MEDICO-SURGICAL SUGGESTIONS

Vol. XIV. JUNE 1945. No. 6.

MEDICAL LICENTIATES

for humanity

This great World War is now reaching its final phase. Achieving the downfall of Japan will inevitably bring its toll of casualties. These wounded men will need all the help, care and sympathy that the medical profession can give them. Many hundreds of Army doctors will, through their service to the wounded, gain the experience which will give them even greater skill to use in the service of humanity when peace returns. You should volunteer now for service with the Indian Army Medical Corps.

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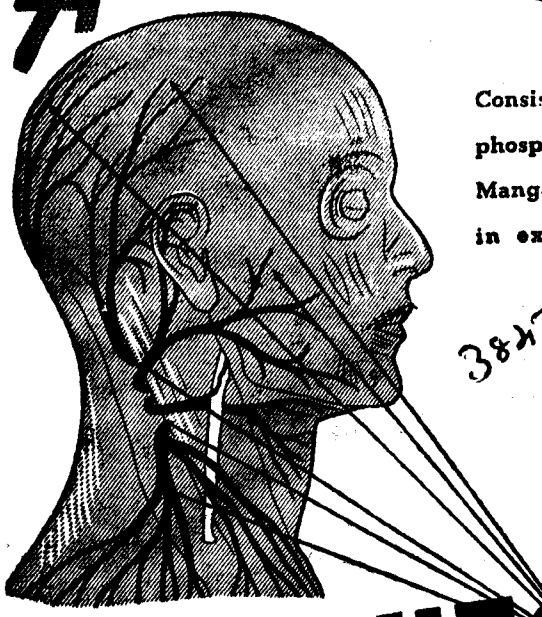

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these reactions. Invariably a patient with septicæmia will have a higher temperature as soon as he receive the transfusion. If a patient with chronic malaria receives the transfusion, he is more likely than any one else to exhibit pyrexia. The underlying cause is probably that the blood and other fluids cause a reaction whereby the already existing pyrexial elements of the patient are thrown out in circulation with resulting imbalance of thermotaxic centres. The cause therefore lies in the patient and not in the technique or the solution. These are therefore really incontrollable and it is therefore said that we can always account for incidents up to one per cent and further, when it is said that these should be of the mildest degree, it is only meant that even in these pyrexial cases, which amount to one per cent of the cases requiring transfusion, every minor detail in technique will contribute to the production of the reactions.

Another cause of reactions that can be considered as a predisposing one only, is a too rapid rate of transfusion. One of the papers discussing this matter has already been published in this journal and it should be therefore enough to pass over it briefly. An ideal transfusion is a drip transfusion at the rate of 40 drops per minute *i.e.* 1 c.c. per hour per every pound of body weight or roughly one pint in four hours. This ideal speed is always recommended in cases of anæmias uncomplicated by hæmorrhage, for here the idea is not of an emergency but that of restoring the patient's wavering resistance. For anæmic patients with hæmoglobin less than 35 per cent (Haldane standard), even a slower rate at the rate of 20 drops per minute is recommended. However, where the question is of tiding over the emergency as in hæmorrhage, the first pint of fluid should be run in 10 to 15 minutes and the second pint introduced a bit slowly. Here the question is of rapid restoration of the blood volume and one cannot delay the transfusion. Again the rapid flow does not always produce a reaction. An injured person is generally healthy. Rapidity only matters when there is cardiac weakness as in anæmia. Here the same increased blood volume works against the weak myocardium which is unable to cope with the strain loaded on it. The patient will therefore show marked discomfort and minor constitutional symptoms and often one sees rigors which stop immediately on slowing the speed of transfusion. The speed therefore in these cases should be sufficient to allow plasmaphoresis in the tissues, so that the total blood volume remains the same.

Temperature of the transfused fluid is an oft neglected cause. It seems difficult to realise as to how often we consider it as a mere fad to look at the temperature of injection fluids. This is not a fad but is one of the essentials. It works both ways. Fluids colder than blood and warmer than blood will both cause pyrexia. In the

case of colder fluid, the rigor and pyrexia are exhibited to warm up the injected fluid. In the case of warmer fluid the fever is due to the products of hæmolysis caused by deleterious effects of overheating the patient's blood. All salines, glucose solutions etc., should therefore be raised to 40° C by placing them in a bowl of hot water at 40° C. The temperature will necessarily come down to 36·5° C or 37° C while the fluid actually enters the veins. This is essential even in small injections upto 50 c.c. This is very very essential in case of blood transfusion because of the phenomenon of cold agglutination. The donor's or the patient's cells may agglutinate in cold just as it happens in paroxysmal hæmoglobinuria in stored blood, kept at —3° C, it should always be allowed to warm itself at room temperature by keeping it out for about two hours. This blood must then be used up or thrown away. In addition to this in case of rapid transfusions, the blood should be warmed by dipping the bottle as well as the last few inches of the tubing in warm water at 40° C. While the transfusion of a large amount of cold fluid is a very unpleasant one, the danger of overheating is still more great and in no case warming above 40° C. is ever tolerated. Best way of knowing the proper temperature is that the patient should not feel the flow of fluid in his veins.

Stored blood hæmolyses after about three weeks. The out of date or incompatible transfusion is fatal and there will always be pyrexia. Similarly, the blood when contaminated grossly and if kept at room temperature even for some time, will be a pure culture of pathogens or saprophytes, both of which will cause severe fever. This reaction will always carry the patient away rather than tide him over an emergency. Another factor in stored blood that causes pyrexia, is small fluffy clots formed within 24 hours. A wire gauze filter is always therefore necessarily incorporated in the transfusion set. In its absence ordinary gauze cloth folded four-fold is equally good.

Let us now pass on to the actual or exciting causes of these reactions. The cause of those reactions in most of the cases is described as "pyrogen". By this term we mean a substance which gives rise to fever but as to its actual identity, we are usually baffled. In fact, pyrogen is not one substance. It is a name to be used for a variety of substances. This thing called pyrogen exists in ordinary water, distilled water, boiled water, double distilled water, and in salt citrate and glucose: An infinitely small amount of this substance is sufficient to give rise to pyrexia. As low a concentration as will evolve 0·005 parts of albuminoid ammonia from 1000 c.cs. of distilled water will always produce pyrexia.

The pyrogen comes from various sources. The apparatus and the containers are a great source and that is why even best companies have been discredited under the false impression that the fault

lay in the fluids rather than in the technique. The imperfectly washed syringes, rubber tubings and metalic junctions are places where fine film of proteinous matter forms and dries. All these substances are soluble in water though it may be in a very very negligible amount. It is thus that this pyrogen which is in this case a nonspecific foreign protein, dissolves in water and gives rise to pyrexia. All apparatus used in transfusions and preparation of fluids for transfusions should, therefore, be scrupulously cleaned immediately after use in cold water and not in hot water. Each part is washed with soap and water. Rubber tubing should be avoided as far as possible. Wherever possible transparent rubber tubings should be used. A stout tape is passed through the tubing and worked to and fro just as the sewers are cleaned by large iron tapes. All clots will be thus dislodged. The apparatus is then boiled successively for five minutes in 20 per cent washing soda solution in tap water and in pyrogen-free distilled water. They should be sterilized in steam sterilizers by preference but in no case should they be dipped in ward or theatre sterilizers. The water in these sterilizers is abounding with pyrogenetic protein and apparatus boiled in them and dried will have a powdery film on the interior derived from pyrogen.

Now we have to consider the faults in the solutions. All solutions should be prepared from pyrogen-free distilled [illegible]. Another source of pyrogen is from the dead bodies of bacteria in the solution. The dissolved oxygen and carbon dioxide give sufficient food for flourishing of the bacterial flora, in presence of particulate materials like dust When these bacteria die out in sterilization, they impart sufficient pyrogenic protein to the fluids from their dead bodies. I will only briefly say as to how this solution should be prepared and kept.

First essential is pyrogen-free distilled water. Pyrogen is oxidizable and is detected by the following test. To 100 c.c. of distilled water and 10 c.c. of 10 per cent pyrogen-free aqueous solution of sulphuric acid and add 0·1 c.c. N/20 Pot. permanganate aqueous solution. Allow to boil for ten minutes and the water should retaiu its pink colour at the end if it is pyrogen-free. Ordinary doubled-distilled water contains pyrogen as much as the single distilled water. The proportion is reduced to harmless concentration only in the third distillation. This triple distilled water should be used fresh to be satisfactory. Water must be distilled in all glass distillery with block ground glass joints free of all rubber connections. Such sets of neutral pyrex glass, which automatically work on connection with taps are rather bulky, if not out of reach in the matter of cost, which comes to near Rs. 750. We have therefore, to fall back on ways other than triple distillation. Ordinary tap water contains dissolved chlorides, sulphates, bacteria and

nitrogenous materials. Each one of these impurities matters. The hardness should be previously softened by lime or soda. The dissolved carbonates distil over causing an acid reaction in the distilled water. They should therefore, be neutralized by previously boiling the water with dilute sulphuric acid, till the reaction of water to be distilled is neutral to phenol-red or phenolphthalein. This is known as processed water and this should be distilled, Double distilled water made from this with ordinary distillery with rubber or metal connections is obtained. This distillation should be conducted where there are no fumes of volatile alkalies or acids in the atomosphere of the room. If this distillation has been done in the iron or copper still, the rust added provides particulate matter round which bacteria flourish. Only if these distilling stills are lined on the interior with blocked tin, will they then yield pyrogen-free water. Another device is also used. It seems that the proteins of pyrogen are coagulated in boiling and always float as surface film. As the watery vapour rises, grosser particles of this proteinous matter also rise out enmeshed or entrapped in current of steam and thus they distil over in the distilled water. To prevent this, traps are introduced to entrap these proteinous particles. Just as water in the still is being reduced, it require to be replaced and this replacement is automatically done by spraying of cold water in the still. Thus it is that up-rising steam is made to pass against the down-failing spray of water which allows only the actual vapour particles to distil over. The gross particles of protein rising from the surface film are compelled to go down again. The distillate is, therefore, pure pyrogen-free distilled water.

Alternatively, if we cannot provide for such an ingeneously constructed still, we may obtain double distilled water from processed water. To every 600 c.cs of such distilled water, 10 grs. of pulvis carbo animalis (animal charcoal) is added and the whole thing is shaken intimately for 15 minutes by clock. At the end, it is filtered out through a sintered funnel. This is by far the most rapid method of obtaining quick supplies of pyrogen-free water and is very efficient and the least expensive.

Even better than this. is the process, which I have evolved and which is as follows. Both distillations are done after the 600 c.cs. of water is mixed with 60 c.c of normal aqueous solution of Pot. permanganate or with 60 c.c. of normal aqueous solution of Pot. dichromate. Additions of 10 c.c. of 20 per cent sulphuric acid to this already processed mixture has an additional advantage of keeping the glassware clean which otherwise gets lined with heavy proteinous material. This process is unfailing and does not tax the patience. It involves negligible extra little cost and labour and is not as rapid as the charcoal method which scores over it only in rapidly,—but not in efficiency. Having obtained fresh pyrogen-free

distilled water by any of these ways and with all clean apparatus we have to prepare the solutions from chemicals. Howsoever refined and chemically extra-pure the chemical stuff is, it is unsterile and contains bacteria. Additions of chemicals to water again add traces of pyrogen. As soon as the chemical is added the solution is passed through asbestos Seitz filter which remove bacteria but adds particulate matter to the solution. The solution has, therefore, to be passed through a sintered funnel, which removes the particulate matter also. The resulting fluid is directly run into the screw-capped bottles which are immediately sterilized in small bulks in autoclave at 20 lbs. pressure for 20 minutes. Only carbohydrate solutions *i e.* glucose solutions do not stand this temperature because they caramelize or polymerize, and become toxic. This will always again give rise to pyrexial reaction. Solutions containing upto 25 per cent of glucose can be sterilised upto 10 lbs. of pressure for 15 to 20 minutes. The solutions containing upto 50 per cent of glucose should be sterilized upto only 15 lbs. of pressure for 20 minutes.

Alternatively when we have no such equipments as sintered funnels or Seitz filters, we may as well filter the solutions through grade IV thick filter papers folded twice The filtration should be done again and again through the same filter papers for at least one dozen times. The resulting fluid is run directly in screw-capped bottles for sterilization, which should follow immediately.

