and consequently returned quite unbalanced with a blood-sugar of 0.290 grm. per cent. and passing sugar in the urine.

This case, though mild, is definitely diabetic and illustrates well the injurious effect of sepsis on the condition.

Case 7, Chart VII.

This patient was in a medical ward for diabetes in July and August, 1929. She complained of thirst, pruritis, neuritis and loss of weight. Her resting blood-sugar was 0.286 grm. per cent., and her urine was loaded with sugar and some acetone. She was put on a balanced diet and 20 units of insulin a day.

Her condition and neuritis improved, and on discharge she could walk with very little difficulty. Fourteen months later she reported at the maternity department four months pregnant and was admitted. She was then found to be sugar and acetone free and to have a low blood-sugar on 125 grm. carbohydrate a day. The insulin was reduced and carbohydrate put up to 153 grm. Insulin had to be further reduced as the blood-sugar was consistently on the low side, and finally at the end of ten days it could be stopped altogether. She was sent home a week later balanced on no insulin and a diet containing 145 grm. carbohydrate.

This patient was admitted later for confinement, which went off normally, and she was finally sent out with urine acetone and sugar free, a normal blood-sugar and on no insulin.

Had this patient only been seen during pregnancy, without knowing the previous history the diagnosis of diabetes would have been in doubt; but in her medical record there can be no doubt that she was a true diabetic, the function of whose pancreas had improved under efficient insulin treatment.

Discussion.

The cases recorded above show that with suitable doses of insulin, women suffering from diabetes may pass through pregnancy with no injurious effects. The importance of a sufficient supply of carbohydrate in the diet must be stressed, as all pregnant women are liable to a mild ketosis, and these patients particularly so. In my opinion, 125 to 150 grm. of carbohydrate a day is necessary and the insulin must be adjusted to this intake.

The fact that these patients during pregnancy frequently pass small or large quantities of sugar in the urine, must not be taken as an indication of an increase in severity of the condition, as it is largely due to the lowering of the renal threshold for sugar which occurs in pregnancy.

In conclusion, it should be noted that in all the cases reported there was an increase in the sugar tolerance, several actually requiring less insulin than their pre-confine-ment value; a result, no doubt, of the more effective control during pregnancy due to the fact that the women were more willing to attend regularly during this period.

THE TREATMENT OF PNEUMONIA.

By H. V. MORLOCK, M.C., M.D., M.R.C.P.

Lobar pneumonia is a self-limited infection; that is to say, within a given time (five to eleven days) the infection has run its course, the patient has either overcome the infection and completely recovered, or the infection has overwhelmed the patient and death has taken place.

What then is the deciding factor in the production of one or other of these results? This deciding factor is the ability or the inability of the patient to build up sufficient antibodies to overcome the infecting organism and its toxins.

Therefore in the treatment of pneumonia,
our task must resolve itself along two lines of attack. Firstly, to assist the patient in building up the antibodies and eliminating the toxins of the organism. Secondly, and if possible, the most important, the destruction of the organism or the neutralization of its toxins by active medical means; by this I mean the employment of drugs or sera, which are known to kill the organism or neutralize its toxins. Unfortunately, in pneumonia, this line of treatment has not attained the paramount importance that it has in malaria (quinine) or diphtheria.

Let us now consider the steps we must take to push home our first line of attack, i.e., the assistance of the patient to build up antibodies and the elimination of the toxins, and the treatment of pathological effects produced by the toxins.

To assist the patient in building up his antibodies, we must conserve all his energy to that purpose and that purpose only, in other words, we must give him complete rest, physically and mentally.

The patient should be nursed in a comfortable single bed; the mattress should be firm in order to ensure that he does not sink down into the middle of a feather bed, which then becomes to all intents and purposes a huge poultice to the whole of his body. As regards the position in which he should be nursed, I am strongly in favour that he should lie absolutely flat, except for one pillow; my reasons for this are that this position is the one that throws least strain on the heart, the organ to which in pneumonia, as we shall see later, we must give a great deal of attention; secondly, because in this position it is far easier to carry out hydrotherapy, a measure which is of utmost importance in the treatment, and to which I shall return later; thirdly, because if one watches patients that are nursed in the raised position, one will see that frequently they slip down and lie huddled at the bottom of a heap of pillows, in which position they are at a great disadvantage in obtaining easy action of the respiratory muscles (i.e., the maximum of rest is not being obtained); fourthly, in the flat position the patient can be nursed with the minimum of movement.

