Clinical and other Notes

A SHORT NOTE ON BLOOD CULTURE.

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The following brief account of a series of one hundred cases, in which cultures were made from the blood, may be of interest. In any event it will add a little more to the value already attached to the prompt withdrawal and culture of the blood in all doubtful fevers, more especially in those countries where enteric and other fevers have to be differentiated. First a word as to technique. In every instance from 5 to 15 c.c. of blood were abstracted. There should not be the least difficulty in obtaining this amount of blood, provided that the veins can be made to stand out, which is almost essential; with children, delicate women, or exceedingly stout subjects, some difficulty may be met with.

Ordinary lemon broth and pure ox-bile were the primary media employed. As a routine procedure two flasks of 100 c.c. of broth, and two small flasks of 50 c.c. of ox-bile were used for the blood of each case, the blood being equally divided amongst the four flasks. Four or five flasks were always used, as it has so often been shown that one or two flasks may prove to be contaminated, or that the typhoid organism is only found in one flask, the others turning out to be sterile. To prevent contaminations, it is most essential that the air around the bed, whilst the blood is being drawn off, should be still. This may not be thought of, but in a hot and dusty climate it is important. In the presence of any contaminating air-microbes the typhoid organism will not thrive. The former grow and mask the few typhoid bacilli that possibly may be in the blood.

The flasks are shaken and put in the incubator, which is kept at body temperature. At the end of twenty-four hours there may be a chance of finding the Bacillus typhosus, but not such organisms as the slow-growing Micrococcus melitensis.

To find the B. typhosus at the expiration of this period, it is necessary to take out from the culture medium more than the ordinary platinum loopful. The bacilli may be so few in number that this small amount will not contain them. It has, therefore, been usual to employ a glass rod and to take out as much of the broth or bile as will adhere to the rod. This represents a large drop or more. If a trial is not made until the lapse of forty-eight hours, then the usual platinum loopful suffices, as by this time the bacilli will have multiplied and can readily be found. There is a wide choice of media on which the primary culture can be placed, but from every point of view, the simpler the medium used the better. For blood work, the ordinary litmus lactose agar plate answers all purposes. Nutrose can be added, if there is any likelihood of finding the M. melitensis.

This medium has the great advantage of being very easily made, which cannot be said of certain others of the special media. The latter are of
course more efficient when one is seeking to isolate the typhoid organism from stools and so on.

Two of the lactose plates are used for smearing the contents of one drop or loopful of the culture medium.

After twenty-four hours' incubation at 37° C. the typhoid colonies will stand out plainly, should any be present. These are then fished and the organism tested with an antityphoid serum, and put through the different media in the routine manner.

One or two points are worthy of notice when trying to isolate the B. typhosus. One is that the bacillus is seldom motile, when first fished off the lactose plate; another is that the delicacy of agglutination is small compared with subsequent sub-cultures. Both these points have been previously noted, but one might at first be led astray by finding an organism which was quite immobile, and think that it was not typhoid. Nevertheless, in nearly every first culture off a lactose plate there is practically no motility. On the other hand we must not be deceived by finding a highly active organism which may grow for the first thirty hours on the plate like B. typhosus, and which may also show some agglutinative response to a serum. When hurried for a diagnosis by the clinician, one might venture to say that the B. typhosus had been isolated, only to find next day that the culture was not that bacillus but the B. pyocyaneus or some other organism. This has happened to the writer on more than one occasion.

Of the 100 cases all were suffering from fever and indefinite symptoms when the blood was drawn.

The subsequent history of 21 of these patients showed that the disease from which they suffered was not typhoid, and therefore the B. typhosus was not found in their blood. From 1 the M. melitensis was recovered. Five others proved to be pneumonia, 1 typhus fever, 2 tubercle, and the remainder very transient fever of indefinite origin.

Thus there were left 79 cases. In 67 of these the B. typhosus was recovered, in 2 cases the B. paratyphosus B. In 1 case both B. typhosus and M. melitensis appeared together. The remaining 10 gave negative results, i.e., the culture proved sterile, or was contaminated. The clinical history of these 10 cases was that of a mild attack of enteric fever. It may, therefore, be stated that the B. typhosus, or B. paratyphosus, was recovered out of the blood drawn from patients suffering from what was, or appeared to be, typhoid fever, in 88 per cent. of the cases. In only two really typical attacks did failure result. The other 8 cases were all very mild in character, with temperatures seldom above 102° F. and with fever lasting only about seventeen or eighteen days.

There is little doubt but that the more severe the attack and the higher the fever, the more typhoid organisms there are in the blood, and therefore the greater the chance of obtaining them by culture. Also the earlier the blood is taken the better from every point of view. Not only
is the value of a definite diagnosis much greater, but the opportunity of isolating the bacilli is also more favourable.

One other interesting point was the working out of the comparison between the Widal reaction and the finding of the organism in the blood. This was carried out in 44 of the cases. The result was as follows: On 42 occasions the *B. typhosus* was isolated. In only 13 of these cases was the Widal reaction positive, that is, a reaction was given at 1 in 40, or a higher dilution.

In the two cases from which the organism could not be isolated, a Widal reaction was obtained. This can be explained by the fact that it was late in the disease when the blood was abstracted, which is all in favour of a positive result of the Widal test, but against the finding of the organism.

The majority of the cases were patients in the Military Hospital, Gibraltar, and the blood was taken by Captains Priestley and Spencer. Both these officers were keenly interested in the work and have done everything in their power to supply specimens in the best condition and at the earliest possible stage of the disease. It is only by the clinician and bacteriologist thus working together that the best results of any such inquiry can be hoped for.

It may be stated without any exaggeration that the benefit conferred on the clinician, as a result of a little trouble on his part, is well repaid by the advantage of being supplied with a definite diagnosis within a few days of a fever patient's admission. Take the example of a patient who has been admitted on the Monday. The blood is drawn at once, incubated till Tuesday, and growth sufficient for plating may be present on this day, so that on Wednesday an almost definite diagnosis can be given, from the appearance of the colony and the agglutination of the bacillus with a prepared serum. By Thursday this can be quite definitely proved. Compared with such a result the Widal reaction gives a poor outlook.

It is freely granted that the agglutinative power of a patient's serum does not develop in most cases of enteric fever until at least one week from the commencement of the illness.

It is quite understood that in private practice any such operation, as the friends of patients may imagine the withdrawal of blood to be, is difficult to arrange; but in the Service, when one is practically master of one's patients, there should be no trouble.

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To illustrate "Fractured Tibia without displacement."

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