Having prepared pyrogen-free solutions, I am going to add a few words about keeping them. They should not be kept with gauze or cotton plugs because they get contaminated. A rubber bung leaves a space between the bung and the rim of flask and therefore, invites contamination. Screw-capped bottles are the utensils of choice. They should be used freshly as far as possible. They should be kept in dust proof cupboards. They should not be jerked or invested. Once opened, they should be used up or thrown away.

Even in spite of all precautions should a pyrexial reaction be met with while transfusing slowing of rate is advised. If the latter fails to stop the reaction the injection should be discontinued. I am afraid to give an injection of adrenaline as is advised at this stage but I have never been sorry for injecting morphine gr. ¼ with atropine gr. 1/100 in these cases.

SUMMARY

There are various grades of these reactions. The reactions may be so severe as to carry the patient away, It may be mild causing minor constitutional symptoms or may be negligible.

Causes of pyrexia are many. Factors are discussed as predisposing and exciting ones. Speed factor is discussed in detail and an ideal speed of 40 drops per minute is advised. Temperature of transfused fluid should also be taken and adjusted to something between 37° C and 40° C. The dangers of rapid speed and overheating are brought out.

Reactions that arise out of storing of blood are also discussed. The faults in apparatus are pointed out. Ideal methods of cleaning the apparatus and methods of sterilization are given.

Faults in solutions are pointed out. Preparation of pyrogenfree water is essential. Properties and tests of pyrogen are discussed. Various mechanical and chemical devices used to obtain pyrogen-free distilled water are discussed in detail.

Methods of preparations of solutions from pyrogen-free double distilled water are noted. Elaborate ideal technical details are reviewed and practical, cheap and universally adoptable methods are given.

Methods of sterilization of these solutions are given and ideal storage conditions are advocated.

A word or two about treatment of these reactions are given.

(*Journal I.M.A., May 1945*).

Extracts.

SULFADIAZINE IN THE TREATMENT OF BUBONIC PLAGUE

BY P. M. WAGLE. M.D., D.P.H,

The drug was tried in 90 cases of plague in the Infectious Diseases Hospital at Poona during the period lasting from middle of November 1943 to middle of February 1944.

DOSAGE.

For comparative purposes equal number of cases were treated with sulfathiazole.

Sulfadiazine. An initial dose of 4 gm. was followed by 2 gm. four hours later. One gm. was then given every four hours. Serious cases were given 6 gm. as the initial dose, 2 gm. four hours later and 1—1.5 gm. every four hours subsequently. This gave a blood concentration of over 10 mg. per 100 ml. 75.7 per cent of the cases in the first group and between 15—20 mg. per 100 ml. in 86.6 per cent of the cases in the second group. Half the initial dose was given intravenously and the rest orally. A 5 per cent solution of sodium salt was used.

Sulfathiazole. An initial dose of 2 gm. was followed by 2 gm, four hours later and then 1.5 gm. was given every four hours till the end of first twenty four hours. One gm. was then continued four hourly on subsequent days. In very serious cases the initial dose was 4—6 gm. which was followed by 2 gm. four hours later, and then 1—1.5 gm. every four hours subsequently. Half the number of cases received 2 gm. of sulfathiazole intravenously as a 5 per cent solution of sodium salt in the beginning. The two drugs were continued until the patient was afebrile for at least 48 hours with distinct improvement in general condition.

This dosage gave a blood concentration of 5 – 10 mg. per 100 ml. in 63 per cent and 1 –5 mg. per 100 cc. in 37 per cent of the cases in the first series. In the second group which received a higher dosage 5.5 per cent of the cases attained a concentration of 10 15 mg. per 100 ml. 69.4 per cent a concentration of 5—10 mg per 100 ml. and the remaining a concentration lower than 5 mg. per 100 ml.

RESULTS.

(1) All cases. The mortality rate in all the 180 cases without making any differentiation into septicaemic or non-septicaemic cases was:

(*a*) with Sulfathiazole	33.7	per cent.
(*b*) with Sulfadiazine	21.9	per cent.
as compared to previous		
(*c*) Iodine (intravenously)	58.1	per cent.

(2) Septicaemic cases. The mortality rate was:—

(*a*) with Sulfathiazole	52.8	per cent.
(*b*) with Sulfadiazine	35.8	per cent
as compared to previous		
(*c*) Iodine (intravenously)	92.3	per cent.

If moribund cases are excluded the result were:—

(1) All cases

(*a*) with Sulfathiazole	21.3	per cent.
(*b*) with Sulfadiazine	12.3	per cent.
as compared to previous		
(*c*) Iodine (intravenously)	53.6	per cent.

(2) Septicaemic cases.

(*a*) with Sulfathiazole	37 5	per cent.
(*b*) with Sulfadiazine	20.9	per cent.

as compared to previous

(*c*) Iodine (intravenously)	91 0	per cent.

Toxic reactions. Were few and mild, 15 cases treated with sulfathiazole and 6 cases treated with sulfadiazine developed toxic reactions. Patients were given plenty of water to ensure an output of at least 1,500 ccm of urine daily. Alkalies were also given as a routine.

—*Indian Medical Gazette, December, 1944.*

SIGNS AND SYMPTOMS OF IMPENDING CEREBRAL HEMORRHAGE

By R. D. Taylor, M.D., & Irvine, H. Page, M.D.,

The signs and symptoms of essential hypertension are referable to the following systems :—

(1) Nervous system such as transient paresthesia-aphasia, temporary motor paralysis, vertigo and syncope, memory defects and blind spots. These are due to impaired cerebral circulation.

(2) Renal System such as headache, uræmia convulsions etc. due to renal failure.

(3) Circulatory system such as congestive heart failure, hypertrophy, coronary thrombosis or myocardial infarct. retinal hæmorrhages

The authors studied 42 patients with essential hypertension to find out the cause of death among these patients. Following conclusions were reached :—

(1) Cerebral hemorrhage	...	47.5 per cent
(2) Congestive heart-failure	...	25 per cent
(3) Coronary occlusion with myocardial infarction	...	10 per eent
(4) Renal failure	...	5 per cent
(5) Causes other than hypertension	...	12.5 per cent

Among this group of 40 persons those dying of cerebral hæmorrhage were 19 (47.5 per cent) and they presented five signs and symptoms consistently.

(1) Severe occipital or nuchal headaches.
(2) Vertigo or syncope.
(3) Motor or sensory neurologic disturbances.
(4) Nosebleeds and.
(5) Retinal hemorrhages in the absence of papilledema and exudates.

The average age in those dying of cerebral hæmorrhage was 46.8 years and in others 50.3 years. The mean duration of essential

hypertension in those died of cerebral hemorrhage was 7.0 years (range 4—12.5 years) and, of the others 9.0 years (range 4—19 years).

(1) Headache. Out of 19 who died of cerebral hæmorrhage 18 complained of headache while of the rest of 21 only 16 complained of headache. 12 out of 18 who complained of headache referred it to only nuchal and occipital region. In the group of persons dying of cerbral hæmorrhage, the headache was of severer type.

(2) Vertigo and syncope. Vertigo was considered only when the world seemed to turn about the patient. Simple dizziness and light headedness were not considered. Syncope included temporary "blackouts" and complete loss of conciousness. One or both of these symptoms were present in 18 of 19 patients with cerebral hemorrhage and these were fairly severe. Only 4 of the other group offered this as a complaint.

(3) Moter and sensory neurologic disturbances. These were present in 17 out of 19 patients dying of cerebral hæemorrhage. These complaints ranged from recurrent numbness and tingling of the fingers of face to convulsive seizures and hemiplegia lasting 2—36 hours. Other symptoms in this group included diplopia, temporary or permanent loss of visual field, transient aphasia and amnesia and permanent muscle weaknoss or sensory defect. In the other group of 21 persons of essential hypertension dying from causes other than cerebral hæmorrhage only 2 complained of any nervous phenomena and that of very insignificant nature. The duration of life from the appearance of the first neurologic sign averaged 1.5 year's six months shorter than the mean span of life dated from any other complaint common to the group of cerebral hæmorrhage cases.

(4) Nosebleed. Nine of those who died of cerebrai hæmorrhage reported nosebleeds. Five of the 21 other patients experienced nosebleeds.

(5) Retinal hæmorrhages. 16 out of 19 subjects with cerebral hæmorrhage had evidence of retinal hæmorrhage while only 2 of the other group developed these lesions.

Arterial Blood pressure. The arterial blood pressure of those patients who had strokes were only slightly higher than those in the other group. The mean of the blood pressure in the former group was (210/124 mm of mercury (range 180/100—260/140 mm mercury) and the mean of the other group, 196/117 with a range of 160/106—250/150.

Length of Life. After First Suggestion of Mode of Death. Those who died of cerebral hæmorrhage lived an average of 2.1 years (0.8 5 years) and the others 2 6 years (0.6—6 years) after the first symptom of the ultimate cause of death.

The Journal of American Medicai Association.
February 17, 1945.

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Indian Army Medical Corps

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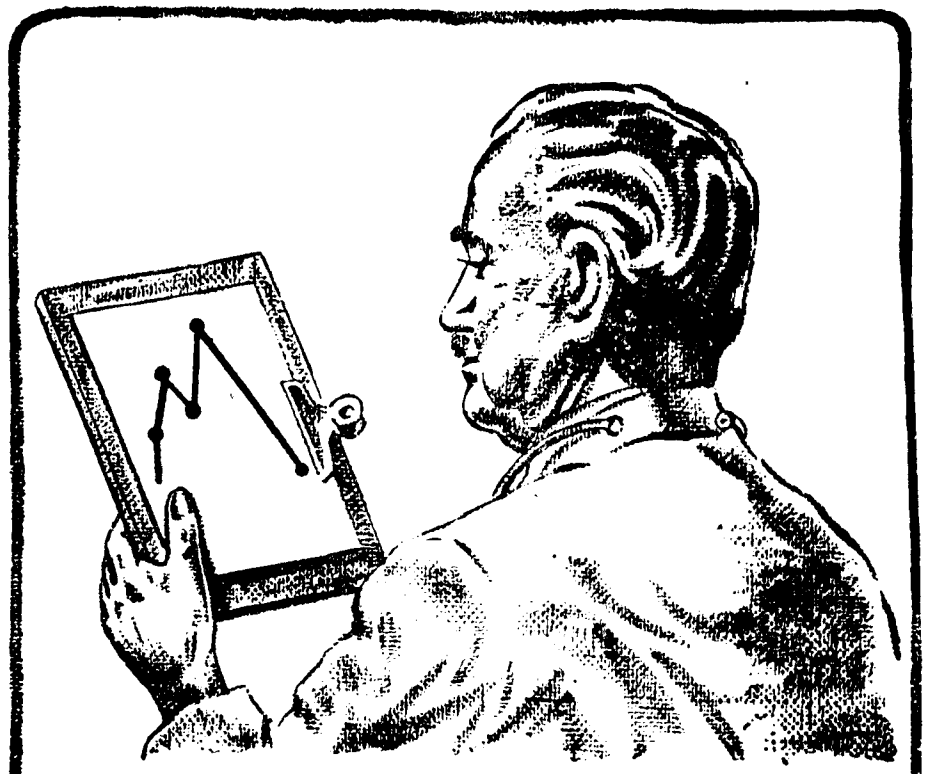

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Vol. XIV. JULY 1945. No. 7.

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MEDICO-SURGICAL SUGGESTIONS
(Established 1932.)

VOL. XIV JULY 1945 NO. 7

BREECH PRESENTATION AND ITS MANAGEMENT

By Dr. Chamanlal Metha, M.B.B.S., L.M. (Dub.)
F.R.F.P.S. (Glas.) F.C.P.S.
Bombay Hospital for Women, Bombay.

I have selected the subject of Breech Presentation and its management because whenever one took up a case for confinement with the Fetus presenting by Breech, one was always worried over it and was anxious for a safe labour. Worries were fully justified because even though the incidence of Breech presentation was second to that of Vertex, it presented lot of difficulties in its management. This incidence varied from 2.3 to 3.3 per cent. This small incidence itself showed that it was not a normal presentation and as such would need your care in its management. This extra care became imperative when you knew that the fetal mortality in Breech ranged from 8 to 26 per cent and as high as 43 to 48.6 per cent when the children were premature. Again complicated and incomplete Breech presentations were also common. Breech with extended legs were common in primipara. If vertex was presenting in your case with careful antenatal care, you should not have much worry about it and when she went into labour you could leave her in charge of a nurse till the time the 2nd stage was already on its way. But your presence was constantly necessary in Breech from the beginning of the first stage till the child was born and patient was dressed up. To a busy obstetrician this constant presence by the side of the patient was very annoying because it upset his usual programme. To you the general practitioners this inconvenience should be still greater. How often you might have wished your case for confinement was vertex presentation rather than Breech ? As I told you there were reasons why you would not wish it to be Breech. These reasons were.