When we have got our patient in bed we have only started on our efforts to procure the necessary rest. In all probability the patient is in pain. A patient in pain cannot rest, and therefore the pain must be alleviated if possible. The pain of the accompanying pleurisy can often be relieved by applying heat to the affected side of the chest, and this should always be done by whatever means you personally prefer: anti-

phlogistine, hot fomentations, linseed poultices, &c.; the only comment I would make is that the application should not be so heavy or so tightly applied as to embarrass the patient's breathing, a point which you must personally reassure yourself about. If local application does not relieve pain, then a general analgesic and hypnotic must be used; the one drug that we have above all for producing rest of body and mind is morphia, and in the early days of pneumonia, when pain is at its worst, we need not hesitate to use morphia in quantities sufficient to produce the desired result (½ to ½ gr.). After the fifth day, one tries other means to procure rest; but if these are not successful then morphia may be used, for complete rest is essential. Another point in obtaining rest is not to examine the patient unnecessarily. After the diagnosis has been made it is unnecessary to move the patient for examination, because we can obtain all the information we require by examining the front of the chest and ascertaining the condition of the heart and also its position if we are suspecting an empyema.

To keep our patient's resistance up, i.e., the power to enable him to build antibodies, we must feed him. His diet must be light and nourishing; but within reason he may take what he fancies. For the most part it will be fluids or semi-solids; may I here mention ice-cream, which, if made with cream and sugar, is a first-class food for a
The treatment of pneumonia

The patient ill with an acute infection, because it is very acceptable to him and also contains the ingredients you wish him to take. The only other point about the diet is that in order to procure rest he must be fed, and not allowed to feed himself.

Let us now consider how to eliminate toxins:

1. By the lungs; 2. by the bowel; 3. by the skin; 4. by the kidneys.

How then can we assist the elimination of the toxins by the lungs? In the first place, by seeing that the air the patient has is pure, cool air, which acts as a stimulant to respiration, thereby washing toxins out of the lungs; in other words, the room must be well ventilated, windows open day and night, a fire burning to create a ventilation and give warmth, the bed being kept out of a draught.

Elimination by the Bowel.—When first seen the patient should be given calomel, and this should be followed by a saline draught each morning, sufficient to cause a free action of the bowel but not to purge him and so disturb his rest.

Elimination by the Skin.—The skin can be stimulated to excretion by hydrotherapy; not alone does hydrotherapy help in this way, but it is one of the best stimulants to the circulation which we have, and it is on the heart and circulation that the toxins of pneumonia have their greatest effect, for they produce a loss of tone in the arterioles and capillaries, and so give rise to a fall in blood-pressure and eventually failure of the circulation. May I here give a very inadequate analogy. The circulation of the patient who is treated in an ill-ventilated room on a feather bed with many bed-clothes, is in the same state as the circulation of a patient after too long a stay in a hot bath; his capillaries and arterioles are dilated and, on attempting to stand, he becomes faint and giddy and feels slack and good for nothing, while the circulation of the patient treated with hydrotherapy is more comparable to the circulation of a man stepping out of his cold bath in the morning. Hydrotherapy is quite simple to carry out. The patient has a cradle placed over him, and a sheet and blanket is placed over the cradle; the patient is tepid sponged every four or six hours, according to his needs. With good nurses, this sponging does not disturb the patient in the slightest.

Not only does hydrotherapy assist in the two ways mentioned above, but it is also a most effective way of producing sleep and abating delirium. In cases thus treated, it is extremely uncommon to see a collapse at the crisis.

Elimination by the Kidneys.—This is produced by forcing the patient to drink fluid, and so washing out the toxins through the kidneys. I am never satisfied with my patient unless he is taking 3 to 4 quarts of fluid per day. This means hard work for the nurse, but it can be done. The fluid can be given as water, imperial drink, weak tea or milk and water; lactose should be added in as large a quantity as possible, because sugar is food and sugar is also a good cardiac tonic. I use lactose because it does not sweeten, and a patient will take as much as 2 oz. to a pint of fluid, and thus, if one gets in 3 to 4 quarts of fluid, one is also getting in an extra 12 to 16 oz. of sugar, or roughly another 1,200 to 1,600 calories.

The treatment of the pathological effects produced by the toxins.—As I have already mentioned, the most marked effects are to be seen on the heart and circulation, and in hydrotherapy we have a very useful measure to combat these toxic effects. The procuring of complete rest is yet another method of assisting the heart. As regards the use of drugs for the cardiac condition, I personally have always given digitalis in adequate doses from the onset of the disease until after the crisis. Dixon has recently shown, in animals, that if the heart is digitalized first, the toxins of an infection have much more difficulty in affecting the heart than in animals whose hearts have not been digitalized. The dose of digitalis is usually
THE TREATMENT OF PNEUMONIA

between 45 and 60 m. of the tincture or its equivalent in other preparations, per diem. With these doses it is seldom that the digitalis itself produces any toxic effects. If these should appear, the quantity of digitalis must be reduced.

