CASE II.

Pte. D. was admitted on June 11th, 1918. There was a compound comminuted tri-radiate fracture of the right patella exposing the knee-joint. The synovial membrane was much injected and the whole wound covered with sand. The same method of cleansing the skin and wound was adopted as in the former case.

Operation.

A tourniquet was applied. The wound was extended on the outer side by making a semilunar incision upwards so as to expose the joint more fully and facilitate the better apposition of the upper fragment of the patella. The bruised skin edges were excised, the joint thoroughly cleansed as before. The fractured surfaces of the patella were thoroughly scraped with a Volkmann's spoon so as to get rid of the sand, but nevertheless it was deemed advisable to remove a small portion on the outer side about $\frac{1}{2}$ in. in diameter. After thorough cleansing with saline the whole wound was gently rubbed with bipp and about 3ij of bipp, previously "let down" with sterile liquid paraffin until it had a more oily consistency, was run into the joint. The bony fragments were approximated as in the other case and the skin was closed with interrupted sutures. A spirit gauze dressing was applied and the dressings firmly bandaged on before the tourniquet was removed, a back splint with foot-piece was then applied.

The patient stayed for seven days, during which time the wound was never dressed. The temperature rose to 101° and 101.2° on the third and fourth day respectively, but the pulse was never over 85. The patient had no pain, and the temperature subsided before evacuation.

I am indebted to Captain Bannister, F.R.C.S., R.A.M.C., for the following notes, dated July 11th, 1918:

"When admitted to the base hospital the temperature was 101° and the pulse 96. The dressings were removed, and there was some slight surface inflammation of the lower end of the wound over the patella. The wound was dressed twice daily with eusol. The temperature reached normal the fourth day after admission, and the stitches were removed on the fourteenth day after the operation. The wound is now completely healed, except for a small area of granulations with some exposed fibrous tissue covering patella at the lower part of the wound. There is certainly fibrous union of the patella, and I think it will eventually become osseous. He can now move the knee about 30 degrees, but I have not allowed him much movement yet."

REMARKS.

I think there are several points of importance to be gathered from the above cases:

1. The thorough cleansing of the wound—this entails a considerable amount of time.
2. Discrimination in the quantity of "bipp" used: I have noticed that if it is used too liberally there is an extensive exudation which gives the wound a sodden appearance and necessitates the changing of the dressings, which is not desirable in fracture cases.
3. The importance of rest to the joint by splinting. This I regard as a most essential factor, whether there is any fracture or not.
4. The pulse, in conjunction with the temperature, is a better guide as to the necessity for changing the dressings and having a look at the wound than is the temperature alone. "Bipp" cases frequently run a high temperature, but if the pulse-rate remains slow there is no need for anxiety.

My thanks are due to Lieut.-Colonel H. A. Bransbury, D.S.O., R.A.M.C., for permission to publish the notes of these cases.

REFERENCE.

- ¹ BRITISH MEDICAL JOURNAL, October 20th, 1917, p. 503.

ON April 12th the "Mary Kingsley" medal of the Liverpool School of Tropical Medicine was presented to Dr. J. W. Scott Macfie, a former student of the school, in recognition of his distinguished researches in tropical medicine and allied subjects.

THE Société de Biologie has appointed a committee, with Professor Charles Richet as chairman, to study the physiological and hygienic problems of industrial life, including such matters as the physical and psychical qualities required for any particular occupation; work for persons with a physiological defect; the re-education of crippled and injured; the effect of diet, of hours of meals, of wine, alcohol, coffee, tea, and tobacco; and of factory conditions. Stress is laid on the necessity of close collaboration of scientists with heads of great industrial establishments and public authorities, which can be carried out only by a permanent committee, having at its disposal a fully equipped laboratory and funds adequate for the remuneration of full-time workers.

The Lumleian Lectures ON CEREBRO-SPINAL FEVER.

DELIVERED BEFORE THE ROYAL COLLEGE OF
PHYSICIANS OF LONDON,

BY

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LECTURE III.

