behind and is not able to assimilate the large quantities of glucose in such a short time and thus it accumulates in the blood leading to hyperglycemia and glycosuria. It is harmless condition and does not lead to true diabetes.

The diabetic curve is characteristic. The fasting value is usually high. After the glucose meal the level goes on rising and does not come to the fasting level even at the end of three hours. Glycosuria is present at all times when the blood sugar is above 180 mgm. In mild type the fasting value may be 150 mgm. and there is no glycosuria, while in a severe diabetic the fasting value may be as high as 200 to 250 mgm. per 100 cc. of blood.

In conclusion it might be stated that glycosuria is a very important finding on routine examination of urine. A single examination is of no value because as stated above a transient glycosuria may be seen under conditions of excitements. The test should be repeated on different occasions especially when the patient is in a quieter atmosphere. Similarly if the first sample is examined immediately after meals, another should be examined immediately after waking up. This may rule out the possibility of alimentary type of glycosuria. Thirdly, if along with glycosuria there is also ketonuria as shown by a positive Rothera's test, then the probability of this case to be one of diabetic type is very high because the renal type does not lead to ketosis. Fourthly, lactosuria is very common in later months of pregnancy and in lactating mothers and if urine be examined at this time, a positive Benedict's test is often obtained. The urine should be examined after the lactation has stopped and if the Benedict's test is still positive, then further tests may be required to be carried out to determine the type of glycosuria.

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ROLE OF THE GENERAL PRACTITIONER IN CANCER DETECTION

BY A. C. SUPAN, M.D.

Denver.

Cancer, too frequently allied with death and recognized for centuries as a disease entity which may have its origin in any tissue of the body, is curable in most instances in its early stages. However, it marches on toward the head of the list of destroyers of American lives. This is true despite recent extensive concentrated educational campaigns by scientists and lay groups of every state in the nation. They have endeavored to create public enlightenment, co-operation and attitude which would lead to early detection, treatment, and a higher per cent of cures.

Despite these efforts, we are confronted with these gruesome figures. This year some 188,000 Americans will die of cancer—one out of eight persons or one death from cancer every three minutes around the clock for 365 days of the year. With an ever increasing incidence, if progressively perpetuated, not many years will elapse before cancer may occupy first place in mortality statistics.

However, the picture is not as dark as one might assume, for more cancer in the early stages, and precancerous lesions, are receiving earlier attention and proper treatment. Also, never and better technics have evolved for diagnosis and successful treatment. The public now regards cancer as a problem of high priority, if public support in fund-raising campaigns is a fair indication. Nearly every country in the State of Colorado last year oversubscribed its quota as assigned by the Colorado Division of the American Cancer Society, and the state quota was oversubscribed by some \$31,000. Like interest was manifested in many of the other states throughout the nation. Certainly this may be regarded as a challenge for greater effort in disseminating existing knowledge in diagnosis, methods of treatment, greatly intensified research, and increased public education in all aspects of cancer.

To meet this challenge, the medical profession of the Rocky Mountain region, in co-operation with the Colorado Division of the American Cancer Society, is assembled in a second Rocky Mountain Cancer Conference. This Conference will serve to review recent advances and emphasize accepted concepts of treatment, prevention, methods of diagnosis, and to stress the further need for intensified efforts in educating the potential cancer patient how he may best protect himself against this disease. While this program is primarily designed as a graduate course, dealing with the scientific aspects of diagnosis and treatment, it seems timely to consider the present status of public and individual attitudes regarding this disease. What good is scientific knowledge if it cannot be effectively applied?

In the solution of any problem it is essential first to recognize the existence of the problem must have appeal for solution. The solution requires mobilization of and the problem essential facts with proper arrangement and application of a plan for the attack. That there is a cancer problem has

long been recognized by the medical profession and allied scientists, but to the public this has been a rather recent revelation. To be sure, everyone has heard about cancer—"cancer as the other fellow's disease"—but few if any individual or individuals even yet regard themselves as possible potential cancer candidates.

To reverse the onward march of cancer with our present available knowledge, first it is essential that a high per cent of existing early cancers be discovered; second, early treatment must be accepted by the afflicted person. The question is: What means have we to accomplish this important task? It might be well to review, for a moment, some rather long established methods and procedures in rendering medical and surgical care to patients. One might well question how many patients, with various ills, appearing in doctors' offices throughout the nation, ever receive a complete physical examination before treatment is begun. When a patient in a metropolitan area has an aching ear, laryngitis, pharyngitis or bronchitis, he still frequently consults the neighbourhood druggist first, or he may go directly to an otolaryngologist or his family doctor. Either of the latter will examine the patient with reference to the areas of regions of his complaint, make a diagnosis and institute treatment. The examination is usually confined to the parts of the anatomy associated with the distress. It logically follows that should this patient have an early cancer of the rectum, uterus or in any site remote from the symptom producing area that could be detected by complete physical examination, it would be missed.

Likewise, if this patient first comes to a proctologist because of some rectal distress, examination of that region is made and, if necessary, treatment is instituted. Yet this patient might have some cancerous or precancerous lesions in the mouth, upper respiratory passages, the breast or the uterus, which in this instance would readily escape detection. Thus through the specialities and frequently the general practitioner, examination is too often confined only to the immediate region from which the distress emanates. This has tended, in a large segment of our population, toward the fixed attitude that examinations need be directed only to local regions depending entirely upon localized symptoms or complaints. Physicians who attempt complete histories and complete physical examinations, at least on all new patients who appear with even minor complaints, find it the rule, rather than the exception, that as they proceed with the history the patient will interrupt with, "No doctor, I tell you, I never have had anything wrong with me. I have always been healthy. Oh, I've had little things like indigestion when I overeat, or some gas pains, but what should all that have to do with this little old cough I came to see about? I tell you, I am all right in every other way and this cough isn't bad, but I just thought I should have it checked."

Then when the examination begins with inspection of the skin, eyes, nose, ears or mouth, the patient, slightly annoyed, interrupts, "No, doctor, there is nothing wrong with my ears or nose, it's a cough in my throat." Then, after the mouth, pharynx, larynx, chest and upper area

lymph glands have been examined the patient appears relieved and questions, "Well what is wrong, Doctor?" Then when the examiner proceeds to the general examination, he may receive a very annoyed, "Doctor, it's that little cough I came in to see about?"

This illustrates, rather crudely but factually, the attitudes of individual patients who appear in a doctor's office with various complaints, and it requires considerable time to convince the patient, if that can be done, that every doctor should first know the cause of his patient's illness and all possible contributing causes before instituting treatment. Too frequently the patient interprets the doctor's motive in suggesting complete physical examination, and often needed laboratory procedures, as simply means for increased fees, rather than essentials to diagnosis. Many patients have learned to regard a simple history of the immediate complaint for relief of distress as sufficient for diagnosis and adequate for the physician to institute treatment. Very frequently this kind of patient does not return, but goes elsewhere the next time to a physician who seems intelligent enough to examine only the chest, with a stethoscope, and then writes a prescription which will give relief to the patient from that little cough.

Just as in all aspects for advancement of preventive measures is reducing or abolishing the incidence of preventable or curable diseases, a sound individual knowledge in the community of these measures is necessary for progress, and in no disease is such knowledge more essential than in reducing cancer deaths. While much good has been accomplished in public education by the American Cancer Society in the past few years, it is only small beginning of what must ultimately be done. As has been mentioned, there has been developed a public interest in cancer, a willingness to support cancer service programs and research in the cancer field by subscription of funds, but everywhere it is evident that the public concept still centres around cancer as the other fellow's disease.

Relatively few individuals in any area perceive that he or she may at this very moment or at some future time, have cancer. This is evidenced by the few who appear at the doctor's office for examination specifically to determine whether or not they harbour cancer. Even those who appear from families where cancer has occurred, do so rather apologetically. "Doctor, I have read so much about cancer recently that I thought I should come in for a checkup just to relieve my mind." If cancer control measures are to be reasonably effective, efforts must continue to impress the individual person that cancer is a disease of the individual, not the public, and that it is not just the other fellow's disease. Stress should be placed on the fact that cancer in its most curable stage is likely to be without symptoms, but that even then it is frequently recognizable by inspection, palpation, and biopsy. The term cancer needs to be resolved in some other terms—something closer to the individual in terms of health.

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Campaigns for periodic health examinations by various public health service organizations, insurance companies, underwriters, the larger pharmaceutical firms and other agencies, are laudable and are beginning to yield results. They are especially effective in bringing to the physician the person with some vague distress somewhere within the body. Cancer detection clinics, well person examination centres, and disease detection centres, especially in larger population areas, have served well in some areas in discovering cancer or precancerous lesions. But, it is doubtful that they will ever serve as well or as effectively as could cancer detection in the office of every enlightened physician. Certainly no greater opportunity is presented for such service as has come, and will continue to come, to the family doctor.

With opportunity comes responsibility, and the family doctor may be rightfully charged with the duties of service in the front lines of defence against cancer. Especially in the rural areas where he still predominates in numbers over those in the various specialities, it is he who will first examine and render prenatal care to the mother. This, alone, offers him an opportunity to reach a large segment of the population for complete physical examination. He also has the opportunity to follow these mothers through their child-bearing years and often from then on. In fact, he is closer to the entire family than is any other individual or any agency in the community. As a result of this, he has a greater opportunity than any other being for enlightening his patients and his community in regard to cancer. Proper attitudes toward cancer are possible for his patients if he will assume the leadership in such a campaign with every patient. By assuming such responsibility, he will not minimize to his patients the possibility of cancer occurring in every person. He may well stress that an examination today does not insure the patient he or she might not develop a cancer in six months or a year. He will stress that cancer may as readily occur in any individual as appendicitis, gallstone, nephritis, diabetes pneumonia, heart disease or any other disease, and that early diagnosis and early proper treatment in all these diseases are equally important in procuring a cure.

The general practitioner, in choosing his vocation, inherits responsibilities far beyond that of those restricting their sphere of practice to special fields. His is the responsibility and obligation to guide all his patients through the gauntlet of all disease known to man. To do this he must, and does, recognize his limitations as to time, facilities, special knowledge and proficiency in technical procedures. He recognizes that he is one of a team, each one playing some specific role. He well realizes that in no disease is special skill required more than in diseases such as cancer and that consultation and special procedures must frequently be utilized.

Nowhere is this more necessary than when dealing with disease of the digestive tract, especially cancer—here symptoms alone are rarely of much help, and usually when sufficiently severe to prompt the patient to

seek medical aid, are too late, for the symptoms with rare exception are the same as those of functional disease and are relieved by medication which is also efficacious in functional disorders. Here, then, symptoms are of little aid in diagnosis. X-ray and endoscopic studies are of utmost importance. It is the delay in utilizing these measures which frequently today leads to inoperable cancer or at best permits only palliative measures.

This is substantiated by many instances such as those reported by Cooper and others. Cooper, investigating a series of 264 cases of carcinoma of the stomach recorded at the New York Hospital, New York, found an average duration between appearance of symptoms and hospitalization to be 12½ months. In 41 of the series, the delay had been 16 months. Braund and Binkley at Memorial Hospital, New York, found that in 108 unselected cases of cancer of the rectum, an average of 18.8 months elapsed between onset of symptoms and treatment. Buirge found that of 416 cases of carcinoma of the large bowel, recorded in the Department of Pathology of the University of Minnesota, that the average delay between onset of symptoms and treatment was 14 months when the lesion was at the sigmoid flexure, 13 months when at the transverse portion, and 12½ months when the lesion appeared in the descending colon; all had provoked symptoms for over one year. But delay between the onset of symptoms and diagnosis and treatment is not alone confined to cancer of the digestive tract. Rosenblatt, Gazzell and Lederer report that in 29 cases of tumor of the testicle, 15½ months elapsed between beginning of the enlargement and consultation with a physician. Goldman, reporting eleven cases of carcinoma of the lung seen on the Surgical Service of the University of California Hospital, states that the average time which elapsed between the occurrence of symptoms and the establishment of diagnosis was 90 months. Folsom, who analyzed the records of 128 cases of cancer of the vulvae, found the average delay in applying for treatment to be 56 weeks.

