STREPTOCOCCAL INVASION OF THE
CEREBRO-SPINAL FLUID.

BY

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The fatality of streptococcal invasions of the cerebro-spinal fluid from septic bone foci is so very great, and treatment is usually so unavailing, that it is worth while to record an instance of proved invasion in which treatment was able to effect a speedy cure.

Pte. C. was transferred to a surgical ward under my care at the — General Hospital, Salonica, on July 23rd, 1917. The

following history was obtained: Six weeks previously there had been an abscess near the anus, clearing up in about three weeks, when the patient began to have pain and stiffness in the neck. These symptoms had steadily increased to the time of examination. There was no antecedent trauma, and no account of personal or family tuberculosis. The temperature and pulse are shown on the chart. The left posterior cervical region was swollen, tense, and hot. Fluctuation could not be made out. The greatest tenderness was just to the left of the ligamentum nuchae in its lower part. The perineum revealed the scar of a boil. Rectal examination showed no induration to suggest tuberculosis. No active focus of infection was found (oral, urinary, nasal, etc.).

Operation.—A muscle-splitting approach was adopted. Beneath the deepest layer was found an abscess under great tension; some 25 c.cm. of thick creamy pus escaped, and at the bottom of the cavity was felt the bare roughened lamina of the fourth cervical vertebra; a probe cautiously introduced was felt to pass completely around it. The release of tension caused considerable oozing. This was arrested by light packing, and the next day Carrel-Dakin treatment was established. (The bone lesion was sterilized in fourteen days and gave no further trouble; slight and temporary stiffness of the neck resulted.) The pus gave on culture streptococci and staphylococci; no tubercle bacilli.

Slightly before and noticeably after operation there was vomiting and retching; the pulse-rate was low for the pyrexia present. The knee-jerks were increased; Kernig's sign was present. The optic discs were normal. On the day following operation (July 24th) urotropin, gr. x, four-hourly, was begun. Lumbar puncture was performed and the fluid shot out at great tension; but it did not appear abnormal to the naked eye. Short streptococci were demonstrated on centrifugalization and grew on culture. Only a few polymorph cells were present. On July 25th puncture was again performed, and 7.5 c.cm. of multivalent antistreptococcal serum were injected after the withdrawal of 15 c.cm. of slightly turbid fluid (in which streptococci were present, but did not grow on culture). Retching persisted and the pulse was still lower. Discs normal. On July 26th, puncture, serum injected; streptococci present. On July 27th, puncture and serum injected. No organisms were seen or grown. A few polymorphs were present to the extent usual after intrathecal serum injections. On the 28th, puncture and serum injected. Fluid sterile. On July 31st the urotropin was discontinued. Discs normal. On August 1st the retching ceased. The pulse rate was 50 to 60 for another seven days. Convalescence was uneventful.

COMMENTS.

1. In the absence of other discoverable focus, the presumption is that the anal boil was responsible for the metastasis.

2. The invasion was at a very early stage. As the organisms had ceased to grow *before* the injection of serum, no claim can be said to be

established by this factor in the treatment, although the effect of the urotropin cannot be disregarded. The case seems to indicate that it takes time and continued invasion to establish firmly an infection (apart from overwhelming virulence), and that there is an infecting period during which surgical treatment of the focus should be of avail, particularly where the spread is, as here, via the lymphatics.

3. Lumbar puncture is the obvious means of determining when this invasion has occurred, and is an invaluable auxiliary in the treatment of the case, as well as an index of its progress.

My thanks are due to Major Colt for permission to publish this case, and to Captain Richards for the examination of the specimens.

INFLUENZA EPIDEMIC IN Q.M.A.A.C.
HOSTEL, EDINBURGH.

BY

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THE total number of beds in the hostel is 500, and, as it is a receiving dépôt hostel, the women in it are of various categories, including (1) the permanent staff, numbering about 40; (2) recruits just drafted in for uniform and training purposes; (3) workers of all categories transferred from camps to be drafted out as required. There is, consequently, an ever-changing population, so that the risks of infection being brought in are the greatest possible.

During the recent outbreak of influenza there have been 115 cases; roughly speaking, 23 per cent. of the inmates have been infected. The first definite case of influenza was reported on September 30th, after which there was a lull of nine days, the second case being reported on October 9th. After this the cases followed in rapid succession.