(Abstract.)

In the third lecture the mortality, prognosis, prophylaxis, and treatment of the disease were discussed.

Serum Treatment.

The influence of the serum treatment on the prognosis was dwelt upon; its effect had been shown to depend to a very considerable extent on its early use. It was particularly in the septicæmic or premeningitic stage that early and vigorous intravenous administration of serum might cut short the disease. Herrick had recently shown that the free administration of serum intravenously reduced the mortality to 18.5 per cent. from 62.5 per cent. obtained in severe cases treated either by intrathecal injection alone or by intrathecal injection combined with small amounts of serum intravenously. Another important point was that the serum should contain the antibodies specific to the infecting strain of the meningococci. Flexner's multivalent serum from the Rockefeller Institute, made by the use of forty strains of meningococci, had on the whole given better results than any other serum, and the use of a multivalent serum, or of a pooled serum of the more probable infecting strains, until the actual type of the infecting organism was determined, when the univalent type serum was employed, would obviously be the most promising method.

Effects of Serum Treatment.

By comparison of the duration of the disease in various series of cases in the pre-serum era with 830 serum-treated cases that recovered Flexner found that the period of active symptoms shortened and that the cessation of symptoms, which in the natural history of the disease was almost always by lysis, was by crisis in 30 per cent. of the cases.

To sum up: although the infectivity of the disease was low, and a small proportion only of the population was affected, the prognosis of cases untreated by serum was bad, the death-rate varied in different epidemics from 20 up to 90 per cent., and was very rarely less than 50 per cent.; whereas with serum treatment the mortality should not be above 30 per cent., and, with further improvement of the methods and serum, might be much less, the duration of attack was shortened, and the incidence of sequels diminished.

Prognosis.

A very acute onset with sudden loss of consciousness—the *apoplecticiform onset*—had a serious outlook, but if the acute stage did not prove rapidly fatal recovery might eventually occur.

The outlook was bad in the fulminating cases also. The presence of a *rash* without further qualification did not affect the prognosis to any considerable degree, but a distinction must be made between the hæmorrhagic rashes, and more especially large purpuric extravasations, and the non-hæmorrhagic rashes. No prognosis as to a fatal result can be made from the leucocyte count. Similarly the temperature and the degree of headache had little, if any, ultimate prognostic significance.

Synovitis was a metastatic complication which, according to Netter, was seen in cases which eventually were cured. Possibly the local focus acted as a "fixation abscess" and raised the resistance to infection in the same manner as a vaccine. Fairley and Stewart found that a low blood pressure during the first three days was associated with a severe infection, and was therefore of bad omen. From routine examination of 184 patients, 116 of whom had optic neuritis, they found that the presence or absence of optic neuritis was of no value in prognosis, but they regarded *nystagmus* as pathognomonic of internal

hydrocephalus. The nature of the *cerebro-spinal fluid* was not a guide to the outcome of the case, except in so far as a large number of extracellular meningococci made the outlook bad. A purulent fluid might rapidly clear after intrathecal injection of efficient serum, or a clear fluid might rapidly become purulent.

The occurrence of *bronchopneumonia* naturally rendered the outlook very serious. Cheyne-Stokes's breathing and Biot's cerebral type of *respiration*, characterized by periods of apnoea at irregular intervals, pointed to approaching death, as did slowing of the respiration pulse ratio from the normal 1:4 to 1:2. Respiration might fail entirely while the pulse was well maintained. More than half the deaths occurred during the first week of the disease. Finally, the prognosis was difficult because sudden exacerbations from reinfection might occur most unexpectedly.

Cerebro-spinal fever in the past had a bad reputation for the number of disabilities it left behind—mental, nervous, and auditory, which in young children accounted for much deaf-mutism. But at the present time there was a general agreement that if the patient survived he was not likely, apart, perhaps, from deafness, to be permanently crippled, and mental changes did not appear to be much more frequent than after other severe diseases.

PROPHYLAXIS.