Delay in seeking treatment in relation to cancer as determined by Harms, Plout and Oughterson, who interviewed 158 successive patients admitted to the New Haven Hospitals or Tumor Clinic was attributed in the majority of instances (59.9 per cent) to symptoms not serious enough; just plain negligence or hoping symptoms would spontaneously disappear; 11.3 per cent—ignorance; 6.9 per cent—expense; 10 per cent—fear of doctors; 1.4 per cent—fear of cancer; Christian Science accounted for 2 per cent; and no delay on the part of the patient but a delay on the part of the physician occurred in 11.3 per cent of the cases. The reason for delay on the part of the physician was attributed to delay in requesting x-ray and endoscopic studies in relation to cancer of the internal organs.

It is recognized that the general practitioner who is called upon to see, at times, from 15 to 30 patients in a day, will not have the time nor the facilities to investigate adequately each and every patient who comes

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into his office. But certainly he is not justified, on these grounds, in resorting to treatment for relief of symptoms alone over any period of time unless he thoroughly investigates the cause or refers the patient to someone who has the time and facilities to do so, nor is he justified in prescribing medication for relief of symptoms for months on and without insisting that his patient submit to procedures necessary to establish a diagnosis. The alert family physician will not procrastinate long or delay in securing consultation and special examination of all persistent vague symptoms emanating from within internal organs. In the future, biopsy of suspicious tissue will be done in increasing numbers and the aid of pathologists will be enlisted. As facilities for and competence in identifying cancer cells in smears of exudates from various organs develops he will be greatly aided in leads toward more intensive examination for the causative lesion.

With regard to cancer education, he is in the key position to create that necessary concept in his patients that cancer is the individual's disease, just as in pneumonia, typhoid fever, scarlet fever, influenza or any of the host of other contagious or infectious diseases. Not all become the disease of everyone, and some can be prevented, just as cancer can be prevented in the precancerous stage. However, cancer differs from other diseases in that acute symptoms at its early inception are rare and it can have its origin in any tissue of the body; also it is as curable with proper measures at certain stages as are other diseases. And, above all, to prevent cancer fatalities, every individual is equally responsible with his doctor. The doctor's responsibility is to recognize early cancer when given the opportunity. The patient's responsibility is to give the doctor that opportunity, at intervals, just as the patient gives the dentist an opportunity to check for early cavities in the teeth or pyorrheal lesions of the gums.

In the interest of promoting preventive medicine in all its aspects, the general practitioner in every community has in the past rendered laudable service. In many instances, single handed, he has broken down resistance against acceptance of desirable sanitary measures for his community. He has been foremost in campaigns for pure water supplies, cleaner and safer milk. He has been successful in breaking down resistance against vaccination and immunization, for reducing preventable diseases in general and he has contributed much to his community for better health.

With the same efforts and perseverance, he can develop in his community an effective preventive program against death from cancer. The well qualified general practitioner has at his command many of the tools necessary toward this end. He should first assume the leadership and responsibility of his profession and help in every way lay groups in the wide dissemination of cancer facts in his area. He should individually assume his obligation as a teacher of cancer to every patient. He should repeatedly stress that today there has not yet been discovered a

serum or a medicinal product universal in its ability to cure cancer. But the early surgical treatment and radiation therapy are effective in producing cures.

He has the knowledge of the importance of good past, present, and family histories. His training has qualified him to regard with proper suspicion lesions which are malignant or which may be precursors of malignant lesions. He should solicit from his patients opportunity for complete physical examinations with the direct purpose of identifying any abnormal masses, moles, blemishes or growths of which the patient may be aware and also to discover any that the patient may not know exists. A routine work up of the patient with or without symptoms in his office should reveal any obvious malignant lesions and lead to suspicion of others more questionable which could then be given proper consideration.

Briefly this procedure entails a good history—past, present, and family—of the patient. A physical examination includes the skin, with special emphasis to the face and hands, especially the areas exposed to the rays of the sun. All that is required for this procedure is vision and sensory perception in the fingers. Questionable lesions can be confirmed, if need be, by biopsy. Routine examination of the nares for abnormal growth, ulcerations and discharges, inspection of lips, membranes of mouth and tongue and gums, aided by palpation, aids in detecting malignant characteristics. Inspection and palpation of the lymph node bearing areas of the breasts in both male and female and transillumination of breasts and soft tissue masses and cavities, such as the sinuses, may disclose abnormal densities. Examination of the testicles in every male by inspection and palpation and by transillumination, bearing in mind that rarely do malignant tumors of these organs give rise to pain and that rarely is the afflicted person aware of any early changes, is important. Careful palpation as to texture of the testis proper is highly essential if malignant tumors are to be detected before metastases have occurred. Examination of the external female genitalia, likewise by inspection and palpation, with inspection of the walls of the vagina and of the cervix and bimanual examination of the uterus or ovaries, should become routine procedures. And the reasons for such examination should be firmly impressed in the minds of the patient.

Rectal digital examination of every patient, one of the most neglected phases of physical examination, should be done on both males and females. And this should be followed by proctoscopic examination, a procedure not much more difficult than digital examination. Cancer can and does occur in the young and diligent search is important for abnormalities in all. Routine laboratory examination with cancer detection in mind should include examination of the urine for blood, in the female urine obtained by catheter; stools for occult blood, and this can frequently be done in a moment's time by a test of adherent fecal particles to the gloved finger tip after digital rectal examination. Thus

it is obvious that for many regions of the body no great quantity of diagnostic equipment other than a trained mind and developed senses are required to discover early suspicious malignant lesions—and if necessary biopsy specimens of many of these lesions can be obtained for pathological study, in most instances with simple instruments. Blood in the urine, occult blood in the stool, irregular intermittent bleeding from the uterus constitute challenges for diagnosis and should suggest cancer until proved otherwise.

No one is in a more opportune position to influence individual attitudes regarding disease of any nature than is the family doctor. His patients look to him for guidance in these matters. It is from the manner in which he deals with his patients that concepts are formed. If he be diligent in diagnosis, thorough in investigation and in his examination, profound respect for his judgment emanates from his patient and nearly always his advice will be accepted. He has within his direct jurisdiction more than any other group, opportunities, responsibilities and challenges that, if properly met, will not only check but will effectively reverse the rising incidence of cancer deaths.

Extracts.

THE WAR AGAINST RHEUMATISM

Diagnosis and Treatment

BY ARTHUR ASTBURY

There is probably no country in the world where rheumatism, in one or more of its forms, is totally unknown. It is, however, more prevalent in cold and damp climates. It has been known from the earliest times and one might suppose that its causes and treatment would by now be well understood.

The contrary is, in fact, the case. Possibly because it is not usually fatal in man, doctors have paid it little attention as compared with what may be called the killing diseases.

Rheumatism takes many forms and the word is used to describe a large number of allied conditions characterised by pain and swelling of the joints and surrounding tissues, often accompanied by a rise in temperature.

The illness may be acute, as in rheumatic fever, which affects the young and often leads to valvular disease of the heart. It may be sub-acute or chronic, as in rheumatoid arthritis or osteo-arthritis.

Rheumatoid arthritis affects principally women in youth or middle age and attacks the small joints such as the fingers or knuckles causing the hands to swell and curl grotesquely. This is the most disabling and intractable of all its forms. Gout, fibrositis, sciatica and lumbago all form part of the rheumatism story picture.

Contributory Factors

How is it caused? There are many favouring factors: climate, heredity, malnutrition, glandular secretions, fatigue, strain, sepsis, all are contributory, but researches at a Manchester clinic during the past year seem to show that the organism responsible is a virus. These have been seen in rheumatic tissues in the form of elementary bodies. Injection of a virus into a rabbit caused signs of rheumatism. The other factors mentioned are aggravating ones.

How can the disease be treated? With improved technique, bacteriologists hope to be able to make a vaccine from the virus which, like small-pox vaccine, will immunise people against rheumatism.

Meantime, some progress is being made on other lines. Drugs such as penicillin, T. A. B., gold, vitamins and gland extracts have successfully been used. Osteo-arthritic joints have been freed from pain by injections of lactic acid and acid sodium phosphate.

Physiotherapy in the form of massage, gymnastic, heat and light treatment, wax baths and so on have alleviated the condition. X-rays, galvanic and high frequency currents, short and long wave diathermy have also been tried in many clinics. The Magnetron tube enables accurate localisation of high frequency treatment to be made and nuclear research is opening up new fields of discovery.

Specialist Treatment

Many hospitals in Britain have introduced special wards and clinics for treating rheumatic diseases. Doctors are beginning to realise that rheumatism is not a general condition to be treated hopefully in general wards and clinics but one demanding specialised treatment.

In the meantime, what can be done to alleviate the lot of the ordinary sufferer? The answer is largely individual, and in the hands of the general practitioner rather than the specialist.

Dieting is often very successful and rubbing with liniment not to be despised. Aspirin often gives relief and keeping dry and warm is a first essential.

Some doctors still prescribe colchicum for gout, but this is a dangerous remedy and should not be taken except under medical supervision, as though it provides immediate relief, it leaves a predisposition; thus every succeeding attack requires large doses until the point is reached where colchicum poisoning would set in were it continued.

One remedy devised by Dr. Foakes, a London specialist of the last century, and used by him with great success, was to take fairly large doses of "Gregory Powder" (Rhubarb and Magnesia) three or four times a day until relief was experienced, and then to continue with one dose a day for several months. Dr. Foakes insisted that the so-called "Turkey Rhubarb" (which actually come from India) should be used, and declared that even obstinate and long-standing cases of rheumatic gout had yielded to this simple and inexpensive treatment, and that the cure, moreover, was generally permanent.

[illegible]

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RAT-BITE FEVER

B. DAS, M.B., D.T.M. & H. (LOND.),
Calcutta.

Rat bite fever is a fever of relapsing type, caused by micro-organisms that are conveyed to man by the bite of small animals, mainly rats. The disease has been recognized, in Japan and elsewhere, as a clinical entity for many years; in Japan it was known as sodoku (so=rat; doku=poison). In India, the first clinical record was in 1913. However, the discovery in 1916, by Futaki and others, of the casual organism gave the disease a more concrete form. Most of the earliest cases were reported from Japan. Knowles and Das Gupta drew attention to the fact that it was a common disease in India and certainly in Calcutta. Isolated cases have been reported from many countries. The first definite report of a case in the United States was made by Shattuck and Theiler in 1924, and Bayne-Jones collected 75 apparently authentic cases from the literature; *Spirillum minus* had been isolated in only five of these cases. It is essentially a sporadic disease; it occurs in those living under insanitary conditions and most subject to the bites of rats; the published records of age and sex incidence reflect only the age distribution of the population from which they are drawn; but there appears to be a definite seasonal incidence, which in Calcutta corresponds to the warm and humid months of the year.