On the question of the use of alcohol as a cardiac and circulative stimulant, I can only say that there is no pharmacological evidence to show that it possesses this quality, and indeed, there is evidence to the contrary, and also that it may definitely inhibit the immunizing process. I therefore do not believe that it is sound treatment to use it as a routine.

Another method which is of service in assisting the failing heart in pneumonia, is venesection. The time to employ this method is when the right side of the heart is over-distended, due to weakening of the cardiac muscle by the toxins, and also to the increased pulmonary pressure. The over-distended ventricle does not contract as efficiently as a normally-distended one, and thus venesection, by relieving the increased venous pressure, assists the right ventricle to contract more efficiently. This increase in venous pressure can be recognized clinically by the distension of the superficial veins on the hand. Normally, when a person is lying flat in bed and the arm is held in the same horizontal plane as the auricle, the veins on the hand can just be seen. If the venous pressure is raised, these veins become distended, and as the hand is raised gradually above the level of the auricle, the veins will be seen to become less and less distended until they reach their normal size; when this occurs, the height to which the arm has been raised above the auricle gives a rough guide to the increase of the venous pressure. When this rise of venous pressure is marked, venesection to the extent of 15 to 20 oz. should be carried out. The trouble is that the venesection is often left until the patient is in extremis, and then it is too late.

Another pathological result which we can treat is cyanosis. Cyanosis in pneumonia means anoxaemia. Anoxaemia results in insufficient oxygen supply to the heart, and also to the other tissues on which the patient is depending for his production of antibodies, and therefore by relieving this anoxaemia, we not only assist the heart but also the general resistance of the patient. As soon as there is the first indication of cyanosis, oxygen should be administered continuously by the nasal catheter method; by this method oxygen can be administered for days and nights on end without interruption if necessary from the beginning to the end of the disease.

In a very few cases, in spite of all that I have advised as routine measures, early on in the disease the toxæmia is profound. The patient has an ashen-grey hue, is restless and semi-comatose. In such cases a preliminary venesection, followed by a large blood transfusion, is a method which may be successfully employed.

In spite of all our therapeutic measures, towards the time of, or at the crisis, collapse may occur; this collapse is due to a vasomotor failure, and measures must be used which are known to effect vasomotor tone. The drugs we have at our disposal are camphor, caffeine, strychnine, adrenalin and pituitrin. Five minims of adrenalin can be given intravenously and 1 c.c. of pituitrin intramuscularly two-hourly up to four doses. Caffeine, camphor and strychnine are also of value when given subcutaneously; but I personally prefer to rely on adrenalin and pituitrin. Coramine has been suggested as a drug of great value for such a purpose, but I have been disappointed in its results. By the use of these methods we may be able to tide our patient over the crisis.

Now I will deal with that part of the treatment which in this country at the present time unfortunately takes second place to the measures I have already described. I refer to the destruction of the invading organism by the administration
to the patient of sera, vaccines or specific drugs. First I will deal with sera. There are four types of pneumococci:—

Type 1 accounts for 33.6 per cent. of cases, with a mortality of 20.7 per cent.; type 2 accounts for 19.1 per cent. of cases, with a mortality of 42.0 per cent.; type 3 accounts for 13.3 per cent. of cases, with a mortality of 41.0 per cent.; type 4 accounts for 33.1 per cent. of cases, with a mortality of 29.2 per cent.

The serum used must be the specific serum for the type of pneumococcus which is causing the pneumonia, therefore, in order to use a serum the organism must first be obtained from the patient's sputum, then cultivated, then typed. This procedure takes anything up to twenty-four hours; further, in order that the serum may be of use, it must be given within the first forty-eight hours of the disease; it will therefore be seen that in order to use serum therapy with much chance of success, two conditions must be present: (1) The disease must be recognized early; (2) institutions must be at hand prepared to carry out the cultivation and the typing of the organism.

In the American Continent, where pneumonia occurs as an epidemic disease and also where pneumonia is a disease feared greatly by the medical and lay public, cases of pneumonia are sent into hospital within the first few hours, and the laboratories have the method for cultivating and typing the organism at hand for immediate use, the above two conditions are fulfilled, and in America type No. 1 pneumonia has been treated successfully by serum, the mortality being reduced from 28 to 7. In this country, because of the difficulty of obtaining the above two mentioned conditions, serum has been used very little.

