mentioned that an afebrile form of the disease is described by Japanese writers. There are periodic sharp rises of temperature, which may be accompanied by a rigor. The intervals of normal temperature last three or more days, and the attacks come with some punctuality. With each attack the local inflammations are increased, and there are usually such general symptoms as great malaise, prostration, pains in the limbs, vomiting, diarrhoea, and soreness of the throat.

Swelling of the tongue and definite swellings in different muscles characterized two of Atkinson's cases. The virus of the disease appears particularly to affect the lymphatic system. The constant presence of intense lymphangitis is noted by Japanese writers, and this was the striking feature in four of my cases. It was present in half the cases collected by Atkinson. Enlargement of lymphatic glands has been more common in English cases, though in one of Horder's cases this was absent. Suppuration is often thought to be threatening, but this does not occur except rarely in the wound.

A form of erythema was present in two-thirds of Atkinson's cases and in four of my five cases. Of Horder's three cases it was absent in one, where the only local affection was firm oedema of the bitten arm. In one of my patients the inflamed patches were suggestive of erythema nodosum, but they were more raised, and the only colour effect was the presence of a concentric yellowish ring within the border of the circular red patch.

An Italian case of rat-bite fever, after two years' illness developed retro-ocular cellulitis and exophthalmos. Albuminuria with dropsy has been recorded in several cases; one of my patients had oedema of the feet towards the end of his illness, but there was no albumin in the urine. The occurrence of epididymitis in one of my patients has been mentioned, while in another there was slight but palpable enlargement of the spleen.

Leucocytosis is present as a rule, and increases with each attack of fever. But O'Carroll's case had marked anaemia and a white cell count of 7,200. In this case and in an Italian case eosinophilia was present, though in others its absence is noteworthy. Dr. Claridge's examination of the blood of my patient, I. H. B., gave 23,300 leucocytes with the following differential count: Polymorphs 91.7 per cent., transitionals 1.6 per cent., lymphocytes 5.8 per cent., eosinophils 0.9 per cent.

Rat-bite fever is a serious illness, as testified to by a medical man who himself suffered from it in 1896. He was seen by several eminent doctors, and thought then to have some form of blood-poisoning. Dr. G. Master's case is now included in Dr. Atkinson's account of rat-bite fever, and he writes to me:

"I was away from work for seven months and did not feel fit for eighteen months after the start of my illness. The wasting was extreme; I could make my two hands meet round my waist, and at one time I could not turn myself in bed. Treatment did not seem to help in any way."

It now appears that rat-bite fever can be added to the list of diseases for which the cause and the efficient remedy have been found.

REFERENCES.

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THE TREATMENT OF CUTANEOUS ANTHRAX.

BY

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AN editorial article in the *BRITISH MEDICAL JOURNAL* of February 5th, 1921, on the question of anthrax in shaving brushes was concerned mainly with the source of the infected supplies and the methods of dealing with them, but there was a short discussion on means of treatment, in which it was stated that excision of the pustule is no longer recommended. In response to an inquiry the Editor kindly referred us to Circular 172 issued by the

Ministry of Health, January 28th, 1921, from which the following paragraph is quoted:

"Treatment of Persons Infected."

"In general, the best treatment for a case of anthrax is physiological rest of the part affected, combined with intravenous injection of anti-anthrax serum—60 to 80 c.cm. on the first day and 60 c.cm. on the day following, if there has been no reaction (shown by a rise of temperature) and the general condition has not improved. Excision is unnecessary. Subcutaneous injection into the abdominal wall of 30 c.cm. has apparently been successful in many cases, repeated, if necessary, on successive days. Difficulty is always met with in estimating the efficacy of different methods of treatment of a malady such as anthrax, which is capable of undergoing spontaneous cure. But the following figures, supplied by the medical inspector of factories, with regard to the results of various forms of treatment in 800 cases of cutaneous anthrax (excluding the erysipelatous form) in Great Britain, support the above conclusion:

Treatment.	Cases.	Deaths.	Mortality per cent.
Serum only	200	8	4.0
Excision only	397	44	11.1
Excision and serum	174	25	14.4
No special treatment	29	14	48.3
Total	800	91	11.4"

At Guy's Hospital, where a few cases of anthrax are admitted every year, and where the possibility of infection is always present in the minds of those in charge of the surgery owing to the special character of the industries of the borough, the practice for some time past has been to combine excision with serum treatment. It is therefore interesting to compare our figures with those quoted above. We have taken the years 1909 to 1919 because it was only in the year 1910 that serum began to be used regularly. Records for 1918 are unfortunately incomplete. Since 1910 the majority of cases have been treated both by excision and serum, but it is only since 1916 that the serum has been given in doses as large as those recommended in the above circular. In going through the reports all those cases have been omitted where adequate details confirming the diagnosis were absent, or those in which anthrax bacilli were not discovered, though on clinical signs they have been classified as anthrax.