Spirillum minus is a short, rigid spiral organism measuring from 2 to 5, but is occasionally longer, even up to 10; it is relatively thicker than the spirochaetes; and the coils vary in number according to the size of the spirillum, but the length of each coil is uniformly about 1 μ . With darkground illumination, the rapid, darting, and progressive movements of the organism can be studied; these movements are effected by means of terminal flagella—of which there are several at each pole—and are very different from the backward-and-forward movements of the spirochaetes. Multiplication takes place by transvers division. The spirillum stains well with Giemsa's or other Romanowsky stains, but for demonstrating the flagella, Triboudeau's modification of Fontana's silver impregnation methods is perhaps the best. The spirilla can be shown in the tissues by this method. Cultivation of the organisms has been claimed

by Futaki and others, but it is not at present a practical procedure. The infection is readily transmissible to laboratory animals, monkeys, guinea-pigs, rats, and mice; the last named are most commonly used. It has been claimed that the infection is transmitted from the mother to the young, either by intra-uterine or by milk infection. Das Gupta 1938 however failed to confirm this observation, as also to infect mice by feeding them on contaminated food. Nevertheless, it is not uncommon for one's whole stock of laboratory mice to become infected naturally. Distribution in the tissues.— In man, the spirillum is found in the local tissues at the site of the bite, in the lymphatics draining the area, in the lymph nodes on the course of these, and in the blood. It has also been demonstrated in the liver, spleen, kidney and suprarenals. In animals, it appears in the blood in about six days, and it has a predilection for the connective tissues of the nose, the lips, and the gums. Infection of the conjunctival sac is apparently common, the organisms being found in the secretions. The salivary glands are not infected.

Transmission is effected by the bite of an infected rat or other small animal. The tissues around the mouth are particularly rich in spirilla, and when a rat bites viciously it usually damages its gums so that they bleed; this infected blood contaminates the wound. Another suggestion is that the mouth of the rat is infected by the conjunctival secretions that come down the nasal duct. Wild rats constitute the main reservoir; 3 per cent of wild rats in Japan have been shown to be infected. In Calcutta, infected rats have frequently been found. After the rat, the cat is the most common agent of infection, and instances have been reported of a similar disease following the bites of weasels, ferrets, squirrels (Das Gupta, 1942) and even dogs; it will be noted that most of these are carnivores that habitually kill rats and are likely to have been infected by rats when they were killing them. As infection is apparently not transmissible by the oral route, it is uncertain how it is transmitted from rat to rat.

Locally, there is hyperæmia and œdema of the skin and subcutaneous tissues, with polymorphonuclear and eosinophil infiltration. Similar changes will be found in the lymph nodes that drain the area. There are few records of post-mortem examinations in man. Hyperæmia and œdema of the kidney, with degenerative changes in the tubular epithelium, and cloudy swelling and necrosis of the parenchyma cells in the centre of the liver lobules, have been described. In the rat, there appears to be little tissue reaction to the infection. The liver may show some congestion. In mice, there may be conjunctivitis and loss of hair. Young guinea-pigs usually show emaciation, keratosis, and other eye complications, and die within two months. There is an increasing anaemia in the blood picture if the disease is allowed to progress untreated, but this is not very evident in cases in which treatment is instituted early. With the onset of fever, there is a sharp rise in the leucocyte count, which subsides during the remission periods; there is a relative increase in eosinophils,

and a decrease in lymphocytes. A cloud of albumin is common and, more rarely, granular casts appear. The Wassermann reaction is reported to be positive in this disease. Our experience in Calcutta contradicts this. Das Gupta chose Wassermann-negative volunteers and infected them experimentally with *Spirillum minus*, at no stage of the infection did their Wassermann reactions become positive. Other reports indicate that the Kahn reaction is frequently positive even when the Wassermann reaction is negative; the writer has recently confirmed this observation.

A definite history of a rat bite may be given, but as the majority of bites occur at night, much more frequently the patient says that he was awakened by a sudden pain in his foot or hand, and that next morning he found an inflamed local lesion which was obviously a bite. The incubation period is very variable, but the average is about two weeks; instances as short as three days and as long as several months have been reported. The initial lesions made by the bite may heal in a few days; this will depend on the degree of sepsis. Then, after the incubation period; the true onset will occur suddenly with a high rise of temperature and often a rigor, headache, pains in the joints and muscles, and a considerable degree of prostration. With the first and sometimes with each subsequent febrile paroxysm, there is a local response of the allergic type, with redness, swelling and oedema at the site of the original lesion, and, if this has not healed, there will be an increase in the amount of discharge. The reaction may also occur in the proximal lymph nodes, which were possibly swollen previously but had meanwhile subsided. At the same time a rash may appear on different parts of the body, mainly on the limbs and the trunk, but sometimes on the face, and rarely on the mucous membranes. The rash takes the form of large reddish-purple patches, as much as an inch to two inches in diameter; they are sometimes raised very slightly above the surface, but they would usually be described as macule. Sometimes purplish papules also appear. The rash subsides with the temperature and occasionally, but not usually, reappears during the relapses. The rash is by no means common; it occurs in less than 2 per cent of our Calcutta cases. The fever rises sharply to 103° or 104° F. and may remain as a high remittent temperature for three or four days; it then falls to normal within a few hours, where it remains for a variable period but not usually. The second rise of temperature is usually as high as the first but the duration is shorter; if no specific treatment is given these relapses may occur at intervals of from 6 to 10 days for many months, but, as a rule, the febrile paroxysms become less and less in height and duration, and eventually the infection disappears spontaneously. The rhythm of the paroxysms may be disturbed by sepsis and the temperature may show a moderately high, irregular curve in which the paroxysms are scarcely distinguishable.

A clinical diagnosis can often be made on the history alone; definite or circumstantial evidence of a rat bite which healed in a few days, an

interval of about a fortnight, and a sudden attack of fever with a focal reaction, even before the relapsing nature of the fever with its characteristic periodicity (longer than malaria and shorter than relapsing fever) becomes apparent, are sufficient to establish a diagnosis with a considerable degree of certainty. There are three practical laboratory methods of confirming the diagnosis: (a) by direct examination of serous exudate taken from the initial lesion, (b) by the immobilization test with the patient's serum and (c) by animal inoculation with exudate or blood.

The hyperæmic or œdematous area around the site of the bite is pricked with a sterile needle, after sterilization of the area and subsequent washing with normal saline, and the exudate is taken up with a capillary pipette and examined by dark-ground illumination. At first the darting movements of the spirillum make it impossible to identify it, but, if the specimen is sealed with paraffin or vaseline, left for a time and examined later, the spirillum will easily be recognized by its characteristic shape, as well as by its movements, now slowed down. Films made from the exudate stained by Leishman's or Giemsa's stains will often show the spirilla quite well, but Tribondeau's modification of Fontana's stain gives the best results; the technique of this method is described by Das Gupta (1938) as follows:—

(i) A thin film of the clear serous exudate is prepared from the lesion on a clean slide and allowed to dry in the air.

(ii) The slide is then laid on a staining-rack and flooded with Ruge's solution, which has the following composition: glacial acetic acid, 1 c. cm.; solution of formaldehyde, 2 c. cm.; and distilled water 100 c. cm. The fixative is poured on and drained off; this is repeated two or three times for about a minute.

(iii) The fixative is drained off the slide, which is next covered with methyl alcohol and flamed by applying a lighted match. This completes fixation.

(iv) The slide is laid on the staining-rack and flooded with the following mordant: tannic acid, 5 grammes, in distilled water, 100 c. cm. It is gently warmed until steam rises. The best and least messy way of doing this is to wrap a little cotton-wool round the end of a piece of wire, soak it in alcohol, light it, and hold under the slide. When steam rises from the slide, the flame is removed and the mordant allowed to act for thirty seconds longer without further heating.

(v) The slide is washed with distilled water and then covered with Fontana's silver solution. To prepare this, a 5 per cent aqueous solution of silver nitrate is taken in a glass cylinder which has previously been thoroughly washed with distilled water. With a capillary pipette, a strong solution of ammonia is added drop by drop. A sepia precipitate forms and then re-dissolves. To the now clear solution more silver nitrate solution is added very carefully, and only drop by drop, from a capillary pipette, until a solution results which is just opalescent (and not more)

on shaking. Not a drop more of the silver solution should be added than is necessary to produce slight opalescence. The slide is covered with the solution and warmed gently until steam rises. Then the flame is removed, and the warm solution is allowed to act for a further thirty seconds.

(vi) The film is washed in distilled water and allowed to dry in the air. It should never be blotted.

The film is then examined with an oil-immersion lens. The spirilla are stained an intense brown-black or black against a faint yellow background.

The spirilla are usually scanty and a determined search for them has to be made; they were found in 64 per cent of our Calcutta cases believed on clinical grounds to be cases of rat-bite fever.

(b) Blood is taken from an infected mouse's tail and mixed with a 1-in-5 dilution of the patient's serum in normal saline. A coverslip is applied and the specimen sealed with vaseline. Examined after an hour, the spirilla will be immobile if the patient is suffering from rat-bite fever; but still very active in the control (with normal serum); a control must always be put up. A positive result definitely indicates rat-bite fever; a negative result does not exclude this diagnosis.

(c) The most suitable animals are:—(i) White mice: the limitation is that those animals are very subject to 'natural' infection, so that clean stock has to be used and the mice examined thoroughly before inoculation. (ii) Young guinea-pigs: in these the development of the infection is slower and perhaps less certain. (iii) Other animals: these include adult guinea-pigs, rabbits and monkeys. The inoculation is made either from the serous exudate from the lesions, a drop of which is given subcutaneously, or from the blood, 0.5 c. cm. being given intraperitoneally to a mouse, 1 c. cm. to a young guinea-pig, and 2 c. cm. or more to any of the larger animals used. The blood of the animals is examined from the sixth day onwards, by cutting off the tip of the mouse's tail, or in the case of the guinea-pig by snipping its nail or puncturing a vein in its ear. The blood is placed on a carefully cleaned thin slide, covered with a clean coverslip, ringed with vaseline, and left for half an hour; at the end of this time, it is examined with dark-ground illumination. The motile spirilla will be identified easily. Spirilla were identified in 70 per cent of our clinically typical Calcutta cases by blood inoculation into white mice.

Therapeutic test.—One adequate dose of arsphenamine will always interrupt, at any rate temporarily, the periodicity of the fever.

The conditions likely to be confused with rat-bite fever are:—

(i) Septic fever from the bite: this will usually follow the bite almost immediately.

(ii) Filarial lymphangitis and fever: microfilariae will usually be found in the blood taken at night.

(iii) Relapsing fever: the 'disease period' is usually much longer, and spirochaetes will be found in the blood.

(iv) Malaria: the periodicity is much shorter, malaria parasites will be found in the blood, and the fever will respond to anti malarial drugs.

Rat-bite fever may simulate other short febrile diseases, such as dengue, sand-fly fever, and influenza, but the diagnosis will be cleared up when the characteristic periodicity of the fever becomes apparent.

The prophylactic treatment of a rat-bite consists in applying pure phenol to the wound with a match-stick swab, washing this out with sterile water, putting powdered sulphanilamide into the wound, and applying a dressing. Specific treatment is provided by any of the arsphenamine group of drug, given according to the weight of the patient. Usually two injections will effect a complete cure, but it may be advisable to give a third. Sulphapyridine given in the usual doses appears to control the fever temporarily in some cases, but it does not effect a cure. In the case of which the temperature chart will confirm spirilla in the blood until novarsenobillon was given.

If adequate treatment is given, complete recovery may be expected by the time the local lesion settles down, and the death rate in our experience has been negligible. In Japan, however, a death rate of 10 per cent has been reported.

(*The Indian Medical Review*, December 1948.)

PREMATURE-INFANT

BY DR. BASHESHAR LAL KAPUR

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The problem of premature child is a vast one. An obstetrician alone is not competent enough to deal with it. One also requires highly specialized paediatist and in spite of co-operation of both, results are not very encouraging.