The avoidance of overcrowding was an essential factor in maintaining the general health and, as had been pointed out in the first lecture, in preventing a rise in the rate of meningococcal carriers.

As the disease is spread by human carriers it should be exterminated if all the carriers were detected and isolated until they became permanently negative; but this was not possible in practice, and, moreover, the frequency of intermittent carriers and the failure of bacteriological tests would prevent such a drastic measure from being infallible. Two methods, short of complete search for and segregation and disinfection of all carriers in naval and military forces, were mentioned: (1) that search for carriers should only be made when a case of the disease had arisen, and only among the contacts, the carriers thus detected being segregated and disinfected; (2) that new entries should be examined and the detected carriers treated in a selective manner.

Details of the treatment of carriers were given, whether by local applications to the nasopharynx or by preventive vaccination.

SERUM TREATMENT.

The use of antimeningococcal serum was not so simple or so uniformly successful as that of antidiphtheritic serum, which was antitoxic, whereas antimeningococcal serum, possessing bacteriolytic, bacteriotropic (opsonic), and anti-endotoxic properties, was more likely to fail in its powers as a whole. The extreme importance of specificity in the serum treatment of the disease and the absence of any benefit from non-specific treatment, or protein shock therapy, of which an extensive trial had unintentionally been made, were noteworthy. The important question, indeed, arose whether the intrathecal injection of inert serum might not do positive harm. Horse serum set up an aseptic meningitis and favoured the passage of meningococci through the meninges. It might, on the other hand, be argued that the increased number of phagocytes thus provided might do good. But it was significant that in 1915 the mortality among the naval cases treated with serum intrathecally was higher (61 per cent.) than among those treated in other ways (41 per cent.). In addition to the serum of immunized horses, the serum from convalescent patients had often been tried.

The serum treatment of cerebro-spinal fever might be directed against the general systemic infection before the meninges had been infected, or of the pre-meningitic stage, by the intravenous injection of antimeningococcal serum. The hypodermic or intramuscular injection of serum had also been advocated, but appeared to be infinitely less effective. The intrathecal injection of serum before the meningococci have invaded the meninges was not a harmless procedure.

The most efficacious method of introducing the serum into the blood stream was obviously by intravenous injection, and from experience of more than 100 patients Herrick found it both satisfactory and safe. His treat-

ment aimed at the sterilization of the blood before the meninges had become affected and was an advance on the usual methods which were concentrated upon the later stage when meningitis was established. Large quantities (200–600 c.cm. in all) of serum were given intravenously and, when meningitis was present, active spinal drainage and comparatively small intrathecal injections of serum were carried out. No bad effects followed the large intravenous injections and serious anaphylaxis was seen in only one case. Of the four classes of cases—the abortive, the ordinary, the severe, and the fulminating—Herrick's most brilliant results were obtained in the severe, the patients often coming out of coma with rapid recession of the rash and symptoms so that in forty-eight hours many were apparently out of danger; large intravenous injections reduced the mortality of the severe cases from 64 to 19 per cent.

Doubtful cases should be submitted to lumbar puncture at once; if the fluid were turbid, serum should be given intrathecally; but if quite clear, serum should be withheld unless meningococci were subsequently found. If the cerebro-spinal fluid was sterile, and especially when a blood culture showed meningococci, intravenous injections of serum should be given without delay; and, as the septicaemic stage of cerebro-spinal fever lasted on into the meningitic stage, the intravenous injections should be continued for a time, together with intrathecal injections. Lumbar puncture and the injection of serum should be performed under a general anaesthetic or under the influence of an injection of scopolamine $\frac{1}{100}$ grain, morphine $\frac{1}{4}$ grain, and atropine $\frac{1}{100}$ grain in 5 minims of water. The access of serum to the base of the brain was aided by raising the foot of the bed, and Ramond recommended that the patient should lie for a time on his face in order to direct the serum to the region of the optic chiasma. When recrudescence or relapse appeared, serum treatment should be at once started again; when an interval of ten days or more from the last injection of serum had elapsed steps must be taken to desensitize the patient, otherwise severe anaphylactic symptoms might appear.