Treatment.	Cases.	Deaths.	Mortality per cent.
Serum only	4	1	25.0
Excision only	6	1	16.6
Excision and serum	37	3	8.1
Treatment not specified	1	1	—
Total	48	6	12.5

The number of cases in this series is obviously far too small to allow conclusions to be drawn from them with any convincing degree of certainty. The gradation of falsehoods into three classes, of which the superlative is "statistics," is a familiar one in political discussion; but it applies with even more force to statistics in medicine or surgery, for the sources of error are innumerable. Successes are nearly all published, very often before they have stood the test of time; failures are as commonly buried in oblivion. Very few series are large enough to exclude the element of chance. But, apart from the factor of the individual and the allowances that must be made for enthusiasm, many other sources of error come in. One is accuracy of diagnosis. Were all cases admitted to Guy's Hospital as anthrax on clinical evidence and not confirmed by discovery of the bacillus to be included, the mortality of the series would be very materially reduced.

This factor of accuracy in diagnosis is especially important in all statistics bearing on the mortality of the surgical treatment of exophthalmic goitre. Another factor is the severity of the type of case which is admitted to any institution. If the death rate from fractures of the base of the skull at different hospitals be examined, it will be found to range from about

50 per cent. in some places to 10 per cent. in others. This discrepancy is merely due to the fact that the first hospital is in the centre of an industrial district where severe accidents are common, the second in a scattered neighbourhood with poor facilities for transport, so that most severe head injuries die before reaching hospital. In fracture of the base it is the severity of the injury and not the line of treatment adopted which is the chief factor in determining the result. For this reason the comparison of statistics published by different surgeons during the war is valueless unless the exact conditions are known. The mortality in gunshot wounds of the abdomen, for instance, might be expected to be small at a base hospital, much greater at a casualty clearing station, and still greater at an advanced centre, merely because distance automatically sorted out the severe cases.

If we examine critically the figures quoted from the circular of the Ministry of Health, it is difficult to agree with the conclusion that excision is unnecessary. The very fact that the mortality after excision, *plus* serum, is greater than that for either serum alone or excision alone, shows that other factors are at work. Were excision a harmful factor (as it might be, owing to disturbance of the protective barrier set up by the tissues), the mortality of the cases treated by excision alone should be greater than that of the untreated cases. But, leaving this argument on one side, it is absolutely certain that, were excision harmful, the cases treated by excision only should do worse than those treated by excision *plus* serum. It is unthinkable that a harmful factor should be less harmful by itself than when combined with a beneficial factor. If, then, excision is not harmful, it may be either a valuable or a neutral factor in treatment. The facts that stand out from the report are, first, that over 70 per cent. of the 800 cases have been treated by excision, which seems to point to a fairly general belief in the efficacy of this procedure; and, secondly, that excision by itself has reduced a death rate of 48.3 per cent. to one of 11.1 per cent. without the use of serum in addition. It seems pretty certain that the mortality given for the cases in which both methods were employed involves other questions in addition to that of the treatment adopted. We suggest that the cases treated by serum only would probably include all very slight cases, and all doubtful pustules in leather workers which resembled anthrax lesions but were not proved to be so, or did not seem severe enough to justify excision. In such cases it would be only right, in view of the danger, to give a prophylactic dose of serum. Late cases of genuine anthrax in which a natural cure was being effected would probably also be treated with serum only. On the other hand, extensive lesions of a fulminating type would nearly all come into the class treated by both methods.