According to Tow premature child is defined as one born little before and after a period of gestation which has lasted seven months or 196 days. But a child can also be born before this time and the possibility of survival is not diminished. The superstition that the children born with 8 months do not live long is baseless. They grow as nicely as the other. Ylpe labels children with 2500 grammes as premature. But the children can be born with still lower weights. He divides them into four groups.

- i. 1000 grammes.
- ii. 1000-1500 "
- iii. 1500-2000 "
- iv. 2500-5000 "

The above division has a prognostic importance. Dolling has made observations on the weight and length of premature infants. An infant child 39 cm long would weigh 40-45 grammes per cm. 40-44 cm. long 110-145 grammes per cm. 49 cm. long 200 grammes per cm. Full term weight would be 250 grammes per cm.

CAUSES

In 50 per cent of cases the causes are not known. Multifarious factors are described for the other half. Teebken found placenta praevia in 14 per cent cases, Friedlander 1 per cent and on our material 3 per cent. Trauma was attributed to in 4 per cent of cases. Syphilis is supposed to be the commonest cause. But Teebken came across only in 2 per cent of cases and Friedlander 7 per cent. Enneper attributes premature child birth to constitutional function of genital organs in 20 per cent of cases. We found in 5 per cent cases on our material. Sexual intercourse plays an important role. (Kovacs & Dapsy) Three of our cases whom we were looking after antenatally gave birth to premature infants. On going through the history we found that they were having sexual intercourse even upto the last day of gestation. In one of them pains started during actual act and an asphyxiated child was delivered within 2 hours. War and consequent famine have a definite effect on the premature child birth. Hofmeier attributes premature child birth to Geno type mother and child. According to Duyzings there is an increasing possibility of premature child birth after the age of 35 years. There is higher proportion of premature child birth in primiparae than in multiparae in plural child birth more than in single ones and in male infants more than in females (Woodbury).

Diet poor in vitamins predisposes a woman to premature beginning of labour pains (Taverud). Strenuous work during later months of pregnancy is very harmful.

Further causes lie in diseases of the mother like nephritis, pyelitis, eclampsia, lung diseases, pneumonia, small-pox, malaria, constitutional diseases like diabetes, dysentery and anaemia etc.

Woman who has a premaure delivery once, is inclined to the same second time (Hefmeier). I cannot agree with this dictum, because in our material it does not hold good.

PREMATURE-INFANT

Due to lack of subcutaneous fat premature infant looks old and haggard in appearance but like a china doll every feature is formed. The skin is stretched and shiny on account of presence of skleroma. Lanugo hair are plentiful particularly on the face, forehead, cheeks, shoulders. Malbria are commonly found on the nose.

Due to thinness of cartilage the auricle is somewhat flabby. The nails may or may not be fully developed. The mammary glands are small and barely palpable without any secretion. The chest is usually soft. The circumference of head is large in proportion to the rest of the body.

Due to incomplete development of central nervous system the infant shows extraordinary quietness. He sleeps all the time and if disturbed cries just at a low pitched tone.

PHYSIOLOGY

According to Mai and Raiha the capillaries of premature infant manifest fragility in their structure. They are readily traumatised. Deficiency of elastic tissue or perivascular tissue in blood vessels has been advanced as cause of this fragility. It leads to cerebral hæmorrhage which is the frequent cause of death of these infants. There is disturbance in oxydation. The premature infants are further inclined to acidosis, low basal metabolism and deficient chemical and heat regulation. The respiratory system of the child is particularly effected, it is devoid of any uniformity. The rate of respiration is 40-70 per minute (Fuhry) and can still be quicker at times. The breathing is irregular and superficial it may cease at times even for a minute.

There is excess of carbon-dioxyde in blood and respiratory center unexcitable to this stimulus. The respiration may be Cheyne Stokes in character. Feeding often produces cyanosis and lack of reflex function may easily permit aspiration of food in trachea. Heart shows frequent attack of cyanosis.

Icterus neonatorum is present. It is due to deficient oxygen supply to liver and this leads to functional disturbance and deficiency in the excretion of bilirubin from the blood circulation.

The number of reticulocytes rises after feeding in a normal child in the first 10-30 minutes and comes to normal after 30 minutes. In premature this food excitation is delayed considerably (Kinkel & Diercks). The cause lies in badly developed bone marrow.

There is rapid blood destruction in the premature children Abt, Mackey, and Magnussen; Hemoglobin falls to 65% during first 2 months and there is a proportionate decrease of erythrocytes and Leucocytes. Three causes have been attributed to anæmia. Deficient ante-natal storage of iron or perhaps copper or some other essential hæmatogenic material, deficient bone marrow due to marrow hypoplasia and increased blood destruction.

Blood pressure rises from 20 to 50 milligrams in the first days in infants less than 14 pounds body weight and to 60 mg. in those above 4 pounds.

The electrocardiogram of premature infants does not show any abnormality. (Raiha).

Immediately after birth blood sugar is 70-80 mg. per cent (Mucharolo) and 85 mg. per cent (Ferri and Gimlette) but it sinks rapidly and hypoglacæmic symptoms develop. The child manifests cramps. The treatment lies in administration of sugar water.

The digestive enzymes are fair in early months. (Hofmeier). According to Seyffort there is low acidity in stomach during the first two months. Lehmann studied the function of intestines of premature child

with ferment meal. He found that stomach empties itself in between 2½ to 4½ hours, duodenum in 8½ to 10 hours and colon after 7½ hours the total time being 6-16½ hours.

Lactic acid secretion in urine was double as compared with that of full term child and the percentage of lactic acid in blood was 4 times (Seckel & Sommer). Investigation of Galactose & Lavalose tolerance resulted in the premature infants (Fabrizio) as:

Galactose tolerance. 1. 6 per lb weight.

Lavalose, 1. 5 per lb weight.

Gotz found infiltrates in the wall of the nabel cord caused by acidity amniot fluid and it is characteristic for premature child birth.

The stump of the nabel cord separates itself as late as seven weeks Naito & Kollmann.

PROGNOSIS

Prognosis of premature infants is usually bad. They die of intracranial hæmorrhage, asphyxia neonatorum, diarrhoea, dehydration and temperature below 97. The survivals do not become normal persons. Most of them manifest after effects.

OTHER EFFECTS.

The children develop epilepsy stammering, Myopia, deficient hearing, disturbance of accommodation, measles and rickets. (Friedlander). They are mentally deficient. Their intelligence is very much decreased. They are backward in their classes. The mental deficiency is not so much due to trauma of brain as much due to chemical injury caused by lack of oxydation. In our practice we found that some of the hysterics and psychoneurotics were early born. The premature infants are more inclined to æsthetic constitution.

PROPHYLAXES.

I cannot lay enough stress upon the attendance of ante-natal clinics. The present standard of organization is insufficient. The campaign should be vigorous. It is for the State and its doctors and Health visitors to see that no woman is delivered without pre-natal attendance. If anything can be done by the way of the preventive medicine it is in this period. The toxæmias of pregnancy, anæmia, diabetes etc., can be looked into. Instructions about the diet are another essential factor. The hygiene of married life must be very well explained. It is suggested that a woman with 7 month's pregnancy should enter special homes where she can have physical and mental rest. It is not practical in our country. Our woman would not leave their homes and family first for the sake of rest and peace. But I am of the opinion that if we could make the husband understand, much could be achieved.

Lot of precautions should be taken in the delivery of the premature Infants. Clifford found that the safest method was the delivery in vertex presentation. Low forceps should be applied and wide episiotomy done. The use of forceps spares the foetal head from the force of contraction existing in the birth canal and thus the possibility of cerebral

hæmorrhage is minimised. Caesarean section is another suggestion but it is dangerous if morphia is administered within 4 hours of delivery. It eliminates the factor of trauma but substitutes asphyxia.

TREATMENT.

For bringing up a premature child the essential personnel is not only a paediatrician and obstetrician but also an efficient trained nurse who should have specialised herself in child nursing. She should have very great patience and be a devotee of her profession. Her only pride should be to see such a child growing to a normal.

A premature child is very much inclined to losing heat. In fact sub-normal temperature and low weight in newly born babies is characteristic of prematurity. So the important factor in bringing up such an infant lies in safeguarding against loss of heat. (Frankenstein) It is imperative that a premature child should not be given any bath for the first 24 hours. It should be just rubbed with oil and wrapped in cotton pads. For the first five days sponging in the morning should be enough.

Further attempts should be made to keep rectal temperature between 97-100 F (Frankenstein). For this purpose incubators have been suggested. Clark's incubator has become quite popular. Lichtfeld finds these apparatuses unnecessary. In our opinion incubators are quite out of date. To-day we can get air-conditioned chambers where necessary temperature of 80-90 F can be kept and humidity maintained between 35-60. For children below 5 pounds weight humidity values are required.

To protect a premature infant from loss of weight the primary requisite is adequate nourishment and it requires 6 calories per pound body weight in 24 hours. The best diet is mother's milk and the feed should be given every 2-2½ hours. (Dukes). The babies are unable to suck. The milk should not be submitted to heat (Hofmeier). The value of human milk can be increased by adding 17 per cent sugar, water half and half. More calories can be covered by addition of 1-2 per cent calcium caseinate with a view of controlling the loss of weight. Soldin advocates 5-10 ccm of blood serum injection. Its effect is attributed to presence of prolactin and folliculin. Mertino suggests subcutaneous injection of folliculin 500 in units. Magnadier supports his views. Siegmund administered prolactin and folliculin individually and came to the conclusion that both had no effect. Moncrieff found estrin also useless. Nai advocates administration of serum of blood from the umbilical vein by mouth. This is a very good suggestion because more proteins are administered.

One of the serious complications of premature child birth is asphyxia. The treatment advocated lies in slapping, rubbing in hot and cold water swinging (Schulze) mouth to mouth breathing and resuscitation manœuvres like LeBordy, Sylvester, Marshall etc. The old dais put the placenta on heated iron without suturing and incising the cord. In our opinion all these methods are very crude. The child is already in bad

condition. With the suggested measure there is very likelihood of its worsening the prognosis.

Immediately after the birth the child should be wrapped in a flannel cloth and the head be put lower than the feet. Nabel vein should not be separated at once. One should wait till the nabel vein has stopped beating; otherwise the child is deprived of 80-100 ccs of blood thus depriving the child of 25-30 per cent of oxygen.

Mucus plug should be aspirated with tracheal catheter very thoroughly otherwise child would develop pneumonia. According to Ross and Strong chest should be inflated and allowed to deflate by its own elastic coil at the rate of 24-30 times per minute. Erichson and Johnson resuscitators have been advocated; but Lichtfeld believes in ordinary oxygen masks.

Stimulating drugs have been suggested. They have some use after the respiration has been established. Coramin is highly recommended. Lichtfeld advocates alpha lobulin per subcutaneous injections.

Every movement of the child should be absolutely restricted especially carrying about. Even the napkins should be changed without lifting the infant. The child should be kept in Fowlers position because it helps in breathing and arrest of cerebral hæmorrhage.

Premature infants develop diarrhoea quite easily. They get so serious that the disease becomes fatal in 60 per cent of cases. Brandee records fatality in 80 per cent cases. This complication should not be liquidated by administration of Pulv Rhei or allied medicines like Glucose, gripe water etc., but a proper diagnosis should be made whether it is hunger, overfeeding or infectious diarrhoea and treatment should be given accordingly.

Greatest precaution has to be taken against dehydration. Wallis-Scheck recommends intramuscular injection of 15 per cent glucose saline solution 20 ccm in morning and evening and plenty of fluids should be administered per oz in between. In cases of diarrhoea we suggest intravenous or intramuscular and intravenous administration of saline solution by drip method.