The number of intrathecal injections of serum should be carefully considered, for it was probable that harm might result from a large number of lumbar punctures. Grave symptoms and even sudden death during intrathecal injections had been ascribed to various factors, such as anaphylaxis, liberation of toxins by rapid lysis of meningococci, the toxic action of phenol, often employed to preserve the serum, and, most important of all, increased intracranial pressure and distension of the closed cerebral ventricles. To avoid this it was important to give a smaller quantity of serum than that of the cerebro-spinal fluid removed; the gravity method of administering intrathecal injections had been advocated and practised, especially in America.

Treatment of Closed Meningococcal Infections.

In chronic cases in which lumbar puncture was either dry or brought away clear and sterile fluid, but in which the symptoms persisted unaltered by intrathecal injection of serum, there might be adhesions cutting off parts of the spinal intrathecal cavity or more frequently closing the foramina of exit of the cerebral ventricles. Lumbar puncture might be performed higher up so as to obtain cerebro-spinal fluid above the adhesions, and if turbid meningococci-containing fluid was obtained intrathecal injection of serum could be given.

When from the symptoms there was reason to believe that there was a closed infection of the cerebral ventricles—ependymitis or pyocephaly—the logical course was to tap and inject antimeningococcal serum.

A much less serious procedure advocated by Bloch and Hébert for cases in which the meningococci might be encysted in situations in contact, but not in communication, with the meninges—for example, the fibro-vascular tissue of the choroid plexus—was the intravenous injection of serum.

Serum Disease.

In the main the serum rash and other manifestations were much the same after intrathecal as after hypodermic or intramuscular injection; but some difference would naturally be expected when the injection was made into the close neighbourhood of the central nervous system.

Flexner remarked that possibly the manifestations of serum disease were more frequent after the intrathecal than after the subcutaneous injection of serum; and from comparison of the naval cases of cerebro-spinal fever with the reported incidence of serum disease in diphtheria the lecturer was at first inclined to this view, but further sifting of the evidence did not show that there was any proof of this.

Clinical experience showed that the severity of the rashes and other manifestations of serum disease varied directly with the amount of serum injected. The rash was usually urticarial, erythematous, or morbilliform, but it might be scarlatiniform. In rare instances it was haemorrhagic; this might occur in association with a sore throat or an infected wound or boils.

Quite commonly a serum rash appeared, faded, and about two days later again became prominent; the first might be erythematous and the second urticarial, and both extremely irritating. These might be regarded as phases of the same reaction. In rare instances two serum rashes appeared at such an interval as to justify the term double serum rash and to suggest two separate reactions, which might be supposed to be the result of injections on different days.

The occurrence of arthritic and other manifestations of serum disease was also detailed, and the appearance of symptoms pointing to seric meningism and meningitis when a relapse was suggested.

True anaphylaxis might occur in a patient who had some time previously had an injection of serum—for example, for diphtheria, or as a prophylactic against tetanus. Although in the case of ordinary subcutaneous injections of serum anaphylaxis was, as a rule, more interesting than serious in its manifestations, the effect of an intrathecal injection of serum in a sensitized person, though fortunately uncommon, might be very grave. The anaphylactic symptoms were severe collapse, fall of blood pressure, rapid and feeble pulse, pallor, vomiting, feeling of thoracic constriction, failure of respiration, rapid eruption of urticaria, or even a haemorrhagic rash. In order to counteract these symptoms, the injection of adrenin and atropine had been recommended.

Vaccines.

Curative vaccines had been employed mainly in sub-acute or chronic cases when serum appeared to be losing its effect, and in a number of cases had been followed by improvement and recovery.

Apart from meningococcal serum, and perhaps vaccines, other forms of treatment were of very subordinate importance, and, except when serum could not be obtained or was inert, as it appeared to be in this country in 1915, were mainly of historical interest.

The employment of surgical measures to secure permanent drainage of the spinal subdural space had proved disappointing. In conclusion, the lecturer gave an account of the use of soamin, hexamine, and helmitol as cerebro-spinal antiseptics; they had not led to any strikingly good results.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

HUMAN SERUM IN INFLUENZA.

