SOME NOTES ON TRENCH FEVER.

BY

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THE following notes were begun during the winter, 1915-16, and are compiled from clinical observations made on cases admitted to the medical wards of a stationary hospital from the middle of November to the end of March.

CHART 1.—Sudden onset on evening of January 14th. Temperature had fallen almost to normal within seventy-two hours of appearance of first symptoms. Temperature after February 4th did not rise above normal.

Among the very large numbers of cases that came down to us from the front labelled "influenza" and "P.U.O." there were some thirty cases of a new type; the curious character of the temperature charts, which showed a series of "spikes" occurring at more or less regular intervals, and separated by afebrile periods, attracted attention. These cases were carefully observed, and a remarkable similarity was noticed in the symptoms they presented and in the course they ran. This was before Captain McNee, Lieutenant Renshaw, and Captain Brunt had published in the *BRITISH MEDICAL JOURNAL* (February 12th, 1916) their exhaustive description of trench fever, but the new disease had already been much talked of.

Our cases presented a definite clinical picture unlike that of any known disease; the character of the pyrexia and the symptoms conformed to the type that we had come to associate with trench fever, and before the end of November we had begun to employ this term in diagnosing them.

CHART 2.—Onset two or three days before admission. No fever before March 8th. Sent down as case of "rheumatism." Temperature after March 22nd did not rise above 99°.

Incidence.

The cases were all young men, or men in the prime of life, and the great majority were infantrymen who con-

tracted the disease while in the trenches; there were two or three artillerymen who had been living in dug-outs, one A.S.C. man attached to a field ambulance, and a couple of R.A.M.C. orderlies also attached to field ambulances.

In one or two instances it was suspected that patients contracted the disease while in the ward—for example, cases sent down from the front labelled "rheumatism" or "myalgia," who had normal or subnormal temperatures for a week before the first "spike" appeared on the chart; but since Captain McNee has stated that the incubation period may be as long as twenty-two days we are not in a position to confirm the suspicion.

Etiology.

The ultimate cause of the disease is as yet a matter of speculation. Permission to perform inoculation experiments here could not be obtained, but the infectivity of the disease has been proved by Captain McNee by its ready transmission from one person to another by the blood, and his experiments also seem to have demonstrated that the virus is contained within the blood corpuscles themselves, whether leucocytes or red cells. As regards its transmission, he suggests that

the disease is either contagious from man to man or, what seems much more likely, is carried by one of the common flies or parasites found in the trenches. During the past summer lice, mosquitos, midges, and flies of other kinds have all been common in the Flanders war zone.

The fact that we have been getting cases of trench fever throughout the winter suggests that the infection can hardly be conveyed by mosquitos, midges, or flies.

CHART 3.—This patient was taken ill five days before admission. No information could be obtained as to duration or intensity of any pyrexia there may have been during this period. In this case headache and pain and tenderness in abdominal muscles attached to costal margins were the predominant symptoms. Temperature after January 16th did not rise above normal.

Lice, however, thrive all the year round; further, there has been a plague of rats and mice not only in the trenches, but also in the artillery dug-outs and in the barns and stables that serve as billets for the troops, and

CHART 4.—First symptoms appeared on day before admission—headache, pain in small of back and calves. Temperature after March 1st did not rise above normal.

these vermin, infested as they are by fleas, lice, and other parasites, may be the agents that transmit the infection.

Clinical Features.

The onset is generally sudden, according to the accounts given by the men. The majority complained of severe headache and pain in the legs and small of the back. The headache was not uncommonly associated with dizziness, and these symptoms sometimes came on so suddenly and

and the tongue was generally coated; sweating was a common accompaniment of the sharp falls in temperature. The only other common symptom noted was a tendency to constipation.

The Fever.

In the great majority of cases the illness begins with a sharp rise of temperature, but occasionally there is no fever until the third or fourth day after the appearance of the symptoms.

Some of our cases reached us within twenty-four hours of reporting sick, and quite a large number within three days. In certain cases it was impossible to determine the length of the initial period of pyrexia, as they were sent down from the front without any notes. However, in the majority of cases it was possible, by starting from the last day on which the patient felt perfectly well and was able to do his work, to fix an outside limit for the duration of the initial fever.

A careful study of the history of each case led to the conclusion that the average length of the initial period of pyrexia was two to three days.

Captain McNee divided his cases into two classes:

In Class A there was an initial period of fever lasting about a week, generally followed by a single relapse.

In Class B the initial fever was shorter and was followed by a series of relapses.

We of course saw far fewer cases than he, but we found it impossible to classify them in this way. We have a number of instances in which the initial fever lasted only two days, and yet was only followed by a single relapse; in others an initial pyrexial period of two or three days was followed by several relapses, like Captain McNee's Class B. We have no unequivocal examples of his Class A, which in his experience was the more common type.

The accompanying charts illustrate these points. The first seven show a series of two or more relapses following the initial rise of temperature, the remainder show only a single relapse; in all except two (Charts 3 and 5) there was evidence to show that the initial fever was short.

After reviewing all the cases in which the duration of the initial fever is recorded or can be calculated (comprising the majority of our series), we have come to the conclusion that these all belong to a single type, the characteristics of which are a sudden onset with a short bout of fever lasting two or three days, followed by one or more relapses.

As a general rule the severity of the symptoms is proportional to the height of the temperature, but it seems impossible to predict from the intensity of the fever of onset whether the disease will run a long or a short

CHART 5.—This patient was taken ill suddenly in the trenches eleven days before admission with shivering, fever and pain in head, back and legs. This is one of the two cases in which it was not possible to establish the length of the initial fever. All the "spikes" are comparatively short; the first one recorded occurred a fortnight after the onset of the disease, and may have been the second relapse. Temperature after January 7th did not rise above 99°.

with such violence that the patient was unable to stand and had to be carried to the dressing station.