Premature children are prone to infection. Their environments should be scrupulously clean. The attending nurses should use masks. No visitors should be allowed in the room. Vitamins should be given by mouth. (Hopneer, Soldin & Bornheim.) Merlino advocates vitamin B for tophic disturbances.

In cases where cerebral hæmorrhage is suspected 10-20 ccs of human blood are recommended intramuscularly. Vitamin K does a lot of good in such cases and is definitely a better suggestion than heterogenic hemotherapy.

(*Journal of Obstetrics and Gynecology*, Aug. & Sept. '48.)

Extracts.

ACUTE CIRCULATORY ARREST.

R. S. LAMPSON, W. C. SHAEFFER AND J. R. LINCOLN,

Sudden stoppage of heart in the operation theatre is a very important emergency when the patient is under light anaesthesia (either during the start of or at the end of anaesthesia). This is likely to occur because the irritability of heart muscle is heightened at this time. Pathologically, the ventricle may fibrillate or may remain in diastole. Death is inevitable unless *immediate* attempts are made to make the heart start normal function. The authors relate an actual case of theirs where a fibrillating ventricle recovered after 27 minutes. The patient, a boy of 7 had an injury of the right sole for which he was dressed under open drop ether anaesthesia. He received pre-operative medication of 1/12 gr. morphine sulph, 1/200 gr. atropine sulph, and 1/4 gr. secenal sodium. Cleaning and repair of the wound took about 1 hour 15 minutes; when the anaesthesia was stopped, the patient suddenly became pale and his heart beat and respiration stopped. A decision was made within three minutes to approach the heart through the 5th intercostal space; the process took about ten seconds and the surface of the ventricle was seen to be fibrillating. At once cardiac massage (alternate compression and relaxation) was begun (about 60 times a minute). The massage was effective in pumping blood into the circulatory tree as shown by appearance of pulse at the wrist. Artificial respiration with pure oxygen was continued. When even after 15 minutes, the heart did not resume its work-3 c.c. procaine hydrochloride solution (1%) was given i.v. This was repeated (2 c.c.) again after 26 1/2 minutes and within 30 seconds the heart started work. During the whole period (half an hour) the heart was clearly visible and what is more interesting the authors obtained the services of an electrocardiograph which recorded the ventricular fibrillation followed by arrhythmic heart beat and later by normal regular heart beat. The immediate post-operative period was very troublesome due to cerebral anoxoemia. Slowly cerebral function improved and he was discharged apparently normal 26 days after the operation. The authors comment that when faced with a similar instance, the problem is to decide whether "a few stimulatory manipulation of the heart through the diaphragm will induce an effective rhythm or whether a prolonged period of artificial circulation by cardiac massage will be necessary." If the abdomen is already open one may at once start manipulation through diaphragm but if this does not produce any result, transthoracic approach to the heart and actual massage should be started. Ephedrine may be used in cases of cardiac standstill and procaine in ventricular fibrillation. Electrical stimulation as devised by Beck is also helpful in fibrillation.

J.A.M.A., 28th Aug., 1948.

THE STATUS OF PENICILLIN IN THE TREATMENT OF SYPHILIS.

December 1, 1947.

SYPHILIS STUDY SECTION, NATIONAL INSTITUTE OF HEALTH,
U. S. PUBLIC HEALTH SERVICE.

The purpose of this report is to summarize the principal facts of clinical importance with regard to penicillin in syphilis. Since 1943, at least 500,000 patients with syphilis in various stages have been treated with this antibiotic, the agent most employed in syphilotherapy in the United States today.

The Intramuscular injection of penicillin in oil and wax, which has been found to be the only practical method in the treatment of syphilis, provides effectively bactericidal blood levels of at least three to five times the duration provided by aqueous penicillin in comparable dosage. This method does not require hospitalization and is therefore suitable for office or clinic administration. Although isolated instances of possible penicillin resistance have been reported in experimental rabbit syphilis and in clinical late benign gummatous syphilis, there is little evidence of the existence of penicillin-resistant disease analogous to arsenic and bismuth-resistant syphilis or sulfonamide-resistant gonorrhea. In patients suspected of having syphilis, but previously treated with penicillin for infections other than venereal disease, it is suggested that treatment be based on the clinical aspects, examination of the spinal fluid, and the amount of penicillin already administered. In general, patients who have not received the minimum amount of therapy recommended for their type of syphilis should be re-treated.

Treatment schedules presently advised, on the basis of experimental and clinical research, were .

1. Early syphilis. Treatment with penicillin in aqueous solution, which necessitates hospitalization, should consist of 4.8 million units of penicillin G administered intramuscularly every 2 or 3 hours over a period of 7 1/2 days. The failure rate in patients so treated averages about 10 per cent. The recommended schedule for ambulatory treatment with crystalline penicillin in oil and wax consists of the intramuscular administration of 6 million units in 10 injections over a period of 10 days. Although adjuvant therapy with arsenic, bismuth, or fever is not advised as a first course of treatment, a combined therapeutic attack is sometimes advantageous in patients who have failed on an original course of penicillin.

2. Cardiovascular syphilis. Available information indicates that penicillin be withheld in syphilitic aortitis with aortic regurgitation, saccular aneurysm, or coronary disease until preparatory treatment with heavy metals has been given; five or more million units of

penicillin should then be followed by small dosages (25,000 to 40,000 units) over a period of at least 15 days.

3. Neurosyphilis. A total of 4 to 10 million units of penicillin alone in aqueous solution, administered over a period of 7½ to 21 days and accompanying induced malaria fever, is suggested for patients with such types of neurosyphilis as early or late asymptomatic neurosyphilis, acute syphilitic meningitis, and vascular neuro-syphilis. For patients with dementia paralytica, taboparesis, or primary optic atrophy, a total of 10 to 20 million units of penicillin, administered over a period of 12 to 20 days with induced malaria fever, is advised.

J.A.M.A., 136: 873-879, 1948.

STREPTOMYCIN IN USE.

Streptomycin is useful in the following diseases:—

1. *Tuberculosis.* Tuberculous meningitis. Report of the Medical Research Council deals with 105 cases followed up for a minimum of 4 months; of these 71 had died, 7 were stationary or deteriorating, and 27 were doing well. If the cases are detected earlier and treatment is given earlier better results will follow. Intramuscular streptomycin alone is inadequate, intrathecal injections must also be given: Duration of treatment is not yet decided. Debre advises continuous treatment for 10 months. Glanzmann of Berns reports an apparent success after only 15 days vigorous treatment with intramuscular and intrathecal injections. Some advise only intrathecal injections.

2. *Pulmonary tuberculosis.* Chronic lesions with fibrosis and cavitation respond poorly. Apart from cases of miliary tuberculosis, streptomycin is chiefly indicated for early acute exudative lesions; laryngeal and tracheo-bronchial ulceration also respond favourably.

3. *Gram negative bacillary infections.* Most of the gram negative bacilli are sensitive to streptomycin in vitro but the infections caused by them may not respond. Typhoid does not respond to streptomycin. Undulant fever requires sulfadiazine in addition. Bacillary dysentery and acute gastro-enteritis in children respond to it. Streptomycin is useful in tularemia and plague and influenzal meningitis, septicemia with gram negative bacilli and Friedlander's bacillus pneumonia. It is useful in urinary tract infection. Obstruction in the urinary passages must be removed and urine must be made alkaline. Bacteria acquire resistance to the drug which is permanent.

(Abstracted from the *B.M.J.*)

PRESENT DAY CONCEPTS OF THERAPY IN PERNICIOUS ANAEMIA.

By: J. E. STEVENS AND B. E. HALL.

Addisonian pernicious anaemia is a deficiency disease due to the lack of a specific substance necessary for the growth and development of red blood cells. This specific substance is known as E.M.F. or Erythrocyte Maturation Factor or A.A.P. or Anti-Anaemic Principle.

The disease occurs only in adults and is characterised by remissions. The disease is not just an anaemia, but progressive changes in digestive and nervous system are also present.

There are five steps involved in the elaboration and use of the substances necessary for normal maturation of erythrocytes.

These are:—

1. Provision of an extrinsic factor in the food.
2. Secretion of an intrinsic factor in the gastric juice by the gastric mucosa
3. The interaction of the two to form an antianaemia substance absorbed by the intestine.
4. Storage of this by the liver.
5. Release of this factor and its utilization by the bone marrow in normal erythropoiesis.

Dessicated Stomach—Dessicated stomach represents both intrinsic and extrinsic factors. Oral use was satisfactory in inducing remissions and maintaining them satisfactorily. The picture of blood regeneration was similar, and apparently equivalent to that in patients undergoing liver therapy.

Extralin is prepared from liver acted on by gastric tissue. It is more powerful in effect.

Liver Therapy.—Parenteral liver therapy has replaced the oral use. There is no strict regimen for therapy of pernicious anaemia with preparations of liver. It is always better to give more. The refined preparations are more highly concentrated and offer a maximal response with a minimum of expense and inconvenience to the patient. Neurologic disturbances respond more rapidly to the use of these preparation. Liver therapy must be maintained indefinitely.

Allergic Reactions to Liver.—Some patients develop hypersensitivity to the liver extract after having several injections. Localised or generalised itching is the first symptom. Other symptoms are: flushing, palpitation, lacrimation, rhinorrhea, urticaria, weakness, nausea, or vomiting, substernal oppression, asthma and shock. Death is rare.

The oral use of histaminase, the use of antigen H, to cause neutralisation of histamine and desensitization of the patient by the use of gradually increasing doses of the diluted liver extract have all been successful.

Some patients have a sensitization reaction on one occasion only. Intracutaneous tests to judge the sensitivity to liver extract are of no value.

Measurement of Potency of Liver Preparations—So far no satisfactory methods of assay for determining the potency of liver preparations have been discovered.

As a routine administration of hydrochloric acid is not required, Transfusion of whole blood are rarely necessary.

Folic Acid: It has a spectacular effect on the hematologic picture in pernicious anaemia, but does not prevent or cure neurologic symptoms. It did not relieve glossitis, completely. Normal levels of erythrocytes and hemoglobin could not always be maintained. Some workers have found that folic acid exerts a deleterious effect on the nervous system and precipitates explosive neurologic manifestations.

(Abstracted from the Medical Clinics of North America)

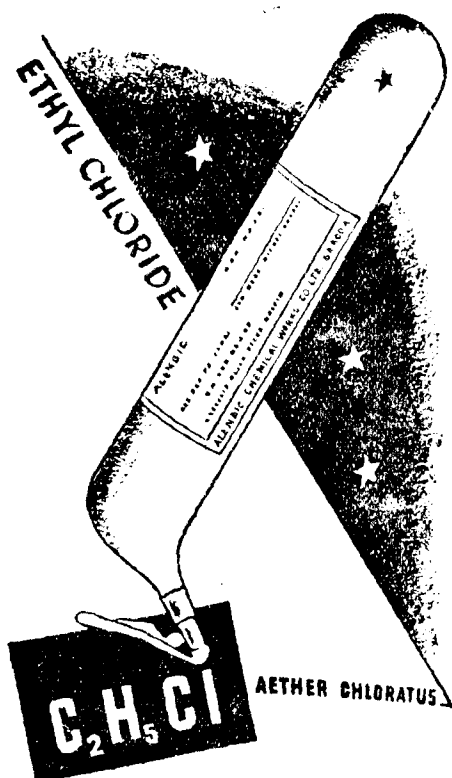
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ANTICIPATION AND PREVENTION OF COMPLICATIONS IN SAFE INTRAOCULAR SURGERY

S. N. COOPER*

A surgeon who can reasonably anticipate complications of intraocular surgery and take steps to prevent them will make all the difference in his results from one who is satisfied in treating such complications as they occur. In India three types of ophthalmic surgeons are in evidence: (1) the mass surgeon, (2) the scientific surgeon and (3) the occasional surgeon. Mass surgery however distasteful to the average scientific mind extends its blessings to hundreds of the partially and totally blind, and the results of two recent eye-camps at Jalgaon and Hubli have completely vindicated their need. The reputation of such surgery is made by the warm thanks and blessings of the masses who are satisfied, if they can see even a little again. In scientific surgery as practised in cities the reputation is made or unmade by each individual case, who ordinarily is not satisfied till he sees fairly well again.