1. It was an abnormal position.
2. It had a big fetal mortality.
3. It had a high percentage of incidence of damage to the soft parts of the mother and of sepsis during purperium.
4. It brought on, in large number, premature labour. Percentage of premature infants was very high in Breech.
5. It needed your constant presence and kept you very anxious and worried.

The question is can we do anything to improve the situation, get better results and avoid the worries? Yes. We can. I am going to confine myself to showing you how this can be achieved with success. I have no intention of entering into the theories of a etiology of Breech presentation, neither am I going to discuss diagnosis of Breech, nor do I wish to show you how you can manage the labour in a full Breech presentation or complicated Breech presentations. I have not like Breech labour and I have almost completely eliminated it in my practice by careful management of Breech during pregnancy. The older obstetrician might boast of their skill in having successfully managed Breech presentation and yet except just a few, they have come to realise that if Breech could be eliminated from their practice they would be happy over it.

This I believe can be done, and the Breech can be converted into vertex during pregnancy by manipulation. These manipulations can be done in majority of the cases from the abdominal wall and is called the *External Version*. In majority of them this will be successful. It is only in a very few cases that one has to do this through both vaginal and abdominal gouts.

This method of management of Breech during pregnancy by external version, changing the Breech to Vertex, has now been accepted or recognised as the best method by obstetrician in all countries. When I began to work on it, this method of treatment was passingly mentioned in the next books and very few adopted it in their practice. I became enthusiastic over it. I presented my results to the Bombay Obstetric and Gynec. Society in 1936, and a lot of criticism was made by some of the senior obstetricians and when the article was published in the British Medical Journal I had letters critising my observations and even a reference in one of the British publication was made that they saw danger in what I advocated; but some of the American obstetricians who were in agreement with my observations and who were already practising this method stimulated a discussion on this subject by publishing their views and statistics. By the time, I presented another paper on the subject at the XVII All India Medical Conference which was published in the Journal I.M.A. and an extract of it was later taken in the Year Book of Obst, and Gyne. 1942 Edition, edited by late Dr. DeLee, this method of management of Breech by external version during pergnancy got universal recognition as the best method.

Results at my hands are very encouraging and they should be so with you, if a little care is taken in selecting the time when you should perform the external version and gentle manipulations are adopted. My observations as embodied in my two articles mentioned above were as under:—

1. Breech presentation in labour was dangerous to mother and the child.
2. Incidence of prematurity and infant mortality in Breech was very heavy.
3. High percentage of prematurity and infant mortality and of danger and damage to the mother could be reduced to a considerable extent if Breech was converted to vertex by External version during pregnancy.
4. The technique was simple and easy, gave no pain to the mother and did no harm to the Fetus. It needed no anaesthesia.
5. No untoward complications resulted from the manipulations.
6. By the adoption of this method of management, the incidence of Breech presentation was reduced to 0.6 per cent and the prematurity was brought down from 39.6 per cent to 14.6 per cent taking a fetus of 5 lbs. as mature and anything below it as immature. The fatal mortality was reduced to 4.25 per cent in prematures and 1.1 per cent in the mature.
7. It saved the worries of the obstetricians, the nurse, and of the mother.

Before I demonstrated to you my technique there were two questions to be answered. When should you do it? And were there any dangers?

In the next books so far published the usual period recommended for this was 36th week of pregnancy on the plea that the child born at the 36th week and later was viable and if your manipulations, done before that period, brought on labour that child would have a few chances to live, it being premature. I have shown by statistics that in the first place their assumption that Breech was due to prematurity was wrong. It is the Breech that induced premature labour. If the Breech was converted to vertex in time, the pregnancy progressed to full term. Their second reason for selecting this period was that in quite a number of Breech cases, the fetus naturally changed its position to vertex by the time it reached the 36th week. Yes? it was true for a few of them but quite a number of them failed to turn naturally. You would thus be convinced of the inadvisibility, of depending on the nature to convert the Breech to Vertex. The 3rd reason given by them was that if external version was performed eariler than the 36th week, there was a chance of its returning to Breech. This was also true to a small extent, but in those cases it was easy to turn the child at a second attempt. Even a third might be required in a very small number, but if no attempt was made early and Breech was allowed to continue till the 36 week and latter, it was well nigh impossible

to do external version and change the position of the child to vertex. This difficulty increased in a primi para.

I would therefore advise you to perform the external version and convert the Breech into vertex whenever the mother came under your observation between the 28th and 32nd week, 30th week of pregnancy would be the best time. If the child reverted to Breech later you could change its position again. The 2nd attempt was usually quite easy. The manipulations at this stage were easy as the fetus was small and there was enough liq. Amnii in the uterine cavity, Even cases with extended legs were turned to vertex at this stage of pregnancy. There was a special advantage in selecting this period for doing External Version. As I said before, it was the Breech that brought on premature labour, if you changed this position to vertex early you gave a much better chance to the fetus to develop normally to full term.

According to this text books the following dangers were anticipated in the performance of External Version :—

1. Manipulations might induce premature labour.
2. It might rupture the membranes.
3. Twisting of the cord round the neck of the child might occur.
4. Separation of a portion of the Placenta might occur and cause bleeding.
5. It might cause Death of the Fetus.

All these dangers were likely if the attempt at external version was made at the 36th week and later. We did not encounter any of them in our two series. If the proper time is selected, light manipulations were enough for the purpose. We did not advise any anaesthesia for the purpose, It was likely that one might use more force and rough manipulations if the patient was not conscious to feel them and resist them. The dangers were unduly exaggerated.

I would not like you to run away with the impression that if you adopted this method early in pregnancy as suggested by me, you could always be successful. There were certain cases where you might not succeed and in some it would not be advisable for you to perform it.

In cases of multipara. Hydramnios, Placenta Previa, Dead Fetus, advanced prengancy, extremely fugety patients and those with over-sensitive uterii which on slightest touch went into contractions, no attempt should be made change the position of the child. They were contra indications. Your manipulations might be difficult and care and tactfulness would be required in cases of primipara with nervous temperament and stiff abdomnial wall. In cases where Breech was down in the Pelvis, in Breech with extended legs, and in Breech lying in the uterus with its back behind, one might even fail.

I will now demonstrate to you the actual technique of performing External Version. Some of steps might appear to be quite simple, but please remenber every step and every instruction gives help to you to successfully treat the patient with no harm either to the mother or child. The technique :—

(1) For Ordinary Breech.
(2) For Ordinary Breech down in pelvis.
(3) For extended Breech.

VERSION IN ORDINARY FULL BREECH.

1. A dose of Castor oil over night should be given and patient called next morning. By experience I have found in few cases the Breech naturally turned to Vertex.

2. Put the patient on the operation table, make sure of the Breech Presentation and Position. Listen F. H. S. and count them. Apply powder over the abdomen.

3. Tell the patient what you intend doing and assure her that your manipulations will give her neither pain nor cause any injury. Teach her how she should breathe deep and slow as to give you good relaxation of her abdomen.

4. Lower the head of the table to get. Trendelenburg position of a moderate degree. Ask the patient to draw her legs up and give a pillow under her head.

5. Dip the fingers of your two hands between the Symphysis Pubis and the Breech into the Pelvic cavity so as to grasp the whole Breech in your hands. Lift the Breech out of the pelvis into the abdomen. This done half the success is achieved.

6. In Breech I hold the Breech with one hand (right) and take it up and out towards the back of the Breech (left side) and with the other slowly push the Head downwards and towards the right side. This maintains the flexed position of the Fetus. These manipulations should be carried out very gently and at the height and to the end of a deep breath. In the meantime the hands should be kept steady.

7. When the Fetus is brought to a transverse position, change your hands, Hold the Breech by the left and head by the right and continue the manipulations.

8. When the Head is brought to the Rt. Iliac Fossa ask the patient to turn a little to the right side. Lift the head out of the Fossa and push it into the centre of the Pelvis, pushing the Breech towards the Centre of the costal arch.

9. Ask the patient to be on her back again. See that the Fetus is now lying straight in the abdomen with the head at the Pelvis and Breech at the Fundus of the uterus. Hold the head with the two hands and push it into the Pelvic cavity.

10. Listen to the Fetal Heart sounds and count them, to be sure that the child was all right. Application of a binder is not necessary.

11. Give a dose or two of a sedative, and ask the patient to report two days later to find out if the fetus maintained vertex presentation.

12. If Breech is returned anytime after your attempt at correction, second attempt be made after a week.

BREECH DOWN IN THE PELVIS.

1. Same procedure to be followed as in steps No. 1 to 4 mentioned above. Increase the degree of rendelenburg.

2. Pass two fingers of your right hand in the Vagina, push the Breech up and out of the pelvis. Keeping two fingers in the vagina pushing the Breech up, hold the Breech with your left hand from above the symphysis and secure it properly. Hand it over to an assistant just to hold it. Wash your hands, dry them, powder them, take the Breech into your hand and proceed with steps as detailed above from No. 6 onwards.

BREECH WITH EXTENDED LEGS.

Same procedure should be followed as in Breech down in the Pelvis, but version will have to be done a little earlier in this case.

(*Journal of Obstetrics and Gynaecology, May 1945.*)

PULMONARY ACARIASIS : A POSSIBLE CAUSE OF ASTHMA

E. SOYSA, M.B., M.R.C.P. AND M. D. S, JAYAWARDENA, L.R.C.P.

(*Abstracted from the British Medical Journal, i, 6th January, 1945, page 1.*)

During the past 2 years the authors have observed that the incidence of bronchial asthma among patients admitted to a military hospital in the South East Asia Command has been particularly high. It was found that a certain proportion of these asthmatic patients showed a high degree of eosinophilia, ranging from 40 to over 80 per cent, and that the patients rarely had a previous or family history of asthma or other allergic manifestation. The existence of alimentary parasitic infestation, which is a common cause of eosinophilia in the tropics, was excluded by the usual pathological tests.

The response to treatment by antispasmodics, vasodilators, iodides, opiates, and other sedatives intravenous adrenaline, etc. was only temporary and was not considered satisfactory. Between June 1942 and June 1944 bronchial asthma was responsible for 48

per cent of respiratory cases and 21 per cent of all cases invalided out of the army through the medical division of this hospital.

The patients were Ceylonese soldiers who were admitted with asthma, associated with an cosinophilia of over 4,000 per c.mm. Their ages ranged from 18 to 42 years. The clinical picture was that of asthmatic bronchitis, cough with expiratory dyspnoea, hyperresonance of the lungs, prolonged expiration witn sibilant and sonorous rhonchi audible all over the chest, and occasional lethery rales at the pulmonary cases. The sputum was scanty and viscid and never blood-stained, and in a few cases there was none at all. Only 5 patients showed a raised temperature and even then fever was not a prominent feature.

The total leucocyte count ranged from 10,200 to 37,000 per c.mm. with the eosinophilia varying from 33 to 81 per cent.

With the exception of mild secondary anaemia in a few cases there was no abnormality in the red coll count or the haemoglobin content of the blood.

The sputum did not show red blood colls, acid-fast bacilli or any specific organism on routine microscopical examination, but cosinophil loucocytes were sometimes observed. Mites of either Tyroglyphus or Tarsonomus were found in 11 out of 21 cases in which the sputum was examined by a special technique.

Treatment was carried out in 2 stages, first with routine anti-asthamatic remedies and then with specific therapy. Routine treatment consisted of mist, asthmatica, comprising the usual remedies, potassium iodide, tincture of belladonna, and tincture of stramonium, but excluding any arsonical Ephedrine adrenaline and pituitrin were used whenever necessary for relieving severe attacks of dyspnoea. Specific treatment consisted in the oral administration of pentavalent arsenic. Stovarsol was the drug first used, being given in the form of 0.26 Gm. tablets. When supplies ran out carbarsone was substituted being given as 0.25 Gm. tablets. Carbarsone contains 28.85 per cent arsenic as compared with 27 per cent for stovarsol. The dosage was one tablet twice a day,

Each patient acted as his own control by undergoing a course of routine treatment for asthma before the arsenic was given. This stage varied from 10 to 50 days. During routine treatment the eosinophil count fell in 8 cases and rose in 7 remaining relatively stationary in the remainder of the 30 cases treated. The clinical response to routine treatment was generally unsatisfactory, most of the patients showing no improvement and others obtaining only temporary relief.