DRIVEN to it by the urgency of a case of influenzal pneumonia, I determined to adopt the Scandinavian plan of taking serum from a convalescent patient, and the results so amply justified the experiment that I have since used it in three more cases.

The technique, crude it is true, but simple and effective, was as follows: After preparing the arm with petrol and distending the vein by means of a sphygmomanometer band, I punctured the vein with a sterile serum syringe, and withdrew into the syringe 20 c.cm. of the mother's blood, she being just convalescent from influenza; it was quickly ejected into a sterile test tube and centrifugalized by means of a cradle of string; the supernatant serum was again drawn into the syringe, and 8 c.cm. injected into the abdominal tissues of the child. In six hours the temperature had fallen, the breathing was almost normal, and the

toxaemic blueness had disappeared. The subsequent history of the case was uneventful, the child making a rapid and complete recovery.

The mother readily submitted, in view of this result, to act as donor for another case, whose condition was extreme. Here a dose of 15 c.cm. of serum was given; the result was as marked as in the child's case, and the contrast of the delirious raving and struggling to that of quiet sleep, which resulted in less than two hours, was marked indeed.

Serum was again obtained from her for the third case, in which its result was the same.

For the fourth case the blood was taken from a patient who had had a simple attack of influenza without pulmonary symptoms; it was injected into the abdominal tissues of a patient suffering from pneumonia, and had the desired effect.

In the three later cases it was necessary to take the serum from one place to another; this was done by enclosing it in an old horse-serum phial, which was sterilized by boiling, and the neck reclosed in the Bunsen flame.

As the immunity following an attack seems from clinical experience to be only some six weeks, it is necessary that the blood should be taken from a person who is just convalescent from influenza, and although I have not had the experience it would seem likely that the value of the serum would rapidly deteriorate on keeping. As there seems to be evidence of a fresh outbreak I publish these notes in the hope that some extensive preparation of serum will soon be made.

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AN ABNORMALITY OF THE TENDON GROOVES OF THE RADIUS.

I THINK it worth while to call attention to a condition which I have recently observed in two or three cases. A lady who is in the habit of playing the piano frequently and for long periods at a time consulted me for a ganglion over the tendons of the extensor ossis metacarpi pollicis and extensor brevis pollicis near the styloid process of the radius. The disability was so great that she could no longer play the piano. I removed the ganglion under a local anaesthetic. No benefit resulted from this. A skiagraph showed nothing abnormal. Under a general anaesthetic I then cut down on the tendons and found them running in a groove very much in excess of the normal depth. The depth of the groove was accentuated by a slight overgrowth of the normal raised edges of the groove. The groove was widened with a chisel, the tendons resecured in place with a couple of catgut stitches and the wound closed. Immediate relief resulted.

I have met a similar condition in hospital practice where the piano playing element could be excluded, and it is possible that it is due to abnormal structure and not to any pathological state. I have adopted the same treatment with the same result. An anatomist friend has promised to investigate the point in the material at his disposal.

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SHOT IN THE VERMIFORM APPENDIX REVEALED BY X RAY.

THE following case has, I think, some interest: C. P. H. V., a man aged 34, had since August last been subject to what he termed "bilious attacks." These had come on at intervals of about a fortnight and lasted from one to two days. They were associated with shivering, malaise, and occasional vomiting. As the attacks continued a bismuth meal was decided upon. He was accordingly seen by Dr. Ironside Bruce and the radiograms revealed the presence of what appeared to be two No. 6 shot, in the region of the appendix, which could be freely moved under the screen. The patient was thoroughly purged and a second skiagram showed the shot in the same position as the first. Colonel Gordon Watson removed the appendix a few days later and two No. 6 shot were found at the tip of the appendix, which showed signs of having been recently inflamed. The presumption is that the patient had swallowed the shot when eating game. He made an uneventful recovery and has had no further attacks.

London, S.W.

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