It is probable that the series from Guy's Hospital, though small, gives a much fairer picture, and that the death rate when both methods are combined is notably lower than when either is used alone. In the early stages of anthrax the bacilli are limited to the pustule and its immediate neighbourhood. Excision by itself will assure a cure in about 90 per cent. of cases in a disease having a natural mortality of something like 50 per cent., while serum at best cannot be relied upon to avoid a fatal issue in all cases. In view of the danger of anthrax and the local nature of the infection in the early stages, it therefore appears to us to be the wiser course to combine the two methods, which are both known to be good and which cannot be mutually antagonistic, and thus to give the patient every chance. Little or no importance can in the circumstances be attached to the resulting scar. We consider, then, that the combination of excision and serum treatment as used at Guy's Hospital is probably the most rational and the safest course in all cases of cutaneous anthrax which have not reached the stage of a septicaemia.

The Journal of the American Medical Association announces that Brigadier-General Charles E. Sawyer, personal physician to President Harding, has been assigned a suite of rooms in the State, War, and Navy Building, formerly occupied as headquarters of the Army, from which he will direct the establishment of a department for the arrangement of better hospital facilities for disabled soldiers and sailors.

CRYPTOGENETIC PNEUMOCOCCAL SEPTICAEMIA.

BY

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CRYPTOGENETIC SEPTICAEMIAS are of particular interest to the physician, and, as a search of the literature on the subject shows few cases recorded of pneumococcal septicaemia without any evidence of a focal lesion or portal of entry, the following brief notes of a case recently under my care is, I think, of sufficient interest to record. That a blood infection occurs in acute pneumonia in a large percentage of cases, and that the pneumococcus can be cultured from the blood in many cases has been demonstrated in an extensive series of investigations. It has been stated by one observer that blood cultures give positive results in 50 per cent. of fatal cases; others have suggested invasion of the blood by pneumococcus to be a constant condition. Pneumococcaemia, however, without distinct localizations, has, Osler states, been reported by Wright, Stokes, Pearce, Flexner, Hektoen, and others. The following case would, therefore, seem to be of the cryptogenetic variety.

Mrs. S., aged 48, came to see me about March 8th, 1921. Her symptoms were of an indefinite character. For some weeks she had been feeling unwell, had been losing energy and some weight, appetite was poor, and she suffered from restless nights, shivering fits, occasional diarrhoea, and persistent polyuria. The temperature was normal and the pulse small and of low tension. A hasty examination of chest and abdomen failed to elicit any definite abnormality. She had no cough or any symptoms referable to her chest. She complained of lumbar pain radiating down the back of the thighs, and also some nausea. There was a history of slight discharge from the left ear, lasting a few days, some short time before, but it apparently cleared up, and at present no otitis media was evident. I examined the urine next day—specific gravity 1016, somewhat turbid, no sugar, a trace of albumin. As her family were becoming increasingly anxious on account of her lack of energy, progressive weakness, and shivering attacks, I was asked to admit her to Mercer's Hospital on March 22nd, 1921.

Condition on Admission.

General aspect: Face yellowish, cheeks flushed, eyes bright. Tongue perfectly clean, gums and throat healthy. Although thin, no marked emaciation. Pulse 100, regular. Blood pressure: systolic 90 mm. of mercury; diastolic 65 mm. of mercury. Temperature normal. Abdomen slightly distended, some relative rigidity below liver, and marked tenderness in both loins. Neither kidney was to be felt, but lower pole of spleen palpable. Reflexes normal. Urine: specific gravity 1020, acid, no sugar, slight amount of albumin; microscopically, some pus and epithelial cells, no casts, a number of mobile organisms, probably *B. coli*.

After-History.

During the following week her condition remained unchanged. She appeared apathetic, had no desire for food, had some nausea, was slightly constipated, and sleep was restless. Her temperature ran up to 101° at night, but returned to normal in the morning. On March 29th she had a distinct rigor. The temperature was 103°, and pulse rate 124. Blood examination showed red cells 4,500,000, haemoglobin 85 per cent., white cells, 8,000. Rectal and vaginal examination were negative.

During the second week in hospital the temperature became remittent, she had recurrent rigors, the temperature reaching 103°, and the pulse ranged between 88 and 128. I noticed a slight roughening of the first sound at the apex, and the rhythm became of a gallop type due to reduplication of the first sound, I thought, or possibly pericarditis. Tenderness and pain continued in the loins, and this was the chief complaint from the patient. There was no cough nor any abnormal lung sounds, although at the end of the second week some rhonchi and rales appeared, clearly due to a congestion or oedema. Petechiae appeared on the left breast, arms, gums, and the inside of the cheeks. She had fairly good sleep with the aid of bromidia.