Clinical and Other Notes.

PENICILLIN IN THE TREATMENT OF HUMAN ANTHRAX.

BY

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Detailed records of cases of human anthrax treated with penicillin alone are not numerous in the English literature. Below is given an account of a case treated in this way at a military hospital in Palestine.

CASE NOTE.

A soldier aged 19 was admitted with an inflammatory lesion on the left side of his neck. This had started ninety-six hours earlier as a pimple that progressively worsened despite hot local applications and sulphadiazine. On admission the patient looked ill and had a temperature of 104°F. The left side of his neck and face was red, tender and extremely swollen. In the centre of the swelling was a ring of bullae surrounding a tough, black eschar. Smears from the eschar showed small numbers of organisms resembling B. anthracis. Intramuscular penicillin was started in doses of 20,000 units three-hourly. After eighteen hours there was a noticeable general improvement. The temperature was 100.6°F and the local swelling had receded visibly. Forty-eight hours after starting treatment the patient was afebrile and apparently quite well. All redness and swelling had gone and only a black slough remained, which separated on the tenth day. The total of penicillin given was 2 mega units.

From swabs taken on admission an organism was isolated with the morphological, cultural and biochemical characteristics of B. anthracis. The penicillin sensitivity was about 0.6 compared with the Oxford staphylococcus. Inoculation of a guinea-pig proved fatal in eighteen hours, with post-mortem findings characteristic of anthrax.

Penicillin has been shown experimentally to be capable of curing anthrax in a variety of laboratory animals. Heilman and Herrell [1] showed that anthrax in mice could be cured, provided that penicillin treatment was started within twelve hours of infection. Sterne [2] found that guinea-pigs could also be protected, and showed that sulphadiazine and sulphamerazine were much less effective than penicillin. Schabel, Reames and Housewright [3] confirmed the effectiveness of penicillin against anthrax in mice, and demonstrated similar results with rabbits and monkeys. Treatment of monkeys was still successful even if delayed for forty-eight hours after infection. Miller et al. [4], using mice, showed that penicillin and streptomycin were both highly effective, whereas sulphadiazine scarcely influenced mortality at all. The sensitivity of B. anthracis to penicillin in vitro is reported as varying considerably. Fleming [5] reported one strain with a sensitivity 1/40 that of the average for four strains of staphylococcus. Abraham et al. [6] describe a strain having the same sensitivity as the staphylococcus. Bondi and Dietz [7] found a strain with a sensitivity of 1/10, stating that growth was inhibited by 0.5 unit penicillin per c.c. Murphy, La Boccetta and Lockwood [8], in their account of three human cases of anthrax, state that one of their strains had a penicillin sensitivity of 1/100, corresponding to complete inhibition by 2.5 units of penicillin per c.c.
Schabel et al. [3] state that the concentration of penicillin needed to inhibit growth may lie between 0.02 unit per c.c. and 2.5 units per c.c.

Of the cases of human anthrax already recorded as having been treated with penicillin, a number also had other treatment likely to have influenced the course of the disease. In 1944 Murphy et al. [8] reported three cases bacteriologically proven. Duration before treatment was from three to five days. Intramuscular penicillin produced rapid cure, clinical improvement being noted after twelve to eighteen hours and the lesions rid of anthrax bacilli in one to two days.

The authors recommend giving 100,000 units over twenty-four hours for two to four days. In 1945 Stott [9] reported cure in a man of 70 with a five-day-old malignant pustule of the neck. Ten thousand units were given three-hourly to a total of 200,000 units and improvement appeared in sixteen hours. Perl [10], Ahmad [11] and Abrahams [12] describe cases in which penicillin appeared to be effective, but had been combined with arsenic, sulphonamide or serum therapy. In the same year the American Medical Association [13] listed anthrax as a condition responding to systemic penicillin. Smyth [14], reviewing the treatment of anthrax in 1946, refers to thirteen cases known through personal communications to have been treated successfully with penicillin. Details of four cases are given, in which 15,000 units of penicillin were given three-hourly. Smears from the lesions showed no B. anthracis after twenty-four hours and cultures were negative on the fourth day.

The same author also mentions a series of 112 cases treated by arsenicals with no fatalities and adds a table comparing mortality rates for various modes of treatment.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>No. of cases</th>
<th>Mortality rate per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nil</td>
<td>25</td>
<td>88.0</td>
</tr>
<tr>
<td>Non-specific</td>
<td>60</td>
<td>28.3</td>
</tr>
<tr>
<td>Serum</td>
<td>519</td>
<td>8.6</td>
</tr>
<tr>
<td>Sulphonamides</td>
<td>64</td>
<td>4.7</td>
</tr>
<tr>
<td>Arsenic</td>
<td>62</td>
<td>0.0</td>
</tr>
<tr>
<td>Serum + Arsenic</td>
<td>72</td>
<td>8.3</td>
</tr>
<tr>
<td>Serum + Sulphonamide</td>
<td>32</td>
<td>9.4</td>
</tr>
</tbody>
</table>

The most conclusive account is that of Ellingson et al. [15] who report in detail upon 25 cases of proven human anthrax, 22 of whom received penicillin alone. The majority of cases were seen about seventy-two hours after onset; in 3 B. anthracis was isolated by blood culture before treatment. The dosage employed was 60,000 units three-hourly for 5 doses and thereafter 30,000 units three-hourly till the following criteria were satisfied:

(i) Diminution of oedema.
(ii) Cultures for B. anthracis negative.
(iii) Systemic symptoms relieved.
(iv) Drying of local lesion.

Discussion.—Penicillin is now of proven value in the treatment of human anthrax, and there would appear to be little use in combining with it any of the sulphonamides. In view of the wide variations in penicillin sensitivity...
among strains of *B. anthracis* this should be tested as early as possible in order that arsenic may be used if a resistant strain is encountered. In this connexion Bondi and Dietz [7] produced evidence of the formation of a penicillinase by *B. anthracis*.

I have to thank Colonel W. H. O’Riordan, M.C., R.A.M.C., for permission to forward this case for publication.

REFERENCES.

[9] Stott, B.M.J., 1945, 2 (July), 120.

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**THE KUPAT HOLIM.**

**BY**

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It is thought that a brief account of the system of medical attention which is available for a large proportion of the Jewish population in Palestine will be of interest, particularly in view of the approaching advent of State Medicine.

The Kupat Holim is a Jewish organization, which controls the Sick Insurance Fund providing medical attention for about 300,000 people. This is half the Jewish population of Palestine. It derives its income from the Histadruth, which is a combination of the Jewish Trades Unions, and the only one in the country.

I am informed that the Histadruth pays a monthly subscription for each of its members to the Kupat Holim. The amount paid varies from half a crown for an unemployed person to twenty-four shillings maximum, and is based on a sliding scale in accordance with the wages of the individual. The scheme includes not only the worker, but also his or her family. The Kupat Holim receives no financial assistance, or interference, from the State.

As the Kupat Holim relies on the Histadruth for its funds, and the latter relies on the former to restore its members to active work as soon as possible, it