The most frequent complaints on admission to the sick bay were—cough in 41 cases, sore throat in 21, and headache in 22. In 24 cases there was nothing definite reported except a feeling of general unfitness, but in every case the temperature was above normal—in one case 105°, in two 104°, and in one 103.6° on admission.

The length of the stay in the sick bay varied from three to thirteen days, with an average of five to six. One case

developed slight pneumonia, and was removed to the City Hospital, but her whole stay in sick bay and City Hospital inclusive was only sixteen days.

The temperatures rose in 3 cases to 105°, in 8 to between 104° and 105°, in 21 to between 103° and 104°. In no case, however, was there any delirium or even mental confusion, though there was considerable sleeplessness in several cases. No hypnotics, however, were required.

In studying the temperature charts, two types are distinctly seen: (1) Temperatures which fall steadily to normal, usually on the second, third, or fourth day, and remain normal or subnormal (89, or 78 per cent. of total). (2) Temperatures which fall to normal after a similar interval, and then show a secondary rise and a final fall after three to nine days to normal or subnormal (25, or 22 per cent. of total). The height of the second rise, speaking generally, was not as great as that of the primary, but there were 5 cases between 103° and 104°. The majority rose to between 99° and 100°, but the second rise was of short duration. At the time of the first fall to normal the patients declared themselves perfectly well and were anxious to get out of bed; so much so that, without consideration of the temperature charts, it would have been impossible to say that there was anything wrong. It seems evident that in many private cases patients are allowed out of bed too soon, and that the second rise of temperature, which seems to be almost pathognomonic of the disease, is the time when the serious pneumonic complications have arisen. In every case where the second rise did not fall to normal within thirty-six hours a slight degree of catarrh at one or both lung bases was

A, Operation. B, Urotropin; lumbar puncture (15 c.cm.; streptococci grown). C, Lumbar puncture; 7.5 c.cm. serum injected (streptococci present). D, Lumbar puncture; 10 c.cm. serum injected (streptococci present). E, Lumbar puncture; 10 c.cm. serum injected (sterile). F, Lumbar puncture.

found. With the marked temperatures the foulness of the mouth was remarkable—more than is usually found, even in such cases.

Climatic Conditions.

In this epidemic, as in others reported, climatic conditions seem to have had no influence on the disease. According to the Registrar-General's monthly report for October for Edinburgh, the difference from the average air temperature for the month was -3.6° . The percentage humidity was 82 and the rainfall was 2.57 in. in excess, the winds being generally from west or south-west. The average death-rate in Edinburgh for the month was 18.3, and from influenza alone 4.8.

Housing has also apparently no influence, as the influenza mortality in Aberdeen was 8.3, and in Dundee, whose housing conditions are much inferior, it was 3.9.

Treatment.

On admission with fever, 10 grains of quinine sulphate were given within the first twelve hours, and, unless the temperature had begun to fall, the dose was repeated within the next twelve hours. During the fall of temperature 6 to 8 grains of quinine were given daily and 4 grains daily during the whole period in sick bay and for three days after discharge. When there was any complaint of pain 10 grains of aspirin were given three times in twenty-four hours. With the onset of cough an expectorant mixture was given thrice daily, or every four hours, as required; when there were catarrhal signs at the bases, hot poultices with mustard relieved the symptoms. For sore throat, gargles with permanganate of potash or swabbing with 2 per cent. iodine were satisfactory, but the foul mouth required to be cleansed by a nurse.

Windows were kept open night and day, and in many cases the beds were close to them. No special efforts were made to warm the rooms, and no difference was found between the cases nursed in rooms with fires and those in rooms without heating. Efforts were made to change the body linen as frequently as possible. Few or no restrictions were made in diet, as each was allowed to have what she asked for, plenty of milk being given to those who were thirsty, and in most cases light diet was preferred to the ordinary rations.

VACCINE TREATMENT OF INFLUENZA.

BY

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At the wish and suggestion of Surgeon Commander Rees, we have in these sick quarters adopted the routine administration of influenza vaccine prepared at the Royal Naval College, Greenwich (consisting of *B. influenzae* 60 million, streptococci 80 million, pneumococci 200 million per cubic centimetre), as a curative treatment in all cases of influenza.

Our routine has been that the patient, on admission, is given 0.112 c.cm. of the vaccine; forty-eight hours later this dose is repeated, and afterwards as often as necessary at intervals of forty-eight hours. After the first dose the quantity of the vaccine may be increased, but this depends on the reaction to the previous dose.