The pain in our cases, as far as we could determine, was invariably muscular. Several patients said they had pain in the shins, but on examination there was no tenderness upon pressure on the tibia, while pressure on the muscles

CHART 6.—Sudden onset, with fever on the day before admission. Temperature after January 23rd did not rise above normal.

along the outer and inner borders of the bone caused acute pain.

This was in marked contrast to the symptoms presented by another febrile affection, very common in our wards at this time, to which for convenience we gave the name of "shin fever." The chief characteristics of shin fever were persistent pain and tenderness in the tibiae, a low irregular pyrexia generally lasting two to three weeks, "fluffiness" of the tibial periosteum—shown by x rays—and marked leucocytosis.

There was a certain amount of variation in different cases of trench fever in the muscles affected, but the infection was invariably bilateral. In some cases the pain in the lower limbs was limited to the anterior muscles of the legs, in others to the muscles of the calves. Pain was frequently felt at the back of the knees and in the muscles of the thighs.

In two cases there was no pain at all in the lower limbs, but pain and tenderness in the muscles attached to the costal margins, and this pain was much increased by contracting the abdominal muscles, as for example, in the effort to sit up.

During the febrile paroxysms which characterize the disease the pain in the muscles and the headache were always worse, and there was general malaise, but during the intervening afebrile periods it frequently happened that all symptoms disappeared, the patient felt perfectly well, and was allowed to get up and take ordinary diet. The pain in some instances was continuous throughout the course of the illness, and in these cases it was sometimes so severe during the febrile periods as to require the administration of morphine.

The fever was always associated with loss of appetite

CHART 7.—This patient was taken ill suddenly two days before admission; his field medical card recorded his temperature (103°) on the evening of January 15th. Temperature after February 5th did not rise above 99°.

course—that is, whether there will be one or several relapses.

The relapses recorded on our charts vary from one to three in number; they may occur every fifth, sixth, seventh, or eighth day, but it is uncommon for the spacing to be exactly regular throughout the illness in each case. The most characteristic thing about them is the sharpness of the rise and fall of the temperature, which gives the

chart a peculiarly "spiky" appearance. The temperature may settle down immediately after the last "spike," or there may be a mild, irregular pyrexia lasting a week or so before convalescence is finally established.

CHART 8.—This case was perfectly well until the evening of the day before admission; he was suddenly seized with violent headache and acute pain in muscles of legs and small of back.

In most of the cases the pulse during the febrile paroxysms was comparatively slow; it did not often go above 100. After the last relapse a tendency to tachycardia and irregularity of the heart's action was noticed in several cases.

Treatment.

The treatment adopted here was mainly symptomatic, the cause of the disease being still unknown.

Various drugs, including potassium iodide and arsenic

CHART 9.—This patient was sent down suffering from nervous debility and depression, and developed the signs and symptoms of trench fever in the ward. Temperature after February 10th did not rise above normal.

were employed, but none were found to have any specific action on the disease.

In some cases aspirin seemed to produce some alleviation of the headache; it did not appear to have any effect

CHART 10.—The first part of this chart is a copy of one brought by patient from the casualty clearing station; the attack began suddenly on February 11th, while he was undergoing treatment for scabies.

on the fever or on the pain in the back and lower limbs. In the severest cases occasional doses of morphine were administered.

The patients were kept in bed and put on a fluid diet

during the febrile paroxysms; in the intervals most of them were well enough to get up and take ordinary food. The treatment of the tachycardia and debility that were often present during convalescence calls for no special comment.

Diagnosis.

A few words may be added as regards the differential diagnosis.

Examinations of the blood, faeces, and urine of a large number of the cases were made by Major Hume and Captain Greenfield, R.A.M.C., with the object (a) of discovering, if possible, some clue to the causation of the disease, and (b) of excluding the enteric group.

(a) Attempts to discover the presence of an organism to which the infection may be attributed have not yet been rewarded with any success. It seems superfluous, therefore, to give an account of the various investigations undertaken with this object. It may be noted in passing that a moderate leucocytosis was found to be a common but not a constant feature. Punctate basophilia was also observed in the blood films examined, but this phenomenon was also encountered in cases not suffering from trench fever.

(b) It had been suggested that the disease was perhaps an atypical form of enteric—"typhoid fever in the inoculated." The clinical picture presented was all against

this hypothesis—for example, to mention only two points, none of the patients ever had any rash, and in no case was the spleen enlarged or tender. However, the question was finally settled in the laboratory.

All our cases without exception had previously been inoculated against typhoid, and this fact had to be taken into consideration in interpreting the Widal reaction. Blood was taken at various times in the course of the disease, at the height of the fever and during the afebrile periods, but in all cases examined the evidence of typhoid or paratyphoid infection was negative, cultures from the blood all proved sterile, and cultures from the stools also gave negative results.

It may be confidently affirmed, therefore, that these were not atypical cases of enteric but genuine cases of "trench fever," and, though it would be imprudent to dogmatize while the cause of the infection remains undiscovered, we can at least say that the disease has every appearance of being a definite clinical entity.

In conclusion, I should like to express my grateful acknowledgements to Colonel Butler, D.S.O., for many helpful suggestions, and to Major Hume and Captain Greenfield for their kindness and patience in carrying out investigations in the laboratory.

DR. A. B. MACALLUM, professor of physiology in the University of Toronto, has been elected president of the Royal Society of Canada.

CHART 11.—This case was sent down with history of inflamed foot; this had been opened and the wound had healed on his arrival here. The first "spike" of trench fever appeared on the evening of the day of admission.

CHART 12.—Sudden onset two days before admission, with high temperature; the height was not recorded on the field medical card. The chart shows a single typical relapse.