Anticipation of complications can be studied under the following groups: (1) Inspection, (2) Clinical examination, (3) Laboratory and biochemical examinations.

I. INSPECTION.

Even as the patient walks to the inspection desk an observant surgeon learns many things of importance. The way he is helped in bright light and in the dark-room and the way he shades his eyes gives in a rough sort of way an idea of his light-sense, and his comparative difficulty in moving about in bright light and in the dark. People with central cataracts can move about better in subdued light, while contrary is the case with peripheral lens opacities. The wide vacant helpless state with the face turned up is the look of the totally blind, where one may expect to find barely light perception.

The photophobic facies suggests some inflammatory trouble inside the eyes, but there is one form of unilateral pseudo-photophobia to which attention must be directed. Usually the patient moves about with one eye partially closed, and the other eye open. Nothing abnormal however is found in the 'photophobic' eye but in the opposite eye which he keeps

* K. E. M. Hospital, Parel, Bombay.

open there is a central cataract. The reason for such a behaviour on the part of the patient is that when he keeps both the eyes open the greater amount of light entering both his eyes constricts the pupils more than when one is closed. This enables the opposite eye with the central cataract to see better with a slightly more dilated pupil. This condition often takes place after cataract extraction in one eye, with a central cataract in the opposite eye. This gives an erroneous impression that there may be still some post-operative inflammation in that eye although the eye looks quite white, more so because the patient keeps on complaining that he cannot keep the operated eye open. A simple test to convince the operator, the patient and his relations is to put a drop of homatropin in the unoperated eye with the central cataract. His unilateral photophobia in the opposite eye will disappear within 20 minutes.

The skin of the patient needs a good look. Scars of lupus on the face and keloids are suggestive of a tuberculous diathesis and it is the experience of the contributor that in such cases the intentional trauma of doing an operation precipitates iritis on about the fourth day after the operation which may be of so severe a nature, that the eye may be lost. A previous desensitization with tuberculin, or instituting the same treatment as soon as iritis develop after the operation, without wasting time on dermal hypersensitivity tests will prevent or abort the iritis.

Any septic condition of the skin of the lids, face and scalp will be a contraindication for immediate operation as obviously such a focus of infection so close to the area of operation must necessarily prove a source of infection. It is advisable to wait till the skin condition is successfully treated.

The leucodermic skin is not a very inviting skin for intraocular surgery. Though by itself it is not a source of infection, there usually is some kind of a general focus of infection which may be at the root of this skin condition, and which may also act adversely at the time of the operation.

The allergic skin is another characteristic skin which merits description. The skin of the lids, especially of the lower ones looks dry and wrinkled with little crusts of dried discharge sticking at places. To the touch also the skin feels peculiarly dry. There is marked itchiness. The two common drugs used after cataract operation, viz., atropin and penicillin are notoriously allergy-producing, and in such cases an irritation of the skin after the use of these drugs may be expected. It is our custom, whenever possible to advise the patient to apply penicillin eye ointment for four days before the operation. In addition to keeping the conjunctival sac free of the common infective organisms any tendency to hypersensitivity to it will become manifest by the time the operation is undertaken. Such a preliminary measure if it is not undertaken before the operation may cause waste of valuable time in deciding whether the patient is allergic to atropin, penicillin or the ointment base if irritation takes place after the operation.

The build of the patient next deserves attention. Contrary to expectation people with a slighter build stand intraocular operation better than those with a heavier build, whereas the puffed plethoric pendulously fatty are the most treacherous. However, the famished half-starved constitution has to be distinguished from the naturally slighter build, for the former causes difficulties in two ways—(1) post-operative insanity and (2) delayed closure of the wound. In connection with the first difficulty we recall a case of an old woman who was admitted and operated on the same day, not knowing that she had not taken anything the day previously. After the operation she developed insanity and was very violent. On the third day the sister of the ward had to give her a nasal feed of milk and egg since she would not take anything by mouth. The following day the patient became as docile as a lamb. The case proves incidentally the utter nonsense about the practice of starving a patient before operation. When the second difficulty, that of the delayed closure of the wound is expected, it is very necessary that the incision should not be completely corneoscleral. It is best to have a conjunctival flap or bridge which ensures nutrition for repair of the wound.

The age of the patient if next to be considered. The majority of the hospital patients are ignorant of their age and it is not a matter of despair because the operator is concerned with the apparent age. The apparent age gives a correct idea about the zonule of the lens, being stronger in the apparently young and *vice versa* in the apparently old, which will give an indication as to which type of operation should be done—intracapsular where the zonule is considered weak or extracapsular when it is supposed to be strong.

The chest condition of the patient has next to be attended to. Is the patient asthmatic or suffering from chronic bronchitis? If so is that a contraindication for operation? The fear of being operated on the eye in the presence of even a slight cough or sneezing is great among lay people but with the use of conjunctival or corneal sutures in such cases the chances of a post-operative disaster have been reduced to a minimum. Such cases after a preliminary treatment particularly with the sulfonamides if tolerated before the operation, the use of one or other type of wound-suture during operation and propping them upon a back-rest after the operation present practically no greater source of worry than a straightforward case.

Constipation in the patient has also to be considered. Habitual constipation is always a source of infection, and it is advantageous to the patient if he is given laxatives a week or so previously to keep the bowels on the move. However a couple of days' constipation is the rule after the patient is confined to bed after the operation. For that reason it is desirable to clear the bowels on the morning of the operation with a purge or an enema.

Enlarged prostate and difficult micturition are other considerations to be taken into account. When there is such a history it is best to admit the patient a day previously and get him accustomed to the routine in bed. If he cannot pass urine in bed, he may be allowed to sit up, or even stand up rather than make him miserable with an unrelieved bladder. Such liberty, if anticipated, will particularly require wound suturing at the time of the operation.

The *temperament of the patient* has also got to be considered, the two extremes of temperament being the extremely nervous and the extremely indifferent. There is no need to elaborate on the patient with the evident nervous temperament, but there are patients who though terribly nervous from within put on a mask of indifference and non-chalance and brag that they are not frightened at all. But their nerves are keyed up like those of the soldier who faces the powder of the first time, and the tension may break at the time of putting the speculum in which case the surgeon is totally unprepared for the scene the patient may create. However the one way of suspecting such mere external show of courage is that the patient complains of diarrhoea and cough on the day of the operation, in the last minute hope of getting the operation postponed to a future date. An examination of the chest and of the "diarrhoea stools" will decide the matter for the surgeon. A placebo, an assurance that all will be well, a pre-anesthetic, and finally the operation itself will cure the patient of his cough and diarrhoea.

It may be stated here that in no other operation, except perhaps tonsillectomy, the surgeon needs the co-operation of the patient more than in cataract operation. Any precaution taken to secure this co-operation will be a step towards safer surgery. The fear that seems to disturb the patient most is the apprehension of pain at the time of the operation and how under such circumstances he is going to remain still at the time of the operation as expected of him. In most cases a kind word, a gentle pat, calling the patient by his first name, a timely warning of pain while injecting and above all a strong assurance that there will be no pain during operation will go a long way to insure an attitude of restfulness and confidence. A pre-anesthetic like sodium amytal or nembutal renders an otherwise nervous patient extremely quiet. One capsule two hours and another half an hour before the operation are required. However in a burly subject this dose may not be sufficient and may produce an adverse effect and make the patient very boisterous. A third capsule will produce the desired sobering effect.

One more precaution is to be taken. If the patient has fallen too deeply into sleep, it is necessary to wake him up before the operation is started because if he wakes up during the operation the fact that he is being operated upon comes so suddenly to his mind that he is startled and may completely upset the even course of the operation.

Perfect anaesthesia is the biggest secret to secure this co-operation because no surgeon can start an operation with a greater disadvantage

than when the fixation forceps are applied and the patient feels the hold on his eye-ball. Only surface anaesthesia, whatever the anaesthetic may be, is insufficient to render the eye-ball completely insensitive as for an intraocular operation. Ciliary block anaesthesia is a simple measure to secure complete anaesthesia. We do this by injecting 0.5 c.c. of a 2% sol. of novocain with 2 drops of liq. adrenalin (1 in 1,000) through the lower bulbar conjunctiva introducing the point at the junction of the outer and middle third of the lower fornix. The needle sticks close to the eye-ball and goes through the bulbar conjunctiva and not the lower fornix.

Full length of a 2 cm. needle is introduced. It is not necessary to strike the ciliary ganglion itself by going deeper. As a matter of fact any attempt to go deeper may cause retro-bulbar hæmorrhage. It is also important to remember not to introduce more than 0.5 c.c. of the solution behind the eye-ball, as it will press on the eye-ball from behind and may cause an escape of vitreous when the incision is made and the cataract is being expressed out.

A further precaution will be to block the facial nerve—akinesia, so that the patient cannot squeeze the eyelids during the operation. Any standard text-book will give the details of a "facial block", but if the beginner or the occasional operator finds any difficulty about this block, sufficient akinesia can be obtained by infiltrating the orbicularis oculi muscle with about 3 c.c. of a 2% sol. of novocain with adrenalin all round the outer orbital margin, going deep down to the bony margin. It is rightly said that facial and ciliary blocks are two long strides towards safe intraocular surgery.

However with all these precautions one will come across a patient who will refuse to be reconciled to his situation as a patient on the ophthalmic operation table. Rather than risk an operation on such an uncompromising subject it is better to operate such a patient with intravenous sodium pentothal anaesthesia, which is the ideal general anaesthetic for ophthalmic surgery. Needless to say that intravenous anaesthesia is not to be undertaken lightly and as a routine. We have operated on such cases with rectal anaesthesia,—sodium bromvthol,—the great advantage being that the patient continues to remain quiet for 4 to 6 hours after the operation. However, we have now limited the use of this type of anaesthesia only for intraocular operation in the insane.

The *kind of eye* is the next consideration. The bulging eye is the treacherous. The eye-ball itself may be large as in myopia, or there may be exophthalmos from a thyroid disfunction. When the speculum is introduced and the outer canthus appears to stretch tightly across the outer side of the eyeball, an external canthotomy is definitely indicated. A routine canthotomy as is the practice with some surgeons is unnecessary, but when indicated as stated above it must not be omitted. It distinguishes the careful surgeon who tries to judge the merits of each case from the mechanical one who follows merely a set routine. As opposed to the prominent eye, the deep-set eye is literally speaking an

eye where nothing seems to go wrong. You may have committed all the sins in the technique of cataract operation yet the deep-eye suffers the insults almost without a murmur. This is no reason to be purposely unmindful about such eyes, but such an eye should inspire the surgeon with that added confidence in the handling of the knife which will make for the best possible result.

The condition of the opposite eye next calls for scrutiny. It has been our experience that the patient who has had his cataract removed from one eye; extracapsularly, usually does not go through the ordeal on the second eye unscarred. Always expect more complications on the second eye to be operated, particularly if all has not gone well with the first operation.

CLINICAL EXAMINATION OF THE EYE.