The stage of arsenical treatment varied in duration from 6 to 33 days and the response was uniformly good and sometimes dramatic. One patient, who had suffered from asthma for 3 years obtained no relief during 40 days of routine treatment and his

cosinophilia rose from 56 to 65 per cent, but from the start of carbarsone treatment the eosinophil count fell rapidly and he was free from asthma in 3 days, requiring only 9 days' treatment with 18 tablets of the drug to complete his cure. The response in another case was equally dramatic, with the eosinophilia falling from 62 tc 3 per cent, with complete relief from asthma after 12 tablets of the same drug in 6 days. Two others completed treatment in 10 days with 20 tablets or stovarsol in the former and of carbarsone in the latter. Most of the patients showed a gradual haematologieal response to arsenic, but alleviation of clinical symptoms was comparatively rapid in all cases. Several patients had exacerbation of symptoms between the third and sixth days of arsenical treatment. Two developed status asthmaticus on the 5th and 4th days respectively; the former was relieved by continuous adrenaline injection but the second was more refractory and required lumbar puncture, which resulted in almost instantaneous control, The criterion of cure was not the control of the clinial condition, which was generally brought about in 7 to 10 days but the reduction of the eosinophil count to a satisfactory level. There was no appreciable difference between carbarsone and stovarsol as regards the clinical response and control of symptoms, but the former generally produced a more satisfactory and prompt haematological response, while the delayed action of the latter drug entailed a more prolonged period of treatment. Both drugs were well tolerated.

So far, over 9 months since the first patient was discharged, no recurrence of asthma has been reported in any of these patients, and several who have been re-examined have shown a normal haematological picture.

The possible coexistence of pulmonary acariasis with other lung affections, however, should not be overlooked. Three cases of asthmatic bronchitis have shown eosinophilia with radiological effects suggesting tuberculosis infiltration of the lungs, and in one case M. tuberculosis and Tyroglyphus mites have been demonstrated in the sputum. Mites have also been found in the sputum of 2 cases of pulmonary tuberculosis.

The possibility that pulmonary acariasis may be responsible for respiratory disorders other than asthma should also not be ignored. Some of the cases described by previous workers as pseudo-tuberculosis or tropical eosinophilia have not been typical of bronchial asthma, and they might well have been manifestations of pulmonary acariasis. The treatment of all such cases, whether asthmatic or otherwise, by the administration of pentavalent arsenicals is worthy of trial, not only in the tropics but anywhere that mites exist.

Extracts.

TREATMENT OF INFLUENZAL MENINGITIS WITH SULFADIAZINE

Sako, Stewart and others reported in the *Journal of Pediatrics* (1944) their results with sulfadiazine in the treatment of influenzal meningitis in children. 23 children with influenzal meningitis were treated with sulfadiazine. Sixteen patients have been discharged as cured and have remained well except I patient who developed and still has a residual generalized spasticity. Four of these patients received rabbit anti-serum and 2 equine serum. All the other 10 received sulfadiazine alone.

Six fatalities occurred, all in young infants below 8 months of age. The following factors appeared to contribute to the poor prognosis in these young infants: the development of early block in the cerebrospinal system the tendency to late diagnosis or misdiagnosis of the disease and hence delayed therapy, and the laek of resistance.

The maintenance doses of sulfadiazine ranged between 1 to 4 grains per lb., with most of the patients receiviug 1½ to 2 grains per lb. The initial dose in most cases was between 1/3 and 2/3 of the total daily maintenance dosage. The drug was continued for 4·58 days in the patients surviving, with an average of 22·8 days per patient. The initial dose of sulfadiazine should best be given intravenously since excretion into the cerebrospinal fluid occurs more promptly in higher concentration than when orally administered. It is also the author's impression that high blood and spinal fluid levels early in the course of therapy are far more efficacious than low levels early followed by high levels later.

Very few complications were encountered with the administration of sulfadiazine in spite of the large doses used. One patient developed leucopenia; one, a drug fever; and one, gross hematuria. All of these toxic symptoms rapidly disappeared with discontinuance of the drug. No kidney blockage was encountered.

In the opinion of the authors, unquestionably the ideal treatment would be a combined therapy using rabbit serum in maximal dosage and sulfadiazine. It is their impression that the cerebrospinal fluid is sterilized much more repidly when type-specific serotherapy is combined with drug therapy.

Digest of Treatment (1945) March.

THE DIFFICULTY OF EVALUATING DRUG TREATMENT IN SURGICAL INFECTIONS

Surgical infections differ materially from medical infections in the following respects:

1. Necrosis of tissue of accumulated purulent exudate is present in surgical infections in contrast to the diffuse cellulitis of medical infections.

2. The dead tissue must be removed or evacuated or absorbed and replaced by scar tissue in surgical infections while inflamed tissue without necrosis returns to normal in medical infections.

3. There is frequently a mixture of organisms in surgical infections in contrast to a single species or virus in medical infections.

4. Necrotic tissue and thrombosed blood vessels prevent certain elements in the blood and medication from reaching the focus in surgical infections in contrast to patent and perhaps dilated blood vessels permitting the inflow of blood elements and medication into medical infections.

5. There is only local (if any) immunity in surgical infections in contrast to general immunity, which may hasten recovery, in many medical infections.

6. Necrotic tissue and pus in surgical infections may inactivate or inhibit certain medications which may be very effective in medical infections.

7. Incision usually benefits surgical infections, while it does positive harm to medical infections. Incision in surgical infections must be properly timed to do the least harm and the most good.

8. Surgical infections, being local, permit the local as well as the general use of drugs, while medical infections usually permit only their general employment. (Exceptions to this are such surface infections as erysipelas, tonsillitis or meningitis).

For the foregoing reasons the evaluation of drug therapy in surgical infections is infinitely more difficult than in medical infections.

Drug administration in surgical infections may be prophylactic or therapeutic.

1. The prophylatic use of drugs is possible in war wounds, in contaminated accidental wounds of the soft parts, in compound fractures and burns in civilians and in operations on contaminated regions of the body, such as the alimentary canal.

2. In order to evaluate drugs properly in these cases there must be a comparison of drug treated cases with non-drug treated controls. These controls must alternate with treated cases without any selection of cases. The group presents a mixed starting point.

3. The appraisal of the therapeutic value of drugs in established surgical infections in much more difficult because there is no fixed

starting point. The infection may have begun weeks, months or years befors the drug treatment is started, during which time it may have had all kinds of treatment, any number of secondary contaminations, profound alterations in blood chemistry, in the nutritional status and in morale. It is difficult to run a parallel control series.

(*a*) In established infections the control may have to be the previous course of the case itself.

(*b*) However, if it can be shown that drug treatment obviates the necessity for surgery or makes possible a more conservative procedure or shortens the healing time or permits primary closure or early secondary closure which would not have been possible without the drug, its value may be demonstrated.

All these facts indicate the difficulty of evaluating drugs in the treatment of surgical infections. A carefully laid out plan should be followed and a number of different investigators in different cities should study the problem in a uniform manner, comparing and pooling their results.

Results of drug therapy in surgical infections may be designated by the terms (*a*) brilliant, (*b*) good, (*c*) questionable and (*d*) with no effect.

In the prophylactic studies, and in established infections when controls are used, the results in treated cases must be significantly better statistically than the controls before the benefit can be certainly attributed to drug treatment. When controls are not used the results must be repeatedly and consistently "brilliant" or "good" in a large series of cases before the benefit of drug treatment can be considered clearly proved.

Melency: *J. A. M. A.* (1944) April.

ONE DAY TREATMENT OF SULFONAMIDE-RESISTANT ACUTE GONORRHOEA WITH PENICILLIN

Page and Heimoff (*Virginia Medical Monthly*) present the results obtained on a series of 30 cases of sulfonamide-resistant acute gonorrhœa in the male treated with penicillin at a Military Reservation.

Type of Cases Treated: 1. All patients in this series were adult males and had had acute gonorrhœa for periods ranging from 6 days to 3 months (average 25.5 days). All except 1 had been treated unsuccessfully with 1 or more courses of sulfonamide.

2. Two had had 3 courses of sulfathiazole. Eleven had had 2 courses of sulfathiazole. Seventeen had had 1 course of sulfathiazole.

3. The average cases appeared with an extremely profuse purulent urethral discharge. At the completion of the penicillin injections, the urethral discharge had become so scanty that smears and cultures of prostatic fluid had to be obtained.

Therapy: 1. The penicillin used was supplied in crystalline form in ampoules containing 100,000 Oxford units. Before use it was dissolved in 10 cc. sterile distilled water or sterile normal saline. Twenty thousand units (2 cc.) were administered intramuscularly (alternate buttocks) every 3 hours, for 5 doses (total of 100,000 U.).

2. Each patient had a smear of urethral discharge taken just prior to his first injection, and this was followed by smears and cultures of urethral discharge of prostatic fluid at the end of 3, 9, 24, 48 and 72 hours. A smear and culture at weekly intervals for next 3 weeks was performed.

Criteria of Cure: 1. Consistently negative physical and laboratory finding for a period of not less than 3 weeks prior to discharge from medical observation.

2. A minimum of 3 consecutive negative gonococcic cultures taken not less than 1 week apart. The cultural material consisted of urethral discharge or prostatic fluid.

Results:—All 30 cases became bacteriologically negative within 12 hours. Fifteen of the 30 cases became bacteriologically negative at the end of 3 hours; 7 were negative at the end of 6 hours; 1 was negative after 9 hours, and 7 were negative at the end of 12 hours.

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THE COMMON COLD.

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INTRODUCTORY.

The common cold belongs to a class of infective diseases which affects the mucous membrane of the upper respiratory tract without provoking any prolonged immunity. It is by far the most prevalent form of disease. The laity call it 'cold in the head' while the fashionable physician labels it as 'coryza'. It takes a heavy toll as regards the loss of working time and efficiency compared to any other malady which the flesh is heir to. Still then it is surprising, rather singular, that so little is known about its etiology and so vague is its treatment.

Prevalence.—There are several large-scale observations, regarding its prevalence. In 1924 the United States Health Service sent a questionnaire to 13,000 persons in 11 localities from Massachusetts to California requesting information as to past colds, influenza and pneumonia, habits, the kind of clothing used in winter, the amount of exercise taken, and the average number of colds contracted in a year. The reports showed that common cold had in all localities certain periods when it might be called an epidemic, and there was a remarkable synchronicity in its rise and fall in different localities. About 90 per cent of 1,272 persons suffered from one or more colds during the months October, 1923 to June, 1924. During 5½ months there was an average of two colds per person. Allen quoted by Rice, of John Hancock Mutual Life Insurance Company state that in 1924, in 300 working days, of 2,000 employees the number absent from work was 651, and the number of days lost were 1,202. Smilley obtained monthly records of acute respiratory infections in male students at the Cornell University for a period of 4 years. It was observed that in each year there was a rise to a maximum in January to February followed by a gradual fall; 23 per cent had 4 or more colds per year, 60 per cent 2 to 3, and 17 per cent 1 or more. Literature is not available regarding statistics in India.

The Galenic concept.—In medine from Galen to Vesalius the view held was that the brain voids mucous and excrementitious matter through the glandula pituitaria into the nose and upper pharynx, the gland acting as a strainer or filter for this matter. The word

'pituitary' was derived from the Latin word 'pituita' which means 'slime or 'phlegm'. During that period it was conjectured that thus were the vital spirits purified. But in 1677 Richard Lower quoted by Hill and Clement disproved the Galenic concept. He observed "whatever is separated into the ventricles of the brain and issues out of them through the infundibulum of the glandula pituitaria distils not upon the palate but is poured again into the blood stream and mixed with it." This remarkable observation made 267 years ago anticipates the recent discovery of internal secretions of which medicine is so proud.