A modified serum therapy is at present being given a trial and warrants the hope of some success. This modification is Felton's polyvalent antibody serum which is given in 10 c.c. doses intravenously as soon as the patient is seen, and is repeated six-hourly up to four doses, during which time the patient's sputum is examined and pneumococcus cultivated and typed, and when the type of infecting organism has been established, further serum therapy is carried out with the specific serum; but even with this modification, Felton's serum must be administered early and success has only been obtained in types No. 1 and No. 2.

Vaccine Treatment.—Winn of Birmingham used a stock vaccine of pneumococci, of which he gave a hundred million as the initial dose, and repeated this dose if necessary on the following day. In those cases in which this treatment was carried out within the first twenty-four hours the results appears to be very gratifying, while if the initial dose is not given until the third day, the treatment is much less effective.

A mode of treatment which has been employed on the Continent, particularly in Germany, with satisfactory results, is the giving of quinine in large doses. In a large series of controlled cases, the mortality would appear to have been reduced from about 20 to just over 8 per cent. There is definite pharmacological evidence that quinine has a deleterious effect on the pneumococci. The quinine can be given either intramuscularly, 5 c.c. of the following solution being given as soon as the patient is seen, followed eight-hourly by another injection; the following day these doses can be repeated and if necessary increased by 5 c.c. The solution is:—

| Quinine H.Cl. | ... | 2 parts |
| Urethane | ... | 1 part |
| Aq. dist. | ... | 20 c.c. |

It must be warmed before being injected in order to dissolve the crystals which appear in the standing solution.

The quinine can be administered orally in the form of a proprietary drug known as Optochin Base (ethyl-hydro-cuprein). This drug is administered in doses of 3 gr. six-
hourly up to twelve doses in all. With this quinine treatment there is one grave danger, and that is the possibility of producing a quinine amblyopia, and therefore the quinine should not be pushed to a greater extent than I have stated above.

I have used both these methods, and I am satisfied that they are definitely of value if they are administered within the first few days of the onset of the disease.

Another method which has been advocated is the giving of a 5 gr. of hydrarg perchlorin intravenously. I have seen this method used, but have formed no great opinion of its value.

These, Ladies and Gentlemen, are the only direct means we have of dealing with the disease, and you will readily see why, although this line of attack is the most rational, I have only given it second place and have put first the treatment of the patient.

I have been dealing with the treatment of lobar pneumonia, nevertheless, all the measures I have described for the treatment of the patient hold good when we are treating a patient suffering from influenzal or bronchial pneumonia.

### POST-GRADUATE NEWS.

The Miller General Hospital, Greenwich, will hold its first intensive special course in Medicine and Surgery under the aegis of the Fellowship of Medicine from July 20 to July 31. The daily sessions will begin at 10.30 a.m. and will continue until 5.30 p.m. The mornings will be devoted to clinical and laboratory methods, &c., whilst the afternoons may be spent in the various departments of the hospital. At 4.30 p.m. formal lectures will be delivered by members of the staff. Luncheon will be obtainable in the neighbourhood of the Hospital, and tea will be provided by the hospital authorities. The tickets at 4 p.m. This course is of particular interest to the general practitioner desirous of learning up-to-date methods of hospital treatment. Fee £3 3s., or £2 2s. for either week.

From August 4 to August 29 a course of instruction in Urology will be given at the All Saints' Hospital, Vauxhall Bridge Road, S.W.1. This course will consist of clinical and cystoscopic demonstrations undertaken by members of the staff on Monday and Wednesday evenings, at 6.15 p.m.; Tuesday, Wednesday, Thursday and Saturday afternoons at 1.45 p.m., on both male and female patients. For particulars of operations and other facilities offered at this hospital during the course application should be made to the hospital. Fee £2 12s. 6d.

An all-day course will take place at the Queen's Hospital for Children from August 17 to August 29. There is an abundance of clinical, medical as well as surgical material as nearly 200 out-patients daily attend this hospital. A simple lunch and tea are kindly provided by the hospital authorities. Fee £3 3s.

In addition to the Special Courses the Fellowship of Medicine provides a "General Course," consisting of the clinical practice of the hospitals affiliated to the Fellowship. A programme is provided which is arranged under subject headings and leaves the holder of the comprehensive tickets free to make out his own time-table in accordance with his requirements. Arrangements are made to meet the needs of those unable to do whole-time study.

The following clinical demonstration has been arranged by the Fellowship of Medicine for July:—

July 10, 6 p.m.—Hospital for Diseases of the Skin, 71, Blackfriars Road, S.E.1, Dr. W. B. Winton (cases).

This demonstration is open to the medical profession without fee or ticket.
The Treatment of Pneumonia

H. V. Morlock

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