1. *Maturity of Cataract:*

The belief that no cataract should be operated on until it is completely ripe has taken so firm a hold on the lay mind that it is difficult to convince them that the opinion on this point is different today. The objections to operate on unripe cataracts were (1) the frequency of post-operative iritis and (2) the frequency of after-cataracts. To avoid these complications an unripe cataract has got to be removed intracapsularly and the objections to intracapsular surgery are (1) it is a comparatively difficult operation especially with the occasional surgeon, (2) the frequency of vitreous escape, and (3) the frequency of deterioration of vision in spite of a good operation. Undoubtedly the surgeon who has to remove cataracts not too frequently should not attempt intracapsular extraction unless he has had a proper training and experience under a teacher in that type of surgery. A regular surgeon can remove cataracts intracapsularly with as great an ease as extracapsular extractions, so that the frequency of vitreous escape no longer remains an objection in his hands. As regards the third objection that the vision deteriorates even after a good operation has never been definitely proved. The objection has been raised by the extracapsular surgeon mainly and so statistical study of importance and scientific accuracy has been carried out to prove or disprove it.

Under the circumstances the intracapsular surgeon holds the advantage of being able to remove even unripe cataracts without much additional risk and bring relief from blindness earlier. Playing for safe cataract surgery the indication for removing an unripe cataract would be to advise an intracapsular operation when the patient's and his family's very existence is precarious. Imagine the plight of a middle-aged clerk with unripe cataracts, who is threatened with dismissal because of the mistakes he makes in the accounts of his firm, who is the only earning member of his family and who is asked by his surgeon to report month after month till his cataracts are ripe. Imagine in a similar strain the plight of a widow maintaining herself all alone and nobody to look after her, or the poor farmer who has travelled many miles to get his cataracts removed not knowing that they are not completely ripe. Their disappointment is acute

if an operation is refused. Today on the subject of maturity of cataracts for extraction urgency is considered the primary consideration. We advise operation whenever the vision has dropped so much that the patient finds it difficult to attend to his daily needs, even though the cataract is not fully mature.

2. *Reaction of the pupils and projection.*

These tests give an idea of the functional capacity of the retina behind an opaque lens. Where the reaction and projection are absent, naturally no operation is indicated as it means total atrophy of the retina and optic nerve, whatever the cause. Also with incomplete projection and a sluggish reaction the prognosis has to be guarded. A rigid contracted pupil which does not readily dilate under atropin is another sign of ill import. It may mean a previous attack of iritis with posterior synechiae or a rigid pupil which interferes with delivery of the lens. Posterior synechiae call for their separation with an iris spatula prior to delivery or an iridectomy. A rigid pupil can best be dealt with by cutting the sphincter below at the 6 o'clock position.

3. *Fundus of the opposite eye.*

Whenever possible this examination will give an idea as to the probable condition of the retina in the eye to be operated and trouble may be anticipated accordingly if there are gross retinal lesions, e.g. high myopia, retinchoroiditis, vascular sclerosis, detachment of retina, etc.

4. *Tension.*

Cataract with glaucoma presents two very disturbing problems. In one case the swollen lens itself is the cause of glaucoma and in the other cataract is a produced in an eye already the subjected of sub-acute or chronic glaucoma. When glaucoma is due to an intumescent lens, should an operation for glaucoma be done first and then the cataract be extracted or should the lens which is the cause of glaucoma be removed first? It stands to reason that the cause of the glaucoma should be removed first, and our experience bears this out. If the tension comes down by medical means there is no doubt that the lens should come out as soon as possible after that when a broad peripheral iridectomy must be done at the same time. Even when the tension does not come down we have found that the end result is better when the cataract is removed along with a broad iridectomy at the same time than when the cataract extraction follows a preliminary glaucoma operation. One reason for this is that the swollen lens gets easily traumatised while doing any operation for the relief of tension because of the very shallow anterior chamber, and it is inviting trouble to leave such a traumatised lens behind. The second difficulty is of making an adequate incision with such a shallow anterior chamber. In such cases it is best to make an incision at the 12 o'clock position with a keratome and then enlarge the incision by cutting cornea along its circumference with incision-enlarging scissors. The lens must come out extracapsularly because the size of the lens precludes intracapsular surgery as there is too much

danger to the safety of the vitreous. However, recently in three cases we have been able to express such lenses out intracapsularly by Smith's method with gratifying results.

The considerations are difficult when there is chronic or subacute glaucoma and cataract is maturing or a glaucoma operation has already been done and the cataract is fit for extraction. Glaucoma must always be the primary consideration, but the difficulties are what operations should be done—iridectomy, trephining, iris inclusion or cyclodialysis, and in which quadrant should the operation be done? The surgeon has got a wide choice of operations to pick from and it is best left to the surgeon's commonsense and experience. We do a trephining or an iris inclusion operation at the 12 o'clock position and remove the cataract through a corneal incision in front of the filtering scar without disturbing it. Other alternatives would be to extract the cataracts from an outer or lower corneo-scleral incision if the filtering scar is at 12 o'clock or plan the glaucoma operation at the 6 o'clock position or at the outer pole of the cornea. Naturally the sites for the two operations should not lie exactly over each other.

5. *Adnexa of the eye.*

Any pyogenic infection of the conjunctiva, lids or the lacrimal sac must be sought out and treated before undertaking an operation. With some surgeons it is a practice to do a bacteriological culture of a conjunctival smear in every case as a routine—a highly scientific practice which is very commendable. However with the mass of work in India, and the comparative rarity of sepsis after the usual preliminary measures in antisepsis and asepsis, with the added help of sulphonamides and penicillin at our disposal today, such an extreme precautionary measure seems a little wasteful. However any frank discharge from the conjunctiva, or a "stye" in the lids and above all a regurgitating lacrimal sac are definite contraindications for immediate surgery. Even after treatment a culture of the conjunctival smear is justified in these cases. With sulphonamides given orally and penicillin locally, such conditions come more rapidly under control than in presulfonamide days when one had to wait for nearly three weeks before operation could be undertaken.

The 'night-pad' test in doubtful cases is a simple precautionary measure of value. To both the eyes eye-pads and a bandage as applied and kept overnight. Next morning the pads are examined and the quantity of discharge determines any precautionary antiseptic measure required. Before the application of the pads the conjunctiva is not to be treated with silver or washes with perchloride of mercury solution, as these measures themselves will cause a profuse discharge and vitiate the judgment of the surgeon.

Syringing of the lacrimal sac as a routine on the day before the operation is still the best precautionary measure against post-operative sepsis. Should every obstructed sac be removed? Where there is definite regurgitation of muco-pus from the sac dacryocystectomy followed by local

penicillin therapy for a week should be done. Where there is only obstruction found by syringing, and the patient is not particularly complaining of watering, the sac may not be removed but daily syringing of the sac twice a day with a 1000 units per c. c. solution of penicillin for two days and penicillin eye-ointment at bed-time is sufficient to render the conjunctival *cul-de-sac* sterile for operation. Instillation of penicillin drops should be continued throughout the dressing period.

6. *Examination of the Blood-pressure :*

The eye has an intraocular pressure of about 20 mm. of mercury. This means that whenever an eye is opened the tension and the hydrostatic pressure within the eyeball and outside the retinal and choroidal vessels, drops suddenly by 20 mm. Intraocular vessels can withstand this sudden severe drop if the pressure inside them is about normal and the vessel-walls are healthy. With a higher pressure inside them coupled with a diseased state of the vessels which is generally found in the habitually hypertensive, the blood-vessels can ill-withstand this sudden drop. An intraocular hæmorrhage which sometimes becomes of the expulsive type results, for which even enucleation of the eyeball may have to be considered. Upto 180 mm. systolic we consider safe for intraocular surgery. Anything more than that requires a phlebotomy. Anything from 200 to 500 c.c. of blood are required to be removed to bring the pressure down to about 175, and the operation is proceeded with immediately after. Even then such eyes stand the operation poorly as a rule and one may expect to come across such complications as keratitis, hyphema, prolapse of the iris and later on glaucoma.

7. *Examination for foci of infection :*

This is perhaps the most treacherous part in intraocular surgery. A hidden focus of infection very often gives rise to iritis on the day the patient is about to be discharged from the hospital. But when we see the terrible state of the condition of the teeth in most hospital patients and the average good result after cataract surgery one wonders whether the condition of the teeth is worth giving a thought to, and whether removal of visibly infected teeth or a total clearance in pyorrhea alveolaris is indicated before intraocular surgery. Even if such is the case what about the invisible, often painless apical infection of teeth which are the worst as far as postoperative inflammations are concerned? It is practically impossible to do a routine X-Ray examination of all the teeth and of the nasal accessory sinuses in every case. The sensible thing to do is to prevent infection by a routine use of sulfonamides by mouth 8 days before the operation, and continue it in a smaller dose throughout the hospitalization period. If inflammation still takes place then a thorough search for any focus of infection is made, and the teeth and sinuses X-rayed if necessary. If however one eye is operated upon and lost it is necessary to make a complete search for any such focus before operating on the second eye.

LABORATORY AND BIOCHEMICAL EXAMINATIONS.

1. *Examination of Urine :*

Usually this is done for determining albumen and sugar which even when found are not contra-indications for operation. In cases where the sugar-content of the urine is high, it is best to control it by dietetic measures and insulin and continue doing so far at least a fortnight after the operation.

A small amount of albumen is of no consequence, but a larger amount though by itself is not a contra-indication demands an explanation of the cause of such albuminuria, e.g., a moderate amount of albuminuria with a high blood-pressure may mean failing kidneys in a case of malignant hypertension, where it is best to stay the hand. Presence of pus cells in the urine is a definite contra-indication and requires to be treated before operation is undertaken.

2. *Kahn Test :*

With the bulk of work we are overwhelmed with in India routine serological examination becomes prohibitive. However when post operative inflammation has taken place or the patient has only one eye, particularly when the fellow eye has been lost after an operation the test is definitely indicated. If the test is positive the patient is put on one course of sulfarsenol injections and the operation may then be done even though the Kahn test remains positive. If the test is negative, but the patient gives history of syphilis it is best to put him on arsenicals prior to operation.

3. *Dermal Hypersensitivity Tests :*

Our experience of post-operative iritis has taught us that the most common cause of this is an allergic state of the subject to tuberculin, lens protein and uveal protein, in the order of frequency. It means that previous to the operation the patient has received into his body these proteins. He becomes hypersensitive to one or other of them, and when the trauma of an operation is inflicted this anaphylactic reaction is precipitated. In the case of lens and uveal proteins the question does not arise at the time of the first operation usually because the lens protein enclosed in its capsule and the uveal protein undisturbed and uncut do not act as-allergens. The liberation of lens protein from its capsule or the disturbance of the uveal tissue after an operation on one eye may sensitise the patient to either or both of them after the operation and the anaphylactic condition may not develop until after the eighth day of the operation. It may even take place as long as 3 months after the operation and in rare cases even after 1 year.

The second eye, however, is already sensitised by the operation on the fellow eye and will show the anaphylactic reaction earlier after the trauma of the operation. The routine determination of lens and uveal dermal hypersensitivity on our part has revealed to us some cases with positive dermal reaction which after the operation on the eye have developed severe post-operative iritis. It is possible to desensitise these

lens and uveal sensitive cases previous to the operation with small doses of lens and uveal protein and thus control this variety of post-operative inflammation.