Does one 'catch cold?—Tracing the history of medicine one will find that in various ages and in different countries the belief in 'catching' cold has prevailed unchallenged. This ancient and unfortunate misconception still flourishes at the present time notwithstanding much experimental evidence which invalidates it. That exposure to cold is not the cause is proved by the experience of Arctic explorers and open-air workers. In the report of Capt. Scott's expedition an account is given of the loss of the life of one of the members of the party in a blizzard with a temperature of −25° to −28°, and the wind blowing at the rate of 40 to 45 miles per hour. Scott wore comparatively light clothing, and was wandering about for 6 hours. Yet he did not catch cold; the only ill effects he suffered from were those of frost-bite.

Reports from places widely apart as Manchester, Leysin, Durban and San Francisco show that children who are put to live open-air lives, well-clothed and fed. but with no artificial heating, suffer very little from catarrhs.

Soldiers at the front in the last Great War fighting in trenches, and sailors exposed in the north sea to the bitterest wintry nights, were singularly free from coryza.

The Austrian physician Chodounsky quoted by Hill and Clement (*loc. cit.*,) tested his disbelief in exposure to cold as a cause of catarrh by a remarkable series of experiments on himself and concluded that his disbelief was correct, that is, exposure to cold did not cause an attack of Cold.

Cold is attributed to chill probably because it is ushered in with a chilly feeling many hours after the infection that caused it. Persons with a cold coming on are more susceptible to chill owing to the derangement of the heat-regulating mechanism due to absorption of toxins.

ETIOLOGY

It is generally agreed that the etiology of common cold is not established on a scientific basis and a chaos exists. This chaos so deeply impressed the mind of an American philanthropist that he donated a sum of £39,000 to Johns Hopkins University, Baltimore, for the elucidation of the subject.

Dust and fumes.—It is well known that there are fumes of certain chemical compounds used in warfare which, when breathed into the nose in a diiution of one part in 5 or 10 million parts of air provoke sneezing. Fumes of similar nature may be present in the air and dust particles may be impregnated with them. Such fumes present in a polluted atmosphere will produce sneezing.

Ventilation.—Bad ventilation is undoubtedly the single most potent factor in the etiology of common cold. It acts in two ways, firstly by increasing the risk of infection, and secondly by producing an unhealthy condition of the nasal and respiratory mucosa. Men leading open-air lives are free from common cold whatever exposure to extremes of weather they undergo. I have observed that cold is very common in women who strictly observe the 'purdah system'. In ill-ventilated rooms in which the air is warm and stagnant the mucous membrane becomes swollen and congested, and covered with thick secretion. Thus the nasal cavity becomes a suitable culture medium for the growth of catarrhal organisms. In reverse conditions the mucosa becomes pale and taut and is well moistered with thin watery secretion and the bacteria are washed out.

Age.—No age is exempt from this disease. Susceptibility to infection tends to diminish with age yet shows great variation among different individuals and even in the same individual under different conditions.

Handkerchiefs.—The pocket handkerchief loaded with nasal and bronchial secretions is a source of contagion. Waved in the air when dry, or partly dry, it may scatter infection. There are women who sometimes wipe their children's nose with their used handkerchiefs. It is the custom with certain men to offer a handkerchief for this purpose to friends particularly to young ladies as a gesture of friendship or as an expression of smartness. Such practices are fraught with danger and hence they must be given up. People must be taught to regard it with the same fear as they now regard foul water or stinking drains. The same note of warming can be sounded regarding the common use of towels and sponges.

Kissing.—Kissing on the lips is beset with the risk of conveyance of infection to either or both the parties. Hill and Clement have advocated that if a kiss has to be given let it be on the forehead, or on the neck, places from where infection is less likely to be conveyed to the nasal mucous membrane.

Contact.—It hardly needs emphassis that people when ill with a catarrh, particularly of the infective type, should not be allowed to contact others.

Constipation.—It is a common experience that constipation and common cold usually occur together. The exact relationship is not known. It is possible that constipation leads to congestion of the

nasal mucosa and then follows the cold. According to some authorities the virus which is responsible for the cold attacks the intestinal tract at the same time and produces constipation.

Thyroid deficiency.—A tendency to catarrh is attributed by some to a subclinical hypothroid state, but no evidence is yet available for this hypothesis.

Relation to sexual organs.—There is a relation between the mucous membrane of the respiratory part of the nose and the sexual organs. The mucous membrane is highly vascular structure and may become congested at times of sexual activity. People with more of sexual libido and consequent frequent sexual activity are often the sufferers of cold.

Smoking.—Chronic smokers very often suffer from cold owing probably to the constant irritation of the nasal mucosa by smoke.

BACTERIOLOGY.

Opinion is divided with regard to the bacterial cause of common cold. Various organisms—M. catarrhalis, B. influenza, pneumococcus, streptococcus, staphylococcus, B. septus, M. paratetragenus, B. Friedlander have all been held responsible for common cold. But their incidence varies at different seasons, now one and now another type predominating. Hence different workers have been variously impressed with the etiological importance of one or other of these organisms, M. catarrhalis is said to be holding the place of honour, Kruse successfully transmitted coryza into volunteers by instilling dilute filtered nasal secretion. Foster in 1917 repeated and confirmed Kruse's experiments. Olisky and McCartney in 1923 found a filtrable agent in nasopharyngeal washings during the very early stage of cold. At least, the symptoms of common cold were transmitted to a number of healthy persons. Robertson and Groves (1924) failed to confirm these results.

The problem of common cold thus resembles that of epidemic influenza, in which there is the same doubt whether the bacteria which can be readily isolated—B. influenza, pneumococci, and staphylococci are sufficient to account for the phenomena, or whether a filtrable organism is the primary cause, the others being important secondary agents responsible for the complaints.

Studies that have been recorded in recent years, those of Dochez and others in particular have greatly strengthened the view advanced by Kruse that infective cold is a virus disease. It was Dochez and associates who, in a series of studies extending over a number of years, eventually concluded that the commou contagious cold in humans is initiated by a filtrable virus. They showed that colds could be transmitted from man to the chimpanzee and from man to man by means of Berkefeld filtrates of nasal washings obtained from individuals suffering from spontaneous colds. These experimental colds were found to resemble in all respects the so-called common

cold. However, they added that one of the significant effects of infection with the filtrable ageut is the stimulation into greatly increased activity of potential pathogens that may be present in the upper respirstory tract. "This", they said, "we regard as of great importance since it seems to explain the marked secondary activity in the respiratory tract of such organisms as pneumococci, streptococcus haemolyticus, and Pfeiffer's bacillus, which lead to the severe sequel of which sometimes follow the commou cold and influenza. In fact, the most important significance of viruses of the type seems to lie in their capaclty to incite activity on the paat of the more dangerous pathogenic organisms that infest the upper respiratory tract."

One would summaaise by saying that some workers adhere to the virus hypothesis, while others are convinced that organisms such as pneumococci, M. catarrhalis, streptococci. etc. are the primary causes. To me it appears that the matter is still *sub judice*, though the virus hypothesis has a larger number of supporters.

Wynn is of opinion that excluding the non-bacterial rhinorrhoeas due to protein sensitization as in hay fever, alergic rhinitis, add also the coryza occurring at the onset of known diseases, *e.g.*, measles, infiuenza, etc., there may be two classes of cold—(1) those caused by unknown filter-passing virus the ordinary nasal organisms as M. catarrhalis., B. influenza, pneumococcus being important secondary factors, whose activity is increased by the primary infection; (2) colds caused by one or more of the ordinaay catarrhal organisms without the presence of a specific virus.

PATHOLOGY

There is acute inflammation. In the early stage there is mucoid discharge which afterwards changes to mucopurulent. In the allegic types of common cold the discharge is more mucoid than mucopurulent. The discharge contains epithelial cells, pus cells and erythrocytes. After the attack is over the restoration of the nasal epithelium to the normal state is very quick.

"What mokes the common cold common?"—The answer to this question will be found in three characteristics of the virus of common cold. First, the virus is highly contagious. It is spread very readily by an infected individual who is coughing, sneezing, or kissing. Almost any susceptible person who is in immediate contact with an infected individual will contract the disease. Second, the immunity is ordinarily of short duration. Consequently, it is possible for an individual to have a number of attacks of the virus inspection each year. Third, the disease is so mild that infected persons continue to go to work and to various public places and thus spread the infection.

CLINICAL FEATURES

Stuffness of the nose is usually the first symptom, which is soon followed by a prickly sensation in the nose and the patient starts

sneezing. There is profuse discharge, at first mucoid but within 12 to 24 hours becomes mucopurulent. In the allergic type the discharge usually persists upto the mucoid stage and only in rare cases it becomes mucopurulent. Impairment of taste and smell occurs. Constitutional disturbances are usually slight. The temper becomes erratic during the attack and sleep is not infrequently disturbed. After a period of 2 to 7 days the patient becomes free from the attack. A second attack comes after a week to a month, but there is no certainty about it.

COMPLICATIONS AND SEQUELAE

The inflammatory process may descend and produce pharyngitis, tonsillitis, tracheitis, laryngitis, and bronchitis. Broncho-pneumonia is an uncommon but serious complication. It is said that pulmonary tuberculosis is flared up by an attack of common qold. Not a few cases of pulmonary tuberculosis follow a neglected cold. The swelling may cause obstruction to the outlet of an air-cell, particularly in the ethmoid or sphenoid, or to the duct of frontal sinus; absorption of air behind such an obstruction may be responsible for "vacuum headache", or if the Eustachian tube is involved to deafness and vertigo; when an air sinus is implicated in the inflammatory process and its opening is obstructed, local pain and "distension headache" are prone to occur. Suppuration in the accessory sinuses or an acute otitis media may occur. Herpes around the nostrils and on the lips may be extensive during the acute stage.

TREATMENT

PREVENTIVE: *Ventilation*—People must be taught the value of free ventilation in the prevention of disease. Crowding indoors is the greatest cause of the spread of infection. Open-air schools and ample ventilation of rooms, public conveyances workshops, cinema houses etc., are valuable means of combating the disease.

"Go home when you feel it"—My intense conviction tempts me to advocate the display of a facious placard on all offices and factories "Go home when you feel it." I believe the industrial world would suffer for less economically when next the disease is rife amongst us if the individual who insists upon totteringas long as he can be subjected to open scorn for his action.

Clothing—It should be loose and free and not confine the movements of the body. Children should be allowed liberty to discard clothes and follow their natural instinct. In our couutry tight collars, with attractive ties and tight-buttoned waistcoats should be scrupulously avoided.

Exercise—Sufficient exercise in the open air must be taken by every one to prevent congestion of the body. This will help the patient in avoiding attacks of cold.

Cold baths—It has been pointed out by many that a cold bath every morning helps the prevention of the common cold.

Smoke pollution—Pollution of the air is as much injurious to health as the pollution of wafer. It must be prevented if common cold has to be combated.

Vaccination.—Evidence concerning vaccination as a means of preventing coryza is conflicting. The consensus of opinion is that it is not of much use. But Ward records his 3 years' experience of vaccination against common cold among the employees in a large Montreal factory. The composition of the stock vaccine was as follows:—B. Influenza 200 millions, Streptococcus 100 millions, M. catarrhalis 200 millions, Staphylococcus albus 200 millions, per c.c. The dosage was 3 min on the first day, followed by 5 min. three days later, and by 7 min. five days after that. Comparison of 426 vaccinated persons with an unvaccinated group of 1,341 showed that considerable improvement took place in the records of the vaccinated as regards freedom from pneumonia. bronchitis, common cold, and tonsilltis; no serious reaction occurred. Ward concludes that although stock vaccines can be regarded as a sure and specific preventive of accute respiratory diseases, they do benefit in a considerable number of cases.

Vitamin prophylaxis.—It has long been a common place of popular belief that those who develop common cold must be "run-down." Modern investigation has offered little more light on the etiology of colds, though it has been shown that the so-called "run-down" state is often directly due to borderline nutritional deficiency. Since the discovery of the essential part played by vitamins in protecting the body against many types of ill health, much work has been concerned with the probable relation between vitamin deficiency and susceptibility to infections generally.

For the prevention of common cold, vitamins A & C are of special interest for their effect in influencing the natural bodily resistance. The infection of the nasal mucosa is greatly facilitated by changes in the epithelium of the mucosa, such as are known to result from hypovitaminosis A. As a factor in preventing colds, therefore, the maintenance of the integrity of the respiratory epithelium by ensuring an adequate intake of vitamin A would appear to be logical.