The treatment has been attended with such success that it may be of interest to quote one or two cases:

Case 1.—E. F., admitted on the first day of his illness; temperature 103° . Given 0.112 c.cm. vaccine. Temperature on the second day not above 100° . On the third day a second dose of vaccine given; temperature 99.6° . On the fourth day the temperature was normal, and patient convalescent.

Case 2.—J. K., admitted November 9th; temperature 105° . Was treated with usual medical routine treatment. The temperature fell to normal on November 16th, but on November 17th he had a relapse. The temperature on November 18th was 102° , and subsequently oscillated between 101° and 99° ; abundant mucopurulent sputum and moist rales in the chest pointed to purulent bronchopneumonia of a severe type. On November 23rd 0.112 c.cm. of the vaccine was given, and subsequently at intervals of forty-eight hours. Marked and continuous improvement in the chest symptoms was soon noted. The negative phases in this case were very marked from a subjective point of view; the patient complained of severe pains in the back and chest, sweating, and temporary increase in the cough; on this account the dose was not increased. He is now quite convalescent.

Case 3.—H. B., admitted November 10th; temperature 103° . On November 14th he developed pneumonia of a septic type (respirations 64) associated with delirium. On November 20th very little hope was entertained of his recovery, but 0.112 c.cm. of the vaccine was given. This was followed by a rise of temperature of 0.8° , but in twenty-four hours' time the delirium was less, and in forty-eight hours he was quite rational. The subsequent three doses of 0.112 c.cm. were associated with rises of temperature of 1.4° , 1.4° , and 0.8° . As the symptoms of the negative phase decreased, the dose of vaccine was gradually increased. Since the first inoculation the patient has shown a steady and progressive improvement, particularly as regards respiration, decrease of cough, and sputum. On December 7th he was allowed to get up.

Case 4.—A. D. D., Lieutenant R.N.R., was admitted on November 23rd with a history of having been ill since November 18th, suffering from symptoms of influenza, for which disease twelve of his crew had been left at his last port of call. On admission he was semi-delirious (temperature 104°) and presented definite signs of early pneumonia. On November 24th he was still cyanosed and semi-delirious, respirations 32. Vaccine 0.112 c.cm. given. On the same evening the temperature was 102.4° and respirations 44. On November 25th respirations 40, mentally much clearer; temperature 100.2° . By November 26th, in the evening, the respirations had fallen to 24 and the temperature was normal. The vaccine was repeated. He was discharged to sick leave quite convalescent on December 1st. The prognosis in this case on admission and on the day subsequent was extremely bad, as judged by the embarrassment of respiration, cyanosis, and delirium.

In conclusion I may state that since November 23rd, when the use of the vaccine was introduced in these sick quarters as the routine treatment, we have admitted 13 cases of influenza with not a single complication resulting; the cases have all shown influenza of a mild type. It is, of course, possible that this happy result is due to the type of the disease becoming milder as the epidemic dies away, but what is certain is that the injection of the vaccine does not cause any symptom in any way prejudicial to the patient's chance of recovery. I have been very favourably impressed by the great improvement in the patients' moral after the injection; they seem to feel that they are on the high road to recovery.

MYOLOGICAL PRINCIPLES: A NEW ULNAR SPLINT.

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In the treatment of peripheral nerve lesions splints should be applied in such a way that, while they prevent over-stretching or fatigue of weakened or paralysed muscles, they interfere as little as possible with the other motor functions of the limb. Further, splints should be so devised and adjusted that as recovery occurs the weak muscles are free to perform, even when in the splint, those functions of which they are capable.

The above statement is surely a truism, but in practice its truth is commonly ignored, and there are but few who realize the importance of consistent application of these simple rules in the after-treatment of injuries to limbs. I venture to suggest, however, that such application of these principles in our practice would be a factor of some financial interest to the State. Their importance is like that which belonged to the discovery of the sharp-pointed screw, and is proportional, not to the simplicity of the ideas, but to their wide and easy application.

To any one who grasps the idea, many instances where these principles are commonly transgressed will occur, but in illustration of their application I will describe a splint which I have found useful in dealing with ulnar nerve lesions.

The splinting is for a typical recovering ulnar nerve lesion, weak adduction of thumb, and some ulnar claw in the fourth and fifth digits. The splint used is made of vulcanized wood fibre and needs no padding. The size and shape are indicated in Fig. 1, its manner of application in

FIG. 1.