In the case of tuberculin hypersensitivity even the first eye can develop post-operative inflammation. Such an inflammation can easily be anticipated by one or other diagnostic tests for tuberculin. We favour particularly Volmer's tuberculin patch-test. A positive result is always an indication to desensitize against tuberculin but a negative result does not mean that the patient will not get post-operative inflammation, because in some cases the hypersensitivity is not shared by the eye and the skin equally. He may get an inflammation in which case the therapeutic test injection of tuberculin can alone establish the cause. The therapeutic test as carried out by us is to inject 0.05 c.c. of a 1 in 100,000 dilution of old tuberculin intradermally. If on the following day there is some improvement in the local condition or in the pain or sleeplessness, we consider the test positive and naturally it is justified to repeat these injections once every fifth day. If the condition is worse it is interpreted as a focal reaction, and the next dose has got to be considerably reduced, e.g., 0.05 c.c. of a 1/1,000,000 dilution. If there is neither improvement nor worsening, double the dose is given on the fourth day, i.e. 0.1 c.c. of 1/100,000 dilution. If no improvement takes place even after this a 0.2 c.c. of 1/100,000 dilution is given after four more days. Even then if no improvement takes place then the test is negative. When we mean improvement the improvement must be definite and almost immediate (within 12 hours).

SUMMARY.

An operation on the eye is an adventure in an unknown realm. The hazards of some mischance either at the time of the operation or after the operation are many. Besides adopting the usual antiseptic precautions it is possible to minimise complications by an intelligent inspection of the patient, a set routine clinical and laboratory examination and dermal tests against tuberculin, lens and uveal proteins.

Extracts.

EXCHANGE OF BLOOD SAVES INFANT LIVES

By :—EGON LARSEN.

The simultaneous draining of all blood from the bodies of weak and unhealthy newly born babies and its replacement by a new supply from a donor is the latest development in blood transfusion. It has saved the lives of many infants who normally would not have survived.

Mr. and Mrs. Jones had had three children, two of whom had died shortly after birth; one child only had survived. Now Mr. Jones was expecting another child. Would it share the same awful fate of her two other children? Why were the Jones' children less healthy and strong than other children, and was it the fault of the parents?

Doctor examined the parents' blood. When Mrs. Jones entered the City Hospital, Chester, in the North of England, for the birth of her fourth child several specialists were waiting to save the baby's life.

Immediately after little Margaret's birth, the transfusion was begun. It consisted of an almost complete transfusion of the child's blood. Margaret's body was placed on a table, padded with cotton wool, and the doctors, watched by some 25 of their colleagues, ran a new supply of blood from a donor into the infant's body; at the same time her own blood was painlessly drawn away. The whole "operation" was completed within an hour. The blood of an unknown life saver ran through the child's veins, and today she is as healthy and grand a baby as any in the world.

Extensive Facilities.

Margaret is only one example of the many children in Britain whose lives have been saved immediately after birth by this latest advancement in blood transfusion. A number of provincial hospitals have already carried out the exchange transfusion, as it is technically known, when necessary, and the London local health authorities have installed facilities for the operation in several hospitals. One, at Lewisham, has dealt with 10 cases since December, 1947.

The pathologist explained to me that in two cases the transfusion proved unnecessary; in seven cases it was successful but one child died because the disease was too far advanced when he was born.

Blood-group research is one of the youngest branches of medicine, and the discovery of the so-called "Rhesus-Factor" is itself only two years old. It was first shown in 1940 that, if the red cells of a Rhesus monkey were injected into a guinea-pig, anti-bodies were produced which would agglutinate not only the Rhesus monkey red cells but also the red cells of 85 per cent of white people. A similar process took place, it was found, with patients who had undergone a blood transfusion and, unexpectedly, had reacted unfavourably to it. The research proved

that the reason for this lay in the fact that there existed two human "Rhesus-type" red cells of the white race:

Rh-positive-type, i. e. 85 per cent agglutinated and

Rh-negative-type, i. e. 15 per cent not agglutinated.

It was next discovered that some cases of infant mortality were due to the incompatibility of the parents' blood-groups. The distribution was found to be as follows:

Mother	—	Rh-negative
Father	—	Rh-positive
Children	—	Rh-positive

In many cases, the maternal serum contained antibodies which agglutinated the red cells of the father and of the children. Frequently the first child of such parents was normal but from the second child onwards, the dangerous effects usually made themselves evident.

Imminent Danger

One child in every 250 born in Europe and America is exposed to this danger, and until recently, 50 per cent. died, that is one in 500. The symptoms are usually jaundice or anæmia developing rapidly after birth. But once the symptoms have developed it is often too late. The time limit for saving the baby's life by exchange transfusion is from 12 to 15 hours after birth.

It is for this reason that doctors are endeavouring, as far as possible, to carry out a pre-natal examination of mothers, in order that they may have everything ready for the transfusion to take place immediately after birth. It is assumed that the embryo suffers most from the incompatibility of the parent's blood during the last month of pregnancy and the child therefore is ill when born.

The technique of the exchange transfusion operation—actually only about 85 per cent of the child's blood is replaced by that of the donor; the remaining 15 per cent is to a certain degree dissolved throughout the body—comes from America and was created by Dr. Diamond of New York; several modifications and improvements, such as the prevention of clotting of the baby's blood, however, have been added to the system in Britain to ensure still greater success of the operation. In all not more than one pint is usually necessary for the exchange.

Racial Variations

Blood-group research has not yet solved all the anthropological and biological aspects of the problem. The classification of human beings in Rh-types, however, appears to be an accomplished fact; the Asiatic races are, almost without exception, Rh-positive, while Europe and America with their mixture of races, have 85 per cent positive and 15 per cent negative as mentioned above. It is, however, surprising that the Basques have a much higher proportion of Rh-negative.

The combination of a Rh-negative wife with a Rh-positive husband forms about 12 per cent of European marriages, but only in about one in 20 of such marriages does trouble arise; the first baby is usually normal,

and "Erythroblastosis" to give its technical name—only sets in during later pregnancies. In a few women trouble arises even in the first pregnancy; this can frequently be attributed to a previous transfusion.

As for as present day science is concerned, the exchange transfusion is the best way of saving the child from the fatal influence of the antibodies formed in the mother's blood. The organisation of this life-saving service is one of the greatest humanitarian tasks assumed by British medicine.

PENICILLIN IN TETANUS.

BY R. S. DIAZ RIVERA AND BERIO SUAREZ.

The value of the tetanus antitoxin is limited once the symptoms of the disease are well established and when an overwhelming amount of toxin is fixed by the cells of the central nervous system the invariable outcome is death.

Signs of a poor prognosis are:—short incubation period, the rapid appearance of muscle spasms after onset, frequent and severe convulsions and a poor response to sedation. The authors studied 59 cases of tetanus. Incubation period varied from 2 days to 3 months. Various kinds of lesions were responsible for tetanus, puncture wounds due to rusty nails, splinters of wood, broken glass, tins, rusty wire, chiggers, lacerations, abrasions, ulcerations, incised wounds, abortion, hypodermic injection, anal fissures, carious tooth, extracted tooth, abscess, burn, contusion, human bite and a surgical wound.

In 56 cases the disease was generalised.

The most frequent clinical observations on admission were stiffness of the jaw, trismus, dysphagia, rigidity of the neck, abdominal rigidity, restlessness, back pain hyperactive reflexes, spasticity of limbs, fever, stiffness of the limbs, opisthotonus, convulsions, oppression in the chest and headache.

On admission every patient received 1,00,000 units of antitetanic serum intravenously after a negative reaction to a dermal test for sensitivity. In the great majority of cases 1,00,000 units were given intramuscularly as well. If a local wound was detected it was debrided and excised after infiltration of the surrounding tissues with 20,000 units of antiserum. The lesion was left open and treated with hydrogen peroxide compresses. Daily intramuscular injections of 5,000—10,000 units of antiserum were given for the next 8 days. Dehydration was combated with 5 per cent glucose in normal saline. Phenobarbital sodium was given hypodermically in doses of 2 grs. or more every two or three hours for the control of convulsions. In some cases ether in oil was given per rectum. Penicillin in doses of 15,000—20,000 units was given

intramuscularly every three hours. The mortality rate was 17.6 per cent. Such a low mortality rate was achieved by penicillin because even in the best institutions mortality rate without penicillin is as high as 50-60 per cent. Favourable action of penicillin is due to its action in hindering the growth and multiplication of tetanus bacillus, thereby eliminating or paralyzing the production of the toxin.

Penicillin also prevents or cures complications like pneumonia. But it is useless in the prevention of convulsions and in the elimination of the free toxin in the body or the already fixed toxin in the cells of the central nervous system.

(Abstracted from the J. A. M. A.)

(18.19.48 pages 19-194)

THE MODERN TREATMENT OF PNEUMONIA.

BY R. J. TWORT, M.A., M.D.M.R.C.P.

The modern chemotherapy has remarkably lowered the mortality rate in pneumococcal pneumonias. The overall death rate is under 5 per cent (Humphrey et al 1948).

General management of lobar and broncho—pneumonia of coccal infection is identical, in the latter type as the course is of longer duration nursing is more important. Nursing care consists in absolute rest, conservation of the patient's energy; good ventilation, adequate light clothing and bed clothes, propped up position to relieve dyspnea, light solid and fluid diet, plenty of fluid. Bowels are moved with simple enemas. At the onset of the disease morphia may be injected to relieve pain and to ensure sleep. Later on chloral and bromides or the barbiturates are used for sleep. Kaolin poultices are used for pleural pain.

Sulfamezathine is the drug of choice. For an adult the usual initial dose is 2 gms. orally for the first few doses, followed by 1 gm. four-hourly. Total average dose is from 25-30 gms. In pneumococcal pneumonias the temperature usually falls by crisis within 48 hours of the initial dose and the drug is continued until the temperature has been normal for three days. In serious cases, intravenous dose of sodium salt may be used at the onset.

If the temperature has not been appreciably lowered after 48 hours of treatment, it is better to supplement or replace sulfonamides with penicillin. Severe cases should receive sulfonamides and penicillin. In congestive heart failure or nephritis cases only penicillin is to be used for pneumonia. Penicillin is the drug of choice for staphylococcal pneumonia. In adults 60,000 units are given every three hours and continued for 5-6 days.

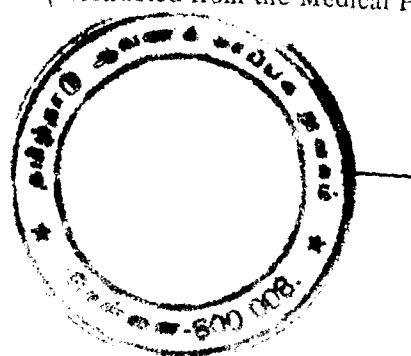
Penicillin in oil and beeswax in pneumonia is of doubtful value. For cyanosis, oxygen is used. The flow of oxygen is regulated at 4-6 liters per minute.

For peripheral vascular failure, the patient is kept warm, frequent drink of warm glucose solution are given and injections of coramine are repeated frequently.

The commonest complications are sterile or purulent pleural effusion in 5—4 per cent of cases. In pyrexia persists in spite of adequate chemotherapy, or recurs after the crisis, empyema should be suspected. X-ray is helpful in diagnosis. Treatment consists in repeated daily aspiration of the pus followed by the intrapleural injection of a large dose of penicillin e.g. 2,50,000 units. Intramuscular penicillin is continued in full doses. This treatment usually succeeds. Intercostal drainage or rib resection may be required in some cases. Breathing exercises should be started as soon as possible to help re-expansion of the lung.

(Abstracted from the Medical News)

(Abstracted from the Medical Press, Nov. 17, 1948, p. 407-409.)



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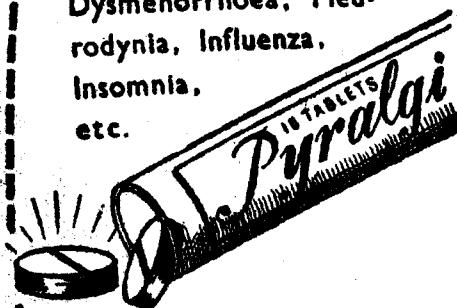
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