Recent observations indicate that vitamin C also may directly affect resistance to infection. Since it was shown in 1935 that vitamin C increased the resistance of the guineapig to diphtheria, other workers have supported the view that this vitamin is of major importance iu mitigating diphtheretic infection. In 1938 it was suggested that, when the vitamin C level of the blood is high, streptococci are less likely to be found in the tonsils, and, if present, are seldom virulent. Infections cause a greatly increased demand for vitamin C, so this vitamin may be a factor needed in the production of immune bodies, in the serum.

CURATIVE: To avert an attack at an early stage the patient should take a hot bath followed by a hot drink of lemon to which an ounce of whisky may be added, if desired. A grain of calomel at night followed by a saline purgative in the morning will greatly help cure. Some prefer an enema to calomel and saline. Aspirin 5 grains with 5 grains of Dover's powder at bed time will secure a good night's sleep. Such traditional remedies as a teaspoonful of liquor quinine ammoniata or 6 minims of oil of cinnamon in hot milk, are widely valued by public opinion. For local use Clegg quoted by Douthwaite recommends the instillation of 1 to 2 drams of a mixture of paraffin molle 1 part and paraffin liquidum 3 parts into each nostril in turn while the patients is on his back. It is to be repeated several times in 24 hours 'Endrine' can be used as an atomiser. 'Stuff a cold and starve a fever'—this time honoured expression sunk deeply into people's minds and its literal application in the sick room has probably caused more suffering than the sickness itself. Regarding the allowance of fluid I would like to quote Harrold who pointed out that no one ever heard a fish sneezing and hence the practice of pushing fluids has probably has a rational basis.

Chemotherapy.—Drugs of the sulphonamide group should not be administered as a routine; only when a pyogenic complication develops should the appropriate drug be given in full dose (Horder and Gow).

For years past a cure for common cold has been sought and numerous so-called specific have had their advocates. None of these specific however, has fulfilled its early promise, and, as the saying goes, if a cold is treated energetically it will get well in seven days, while if left to itself it will get well in a week. While-spread interests will be aroused by the group of reports on patulin in the treatment of common cold. These reports show that the benificient genus penicillium has provided us with a substance of therapeutic promise. From the mould P. patulinum. Raistrick and others have isolated an active principle which they call patulin, and which they have identified chemically. This feat is a part of a series of researches of great potential value, but it may have immediate value too. At almost accidental observation by Gye suggested that patulin might be used in the treatment of common cold, and the reports include an account of its trial for this purpose by surgeon commander W, A. Hopkins, among the naval personnel at Ghateam, aiternate subjects received patulin and an insert fluid which they though was patulin, sprayed, snuffed up or instilled from a pipette into the nose. In the third trial even those in charge did not know which was the treated and which was the control group. The criterion adopted was "recovery in 48 hours", and in each of these trials the balance of evidence was in favour of the treated group: 44 per cent recoveries against 2.4 per cent, 70 per cent against 12

per cent, and 83 per cent against 22 per cent. An effective remedy for colds would be so welcomed that every one will be tempted to regard these figures as conclusive but it is understood that another investigation elsewhere gave results that were anything but encouraging. Hence we must await with what patience we may the additional evidence to demonstrate beyond doubt that patulin combats cold and (if so) how it does it.

One may imagine a "cold cure" to work in one of several ways: for example, it may have pharmacological properties leading to shrinkage of the inflamed mucosa; it may have a similar action on secondary bacterial invaders.

Patulin has not been released for general issue pending the completion of further large-scale confirmators trial. Meanwhile let us hope and pray that patulin will justify our hopes so that the therapeutic nihilism regarding the treatment of common cold will end and mankind will be free from the common and distressing malady the Common Cold which has been called "public enemy number one."

ACKNOWLEDGMENT.

I must thank my friends Mr. N. N. Mukherji and Mr. M. B. Roy for their valuable suggessions in writing the article.

My thanks are due to the members of the Medical Club, Medical College, Agra, for the patience in listening to the talk.

(*J.I.M.A.* May 45.)

Extracts.

THE CLINICAL USE OF PENICILLIN

Writing on the clinical use of penicillin Herrell says that Fleming in 1929 found that the broth in which Penicillium notatum had grown was inhibitory for certain pathologic organisms. He named the substance penicillin. Unfortunately, penicillin did not receive clinical application for a period of eleven years following his observations. He used it on man first for irrigating wounds and human conjunctiva.

Chain and others in 1940 reported on penicillin and its possibilities as a chemotherapeutic agent and this led to further investigation.

PREPARATION FOR CLINICAL USE:

Sodium Salt of Penicillin: It is hygroscopic; it is destroyed easily by alterations of hydrogen ion concentration in the surrounding medium; and is sensitive to oxidizing agent. Heat, primary alcohols and metals alter the material. Because of these, it should be stored in as dry a state as possible and at temperature not higher than 5 C.

Calcium Salt of Penicillin: It is nonhygroscopic and could be handled more conveniently than sodium salt. They used it for local use. It is less toxic to the tissues. It can be stored at some temperature.

Dosage and Methods of Administration: *Local Application*: Sodium and calcium salts both are satisfactory for local treatment, but calcium salt is superior because of its stability and ease of handling.

Intramuscular Administration: 10,000 to 20,000 units 4 hourly, is reliable, but this method has disadvantages. It requires considerable time on the part of the medical personnel. As penicillin disappears very rapidly from blood stream, repeated injections are necessary and the material used is far in excess of that required to obtain satisfactory results. So intramuscular method should be used where intravenous drip method is not feasible.

Intravenous Method: Two methods are possible: first penicillin in concentrated solutions (10,000 Oxford Units per 10 cc.) every 2 or 3 hours. Total daily dose is 80,000 to 120,000 units and has the same disadvantages as intramuscular one.

If the interval between the repeated intravenous injections is increased, there will be a period when there will be no penicillin in the blood, which is undesirable.

The best method is continuous intravenous drip method. 40,000 units per 24 hours has been found adequate. Half of the 24 hours' dose is dissolved in a litre of normal saline. It can be given in 5 per cent dextrose solution but continuous administration of dextrose may produce venous irritation at times. Initially, between 100 and 200 cc. of the material is administered at a fairly rapid rate. Then it is slowed down between 30 and 40 drops per minute. The second

litre containing penicillin may be attached to continuous intravenous system eight to ten hours later. Thus repeated venipunctures are avoided.

Intrathecal administration: Penicillin is not found in C. S. F. when given intramuscularly or intravenously. So intrathecal dose of 5,000 to 10,000 units once daily is necessary.

Toxic Reactions: Chills and fever are complained of but they are due to impurities. Thrombophlebitis is observed in very few cases, but this reaction promptly subsided when the intravenous drip had been changed to another site.

Summary & Conclusions: Penicillin is a highly effective antibacterial agent against susceptible pathogens. Among the cases in which penicillin was used were infections due to Staphylococcus aureus, Neisseria gonorrhoea, streptococci, artinomycetes and micrococci,

The experience in this group of cases seems to justify the conclusion that 40,000 units of penicillin per day is sufficient in the treatment of the infections described. The author is of opinion that the intravenous drip method of administering penicillin has been the most satisfactory.

Penicillin should be reserved so far as possible for infections resistant to sulfonamide compounds. Penicillin therapy is no substitute for sound medical and surgical judgment in the treatment of bacterial infections.

J. A. M. A. (1944) March 4, p. 622.

TREATMENT OF EARLY SYPHILIS WITH PENICILLIN.

A. O. F. ROSS, RACHEL B. NELSON, E. M. LOURIE AND H. O. J. COLLIER. LANCET, LONDON, 2: 845-848, Dec. 1944.

The authors report the preliminary results obtained in 5 patients with early syphilis who were treated with penicillin and observed for 9 months. The patients selected were strongly seropositive and had well-marked secondary lesions.

The dosage schemes employed were (a) 30,000 units of penicillin given intramuscularly at 3-hour intervals for 80 injections (a total of 2,400,000 units over a 10-day period) in 4 patients, and (b) 30,000 units intramuscularly every hour for 40 injections (1,200,000 units in 40 hours) in 1 patient.

Lesions and rashes cleared up within 1 or 2 weeks. There were no toxic reactions.

Of the 4 patients receiving the maximum dosage (2,400,000 units), treatment was an unequivocal success in only 1. The patient treated with the minimum dosage of 1,200,000 units had a serologic relapse after 2 months' treatment.

Although the results of this study indicate that immediate response to treatment was favourable, the authors state that it is doubtful whether penicillin was as beneficial as arsenic-bismuth therapy might have been.

It is the upinion of the authors that penicillin treatment for syphilis will not become suitable for routine civilian practice until frequently repeated injections day and night can be avoided.

Medical News and Notes.

New Preparations of May & Baker.

Dental Cones—These specially designed cones containing Sulphanilamido (½ gr.) and Sulphathiazole (½ gr.) are for topical sulphonamide therapy in the prevention and treatment of infections following extraction. Other indications are dentito difficilis of the wisdom tooth, fractures and osteomyelitis. Literature on request.

Neo-Halarsine.—This trivalent arsenical is a crystalline substance of definite and constant composition providing uniform therpeutic and physiological activity. **Neo-Halarsine** is used by intravenous injection in the treatment of syphilis and other spirochaetal or spirillal infections. **Nee-Halarsine** gives rise to fewer reactions than neoarsphenamine. Supplied in ampoules of 0.045 gm, 0.06 gm, 0.09 gm. and in boxes of 10 ampoules. Literature on request.

Neptal.—A new packing of this mercurial diuretic has recently been introduced. It is a more dilute solution for administration by the intravenous route only and is supplied in ampoules of 5 and 10 c.c. these being equivalent to the 1 and 2 c.c. ampoules formerly employed for the purpose. The latter continue to be supplied for use by the intramuscular route and the strength of this solution remains the same, namely 9.2 per cent w/v mercuramide and 5 per cent w/v theophylline. Supplies of 6×5 c.c. are now available. Literature on request.

When ordering please mention *Medico-Surgical Suggestions.*

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BLOOD TRANSFUSION.

BY R. V. WARDEKAR, B.SC., M.D.

Bombay.

I was asked by Dr. B. N. Purandare to read a paper on blood transfusion before this society and I immediately consented knowing fully well that I have to read it before an audience most of whom have given many transfusions and know everything about it. But I consented only because I wanted to learn something from your experience.

We owe all our knowledge of blood groups to Landsteiner,—who in 1900, first showed that the serum of one normal human being can agglutinate or hæmolyse the bloods of certain other individuals and it was he who pointed out the importance of blood groups in blood transfusions.

If blood cells of individuals of certain groups are mixed with the serum of individuals belonging to certain other groups, the red blood cells will come together in clumps. This phenomenon of agglutination forms the basis for the division of all human-beings into four groups O, A, B, and AB. According to Landsteiner the existence of the four blood groups depends upon the presence or absence of two agglutinogens A and B in the red corpuscles and two agglutinins a and b in the serum. Several different nomenclatures for the four blood groups have been used but because of the confusion on many occasions on International Nomenclature has been officially recognised by the Health Committee of League of Nations now.

Blood Groups in relation to age:

Agglutinogen can be demonstrated in the red blood cells of a foetus of 37 days. Sensitivity increases throughout antenatal and postnatal life up to 20 years of age. After this it becomes constant. Agglutinins are usually not developed at birth but rapidly increase in titre thereafter upto the age of puberty, after which time the titre falls gradually. Whatever agglutinins are formed at birth are usually derived from the mother.

Technique of Grouping:

There are various methods of determining the group, porcelain dish method being quite reliable and convenient. 1 per cent or 2 per cent suspension of unknown cells is mixed with sera of Group

A and B and kept for some time. These sera should be of high titre and then only serious mistakes in grouping can be avoided. It is better to use a control serum of group O to check the results of group found out by A and B sera. Or the result may be checked by mixing cell suspension of Group A and B with the unknown serum and confirming the first result.

The results may be read by naked eye examination or lens but it should always be confirmed by microscopic examination. Pseudo-agglutination can be detected by this means only.

Sources of err or in blood Grouping:

(i) The mixture of serum and cell suspension may not be kept for sufficient time and so agglutination may be missed.

(ii) The grouping sera may have a low titre and so fail to agglutinate the corpuscles for a long time.

(iii) Some corpuscles are not sufficiently sensitive for agglutination and this commonly happens with subgroups A2B.

(iv) Presence of certain other agglutinins such as cold agglutinins or autoagglutinins.

(v) In addition to these known ones there are certain irregular or anomalous agglutinins.

***Rh Factor*:**

Recently another agglutinogen has been demonstrated in the corpuscles. Similar antigen is found in the red corpuscles of M. rhesus and so this antigen has been named Rh factor. Normally immune bodies against this Rh factor do not exist in the serum. It has been found that about 85 percent of the population possess this additional agglutinogen in the corpuscles: When Rh+ve blood is transfused to Rh--ve recipient it may result in the production of anti Rh immune bodies in recipients' serum. These may react with the Rh positive corpuscles at the next transfusion. On this basis some of the post transfusion hæmolytic reactions can be explained.

Relation of Rh factor and Erythroblastalis Faetalis:

Now it has been proved that it is the Rh factor which is responsible for the condition of erythroblastalis fætalis:

The theory briefly is like this:

If Rh-ve woman conceives from Rh positive man, the child may be Rh positive or -ve depending on whether the father is homozygous (Rh rh) or heterozygous (Rh rh).

If the father is homozygous all the children will be Rh positive and if heterozygous, each child will have an even chance of being Rh-ve and of escaping the disease.

So Rh -ve mother having a Rh positive faetus might produce anti Rh agglutinins as a result of immunisation with fætal blood. The anti-bodies pass through the placenta and in suitable concentration cause hæmolysis of the fætal red-cells.

With this new etiology of the condition of erythroblastalis fætalis it becomes quite obvious that the ideal donor is Rh-ve belonging to the same group as the child. If such donor is not available Rh -ve of Group O may be used. If mother's blood has to be given it should be washed free of plasma and only corpuscles should be transfused, for it is the presence of anti Rh agglutinin in mother's plasma which bring about the destruction of fætal corpuscles.

In some cases of erythroblastalis fætalis mother is Rh positive, in such cases if isoimmunisation is responsible it seems that another antigen must be involved. This Rh factor is of great importance in cases of transfusion in a pregnant woman. If the patient is Rh -ve and the foetus Rh positive, Rh positive donor's blood will give severe reactions and so in such cases the patient's blood should always be tested for the presence of Rh factor.

After knowing all the factors which are concerned in bringing about an agglutination or hæmolysis of the donors cells, it will be convenient here to know the various procedures that should be done to see the compatibility of blood.

(1) Grouping of the recipient by reliable sera and controls.

(2) Cross matching of the donor's and recipient's blood.

(3) Recipient's serum and suspension of donor's corpuscles tested for hæmolysis and agglutination at 37°, in cold and at room temperature. This test is very important after first transfusion and in cases of pregnant patients even for the first transfusion. Any negligence in doing these tests may result sometimes in severe post transfusion reaction.

Indications for Transfusion:

The therapeutic value of blood transfusion depends upon the following main effects:—

(1) Volume of circulating blood is increased.

(2) An immediately availble supply of oxygen carriers is supplied.

(3) Bone marrow is stimulated.

(4) Coagulability of blood may be increased.

(5) Some natural or immune antibodies are transferred from the door to the recipient

I am going to restrict myself to the indications in obstetrical and gynæcological practice only.

(1) Shock and hæmorrhage in obstetrics and gynæcology.

This shock is mostly due to blood loss. This, in early stages is replaced by transference of intercellular fluid to the blood vessels and thus the blood loss may be partly compensated by dilution of the blood, but this dilution in later stages leads to anoxæmia, which in turn increases the permeability of capillaries and thus again there is hæmoconcentration due to transference of fluid to tissue

spaces. This is seen in prolonged bleeding of incomplete abortion and ectopic pregnancy.

In postpartum hæmorrhage, the bleeding is continuous and may be severe enough to produce an early collapse.

Patients with late pregnancy toxæmia, particularly with hypertension may collapse even in the presence of even a small postpartum blood loss.

From an analysis of the Glasgow Royal Maternity Hospital it has been concluded that mortality rate from hæmorrhage has been much reduced by transfusions.

Transfusion also is advocated in functional uterine bleeding preferably from pregnant women.

Before some of the major gynæcological operations, transfusion may be given in very low patients.

Selection of a Donor :

There is always a great difficulty in getting a donor in hospital as well as in private practice. The immense value of blood transfusion has not yet appealed to many, and lay people have still got a notion that even a healthy man cannot stand any loss of blood. Because of these difficulties it always becomes a great job to get a suitable donor. It is high time now that some kind of public instructions and demonstrations should be given to root out this silly notion from laymen's minds. With these points in view some days ago a Civil Hospital Emergency Committee was appointed with few very enthusiast workers, but as far as my knowledge goes people did not respond to it and very little is heard of it now.

At present the Red Cross Society has maintained a transfusion service and as far as possible they try to give a suitable donor. Their register also appears to have comparatively fewer names, as many times the same donor is seen to come over and over again. Sometimes it becomes difficult to get a donor from this service on holidays and Sundays, as many of the donors have no arrangements for receiving phone calls, and so the service sometimes cannot provide donors for obstetrical emergencies With all that, they deserve to be congratulated for keeping it going on in spite of so many difficulties.

The donor must be healthy and all possibilties of syphilis, malaria, hypersensitiveness etc. should be excluded. A healthy donor can give 500 c.c. of blood without any ill effects. It is advised that he should not give another donation after this loss at least for three months.

In the present war because of the establishment of the many blood banks the problem of effect of donation of blood on the donor was studied in greater details. The results of these investigations are as follows :—

(1) Incidence of fainting is 28 per cent to 6.85 per cent.

(2) Fainting is more common in women than in men and especially when menstruating

(3) More common in younger donors.

(4) Common when donor is fasting for many hours.

Use of a Universal Donor :

It is preferable to use a donor of the same group as the recipient, as sometimes the agglutinins of the donor are of high titre and a transference of such a blood might cause hæmolysis of the recipient's cells and might cause mild reaction after a small transfusion and a severe or fatal one after a large transfusion.

Method of Transfusion :—

Blood may be transfused either unmodified or by modifying it by adding various anticoagulants. There are staunch advocates on either side and the relative advantages of transfusion of unmodified or of citrated blood do not appear to be settled as yet.

Unmodified Blood :—

The advantages of whole blood are that it contains in a relative unaltered from the clotting elements leucocytes, immune bodies etc. which the physician often desires to use. This method therefore appears to be of choice in hæmorrhagic conditions, infections, cachectic conditions and in all diseases where the opsonic and phagocytic powers of the blood have to be made use of. The advocates of this method claim that the cirated blood gives rise to more reactions than unmodified. Wiener and others have now definitely proved that the severe reaction were not due to the cirate but were due to other factors especially foreign matter derived from the apparatus. They have shown that thorough cleaning and sterilisation of the apparatus brings down the reaction to a very low level.

The best and most popular method of transfusing unmodified blood is by syringe valve method. Various modifications of such syringes are available.

Citrated Blood :—

There are many anticoagulants, of which sodium citrate is most useful and reliable. The quantity of sodium cirate recommended is 0.25 to 0.3 per cent.

A 2 per cent sodium citrate solution should be prepared in physiological saline : 15 cc. of this should be taken for 100 ccs. of blood.

The sodium cirate should be neutral. The water must be treply glass distilled water.

There are many advantages of using citrated blood, the main being the ease with which it can be manipulated. The method is best in most of the surgical, obstetrical and gynæcological conditions.

Other anticoagulants :—

Heparin : The donor is given 1 mg. of heparin per kg. of body weight and the transfusion should be started within 10 minutes and

completed within 30 minutes. The donor's coagulation time is altered for about 1½ hours. Heparinised blood has no effect on the recipient. The effect of heparin in the donor can be immediately destroyed by the intravenous injection.

Heparin can also be used in proportion of 0.1 to 0 2 gm. per 100 cc. of blood. By this way clotting is prevented from 105 to 120 minutes. Heparin acts by inhibition of platelet agglutination.

Recently a new drug—'Dicuomarin' with anticoagulant property has been described. It acts at the prothrombin level. It takes about 24 hours to act. So far it has not been given any trial as an anticoagulant for blood transfusion purposes.

Technique of Transfusion :—

The blood may be collected in a saline flask containing requisite amount of 2 per cent citrated saline and then given by gravity method. This method has some disadvantages, the main being that the blood is exposed to air for a long time and so chances of contamination and hence post transfusion reactions are many. The ideal method is to collect the blood in a closed bottle and give it by drip method. This method may be described in details ;

Materials required :—

(1) Fair-deals or filtrair's bettles with a lid having a rubber diaphragm.

(2) 2½″ long B. D. needles of 15, 16 and 17 sizes for use of the donors. In females it is better to use size 17 needle.

(3) Transparent rubber tubes for collection and transfusion of blood.

(4) A specially prepared 6" long neddle of the same bore as B. D. 15 size for collection.

(5) Air filters.

(6) Drip with one outlet and two inlets.

(7) A glass adapter for needle.

(8) B. D. 18 size or 20 may be used for recipient.

Method of Sterilization :—

2 per cent solution of sodium cirate in normal saline in requisite amount in the bottles and the lid is kept loose. Then it is sterilised in an autoclave with the lid loose. After sterilisation is finished, the lid is tightened when the solution is hot,

The needles and rubber tubes are boiled in 0.1 per cent NaOH solution for 5 minutes, washed throughly in distilled water and then sterilised by boiling.

The air filters are sterilised in hot air oven.

The blood is collected in this bottle by piercing the rubber diaphragm and not by opening the bottle. The bottle must be well shaken to prevent clotting and the blood should fall directly in the solution and not to the side of the bottle.

The transfusion apparatus should contain a drip with a side nozzle and a filter for the blood. To the side nozzle is attached another filtrair bottle containing sterilised saline. This helps in washing off the whole rubber tube and prevents the sedimentation of the blood in the rubber tube when the blood is given slowly. The blood should be allowed to go by gravity at the rate of 40 drops per minute or with the same number of drops per minute as the pulse rate. The saline should be allowed to flow at intervals. The blood is given by method of gravity. The main advantages of this method are :—

(1) Complete asepsis can be maintained, this being a closed system.

(2) The rate of blood flow can be controlled.

(3) Biological test can be done.

In this method about 20 ccs. blood are injected in the recipient's vein and if after 10 to 20 minutes no reaction occurs a large quantity may be injected. This test should be used as a supplement to the methods of typing and cross matching.

Routes of Transfusion :—

(1) Intravenous—This is the usual route. Sometimes the veins are collapsed and it may not be possible to get in even after desection. In these cases other methods have to be used.

(2) Through sternum—In adults this is one of the easy routes in cases where it is difficult to get in a vein. Recently Hamilton Bailey has described this method in details in one of the *B. M. J.* issues. He uses special sternal puncture needles.

(3) In children—Tibial puncture is better and easier than sternum, as the sternum is very thin in them.

(4) Sagital sinus in children.

Dr. B. N. Purandare will demonstrate this apparatus at the end of this paper.

Post Transfusion Reactions :—

Post transfusion reactions can conveniently be divided into three large groups—Allergic, Haemolytic and Pyrogenic.

Allergic reactions : are manifested as urticaria etc. It is seen that such reactions are more common when the donor's blood is collected after meals and particularly if he has taken some proteins to which the patient is sensitive. These can be prevented in some caaes by bleeding the donor when fasting. These reactions respond well to adrenaline.

Haemolytic reaction : The usual symptoms are fullness of head, restlessness and anxiety, a sudden sharp pain in the lumbar region, precordial oppression, dyspnœa, coughing etc. This may be followed by collapse, shock or hæmoglobin urea. Sometimes the patient gets complete suppression of urine. Certain cases exhibit a bleeding tendency. Some develop jaundice later on.

These reactions are explained as follows:—When blood hæmolyses, it is excreted by the kidney and in it forms acid hæmatin which blocks the tubules and causes anuria. This work has been supported by experimental work and recently by p. m. examination of kidneys in cases of crush syndrome. In this condition the kidneys showed casts of myohæmoglobin in the tubules causing obstruction, anuria and other symptoms.

The factors which are responsible for these hæmolytic reactions are:—

(1) Transfusion of blood of an incompatible group—this can be avoided by doing the typing and grouping very carefully.

(2) Use of a so called "Universal donor". In these cases possibility of hæmolysis exists if more than 200 ccs. are transfused in a severely anæmic patient or if the donor's serum is of a high titre. Prevention is to avoid such a universal donor whenever possible.

(3) Another factor is the presence in patient's serum of atypical agglutinins and hæmolysins acting on donor's corpuscles.

(4) Rh factor—presence in Rh negative patient's serum of iso-immune Rh bodies, which cause hæmolysis of Rh positive carpuscles—or—donar. Preventing is to use a Rh—ve donor.

(5) In certain cases there is no in vitro incompatibility of blood. Such cases should be classified as "Unavoidable" in the present state of our knowledge.

Many of these hæmolytic reactions are likely to occur in obstetric practic and they can best be avoided by careful typing, cross matching, testing in vitro for hæmolyiss and agglutination at 37°C, at room temperature and excluding the presence of cold agglutinins This can be done only by a man specially trained in these procedures

Treatment for haemolytic reaction :—

If symptoms appear, transfusion should be immediately stopped. and urine should be alkalinised. A rapid method of alkalisation of urine is as follows:—10 cc. of 2 M or 3 M sodium lactate solution (which is sterilised by autoclave or filtration) and 10 cc. of saturated solution of sod. bicarbonate (sterilised by filtration) are injected intravenously. Intravenous glucose also may be given to produce diuresis.

Pyrogenic Reactions :—

Symptoms are sensation of chill, rigors, rise of temperature etc. These reactions for a long time were supposed to be due to citrate itself. Now it has been proved beyond doubt that other factors are responsible for these, such as foreign bodies in the transfusion apparatus, old blood clots or fibrin strands, distilled water used to prepare the solution incomplete sterilisation of the rubber tubes etc

These reactions can be prevented as follows:—

(1) Using reliable and best quality material (sod. citrate and sod. chloride).

(2) Using fresh treply glass distilled water.

(3) Cleaning the apparatus as follows after using it: After thoroughly cleaning it in tap water and removing all dirt particles and blood clots—the apparatus is boiled for five minutes in 0.1 per cent NaOH solution. Then it is thoroughly washed in distilled water and then sterilised.

(4) The rate of blood flow should not be too fast—the ideal spread being the same number of drops of blood per minute as the pulse rate.

Some of these can be prevented by administering ephedrine and luminal ½ to 1 hour previous to the transfusion. This also puts the patient to rest and minimises the excitement of the transfusion.

It has been observed by certain workers that pyrogenic reactions are more marked in the following conditions:—

(i) Blood dyscrasias, leukaemia, purpura etc.

(ii) In febrile than in afebrile patients.

(iii) Persons suffering from septic diseases.

(iv) Patients treated for gynæcological troubles: Our experience in the K. E. M. Hospital with preserved blood also is the same.

Follow up of the patient after a transfusion—Immediate:—

Watch must be kept on pulse rate, any other distressing symptoms and especially for any symptoms of hæmolytic reactions.

Delayed: In cases of urticaria adrenaline must be injected. In cases of hæmolytic reactions patient's serum and urine must be examined for evidence of hæmoglobinæmia and hæmoglobinurea respectively and the patient's and donor's blood should again be tested to exclude the error of transfusion of an incompatible blood.

It is better to examine the 1st, 2nd and 3rd samples of urine after every transfusion for evidence of hæmoglobinurea.

Other blood except from a donor:—

Placental blood: This blood has been given a trial but the yield from the placenta is very little, about 80 cc.s and moreover it is very difficult to avoid contamination.

Cadaver blood: Cadaveric blood has been given an extensive trial in Russia and probably a great progress will be done during this war. In must be collected within eight hours of death. This method has not yet been tried here.

Other blood Substitutes:—

Plasma: Some of the results of plasma transfusion in obstetric hæmorrhage and shock are so striking that it is felt by some that every lying in institution should be equipped with plasma. At least for the present preparation of plasma is not easy in small hospitals.

It is possible only for very big institutions to have sufficient quantity of plasma and they if possible should supply it at moderate charges to the other hospitals. A healthy donor can give 500 ccs, of blood and from this the maximum yield of plasma is about 250 ccs. This plasma should be pooled i.e. the plasma from different groups must be mixed together and then redistributed into different bottles ready for supply. This pooling together is supposed to diminish agglutinin titre of high titre plasma and thus lessen the risk of reactions. Even this plasma in vitro may give rise to agglutination of recipient's corpuscles and so theoretically such a palsma should not be given, but for practical purposes 500 cc. of pooled plasma may be safely given if the rate of introduction is slow. This is explained as due to dillution of the plasma by recipient's plasma and so the titre of the plasma introduced goes still lower and chances of agglutination of recipient's corpuscles become less. Some material gets deposited in the liquid plasma stored in cold after sometime, and so it has to be filtered before use. The ideal plasma is of Group A B, as it does not contain any agglutinatinins. It is said that allergic reactions after plasma are more common than with whole blood.

Because of the sedimentation of some material in plasma dried plasma is preferable.

The other blood substitute is lyophilised or evaporated blood serum. It helps to maintain the osmotic tension in the blood.

One more preparation has recently been described as a blood substitute. It is despiciated bovine serum This is a serum of animals which has been detoxicated by some chemical processes. Few reports of its trial have been published but its general use requires more clinical trials.

A word about the Blood Bank must be mentioned. The K.E.M. Hospital has been running a blood bank of their own for over two years, and the clinicians there, feel that it is serving a very useful purpose. The published statistics about the post transfusion reaction of Bank Blood compare very well with the citrated blood or unmodified blood in Western countries but unfortunately my experience as far as reactions are concerned was not so in the K.E.M. Hospital. I find that the pyrogenic reactions are high.

Before I take my seat I must thank Dr. B. N. Purandare for asking me to read this paper, and you all for the patient hearing.

Dr. B. N. Purandare demonstrated the blood transfusion apparatus used by him in his private hospital. The citrate solution is kept in ampoules. He has been using it for a long time and has never seen any reactions following it use though they are preserved for a long time. The bottle with the special lid, which has one outlet and one inlet for air is used by him. The citrate is first filled in the bottle

in requisisite amount or praferably a little in excess and then blood is collected with the usual precautions.

Sometimes a long clot forms in the collecting metal rod and falls to the bottom of the bottle which sometimes causes an obstruction to the blood flow. To prevent this, the metal rod is removed very quickly from the bottle at the end of collection of blood from the donor.

Then the lid is changed and another special lid mentioned above is used.

A drip with a side nozzle is included in the transfusion apparatus.

DISCUSSION

Dr. B. N. PURANDARE said that cadaveric blood had been tried in K. E. M. Hospital by Dr. Dikshit on 50 patients and was found satisfactory. He thought that gynæcological patients in the hospital reacted badly to blood transfusion because of the defect in the techinque, the use of the open method instead of the closed method of transfusion.

He did not think that fresh sodium citrate was essential. He did not observe any reactions with old samples of sodium citrate prepared in triple distilled water and stocked properly in sterile ampoules. He also demonstrated the dried plasma bottle and the method of preparation and administration. He asked Dr. Wardekar whether he had noticed the reactions in the patient after a plasma transfusion that one would expect with a blood transfusion. He cited one of the cases who complained of pain in the back, feeling of suffocation, and cramps in the legs while receiving a plasma transfusion. He persisted with the transfusion after which the patient developed urticaria for which adrenaline was given. The patient had two or three blood transfusions previously, and he wondered if this had anything to do with the reactions produced by the subsequent plasma transfusion.

Dr. M. S. TALWALKAR wanted to know how much blood should be given to a ptaient at one siting. He did not think that plasma was a good substitute for blood in cases of hæmorrhage where only blood can replace blood. In shock, plasma can certainly be tried. He asked if it was advisable to try bone marrow transfusion in those cases where the veins get easily blocked or are difficult to get into in collapsed patients.

Dr. JUNGALWALA preferred trying bone morrow transfusion in those cases where the veins are difficult to expose or to get into. The best site for bone marrow transfusion is the manubrium sterni and he demostrated the special needle and the technique.

Dr. SARAIYA said that the indications for blood transfusion were: hæmorrhage, anæmia and infections. He has tried transfusion into the femoral vein in badly collapsed patients. Thrombosis of the femoral vein after such transfusions is due to neglect and careless technique. He prefers this method of transfusion to bone marrow transfusion.

With anæmic patients blood transfusion is treacherous, and the result depends on the condition of the myocardium.

In cases of infection, blood transfusion does not give good results.

He asked Dr. Wardekar if blood transfusion was advisable in cases of anæmia with high blood pressure; if it was necessary to group the blood of new born babies before giving them a blood transfusion.

Dr. KARANDE referred to an article in the Year Book of Obstetrics and Gynæcology 1943 where it is stated that it is not necessary to match the blood of new born babies as they are supposed to be immune to reaction.

Blood transfusion should be restricted to cases of hæmorrhage, where the results are good. For anæmias he is chary about giving blood transfusion, which, if absolutely needed, should be given in small quantities and very slowly. If any reactions developed, the transfusion should be stopped immediately. When collecting blood from the donor, it is better to filter the blood through gauze pieces to avoid any mishaps that may result from clots blocking the tube.

Plasma also should be fitered to prevent any reaction. Plasma is a good substitute for loss of fiuid if not for loss of blood. He asked if the Rh factor was being determind in Bombay.

Dr. B. N. PURANDARE said that patients with severe anæmia and high blood pressure, should receive a blood transfusien soon after delivery to avoid the effects of the sudden drop of blood pressure that occurs soon after delivery in these toxæmic patients. He has tried sternal transfusion in a very small child with sarcoma bothriod on the day previous to operation but found that he could not give more than 50 cc. due to some obstruction. So he subsequently finished the transfusion by injecting the blood into one of the tibias. He has tried transfusion into the femoral vein by close method in two cases without any thrombosis. The femoral vein is very easy to find and there is no need to cut on to it to expose it.

Dr. JHAVERI said that most blood transfusions at the Bhagat Hospital were given for secondary anæmias. At the first transfusion a small quantity is given, and the transfusion is repeated a second and even a third time if necessary.

Dr. WARDEKAR, answering Dr. B. N. Purandare's questions said that Dr. Dikshit's work on cadavaric blood was not published anywhere and so was not known. During his stay at K. E. M. Hospital he tried for cadaveric blood, but for one reason or the other a suitable cadaver could not be obtained. Referring to Dr. Purandare's question about old sodium citrate ampoules, he said that the preparation of triple distilled water and sodium citrate solution, filling of ampoules and their sterilisation should be done on the same day. The old distilled water should not be used, as it is such water which generally gives rise to pyrogenic reactions. These sealed ampoules may be used any time later on. The reaction after plasma transfusion in this particular case may be due to high sensitivity of patients corpuscles or high agglutinin titre of the plasma of that particular batch. Answering Dr. Talwalkar's question, he said that 500 cc. of blood raises hæmoglobin by 10 per cent. In obstetric cases a transfusion of 500 to 800 ccs. is recommended.

If patient is not anæmic befeor hæmorrhage, the immediate thing to be combated after hæmorrhage is shock and not percentage of hæmoglobin, so-plasma serves this purpose very well, though whole blood is preferable. Plasma moreover can be always kept ready for emergency.

In reply to Dr. Saraiya's question, he said that agglutinogens are present in new born babies, but the titreis not high. The agglutinins start developing after 10th day usually, and if present before that day, have a very low titre. It is not necessary to group the babies blood. In children it is better to give blood transfusion by tibial puncture rather than by sternal puncture.

In anæmic patients with hypertension if a transfusion has to be given it is better to give a suspension of red blood corpuscles. Plasma must be filtered after mixing, in order to remove the coarse particles.

As far as my knowledge goes no pathologist in Bombay is determining Rh positive and negative bloods, but they do in vitro test for hæmolytic reaction before every transfusion.

The greatest danger of a large blood transfusion in severely anæmic patients, is the sudden failure of the heart which has adalrey undergone a fatty degeneration. In such cases 100 cc. should be given preferably by sternal puncture and repeated every 4 or 5 days.

Dr. N. A. PURANDARE thanked Dr. Wardekar for his excellent paper. Referring to the previous clinical meeting he thought that the help of a pathologist was more essential than the help of an anæsthetist.

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