

LUMBAR PUNCTURE.¹

BY A. H. WENTWORTH, M.D.

I HAVE been asked by the chairman to make a few remarks on lumbar puncture. I shall allude briefly to some of the difficulties of the operation, and also emphasize the importance of a systematic and careful examination of the fluid. In a certain number of cases in which lumbar puncture is performed one fails to obtain any fluid. In some cases this may be explained by the fact that the point of the needle is not in the spinal canal; or that after several minutes spent in endeavoring to find the canal with the point of the needle, the lumen of the latter becomes occluded by a blood-clot; or that one of the nerves of the cauda equinae may act as a valve across the opening in the needle; or most important of all, the point of the needle may be in the spinal canal but lying between the dura and the bone and not in the subarachnoid space.

The first of these difficulties is overcome by noting the depth to which the needle has penetrated; the direction which it has taken and whether the point of the needle is free, or fixed. By passing a sterile wire through the needle, *in situ*, a blood-clot can be forced out, if the wire is large enough to almost fill the opening in the needle. By withdrawing the needle for a short distance the third difficulty should be overcome. In several cases, I have convinced myself that the needle was in the spinal canal and that there was no blood-clot obstructing its lumen, but from the depth to which the needle had penetrated and the direction which it had taken I suspected that it was outside of the dura on the left side. After withdrawing the needle a short distance and thrusting again, with the point directed toward the median line, the fluid has flowed freely. In one case, punctured, at the time of autopsy, there appeared to be no fluid in the spinal canal. This was not a case of meningitis.

The pain of the operation is solely that of puncturing the skin. This has been ascertained by observing infants and children during the operation and by questioning the latter as to the degree of pain.

The importance of arranging the patient properly should not be overlooked. The patient should lie on the side, with the uppermost shoulder depressed, so that the spinal column presents directly toward the operator. In this way the operator can control the direction taken by the needle because he thrusts directly forwards. The knees should be drawn up to obtain as much convexity of the back as possible in order to separate the spinous processes.

The examination of the fluid should be as carefully performed as in any bacteriological examination. The microscopic examination of cover-glass preparations of the sediment, previously fixed and stained, should never be neglected and the character of the exudation should be noted.

Cultures should always be made from the fluid on blood serum as soon as possible after its withdrawal, and, when possible, a guinea-pig should be inoculated with some of the fluid. Tubercle bacilli are rarely numerous in the spinal fluid from cases of tubercular meningitis and their recognition is oftentimes difficult. The inoculation of guinea-pigs is the surest means of determining if tubercular meningitis is recovered

from. A recent case in which I performed the operation illustrates this: one typical, and two or three doubtful tubercle bacilli were found. A guinea-pig was inoculated, and after thirty-nine days, was killed, and not a sign of tuberculosis could be found.

Inoculations should be made as soon as possible after withdrawing the fluid. If fibrin has already formed it is well to break it up with a sterile wire at the time of inoculation, because the tubercle bacilli are retained in its meshes.

In making cultures from the fluid it is not safe to depend upon the quantity of fluid which can be obtained in the loop of a platinum wire. In several cases I have failed to obtain a growth of pathogenic bacteria because enough fluid was not used. It is best therefore to withdraw one to two cubic centimetres of fluid from the test-tube by means of a sterilized hypodermic syringe and to squirt the fluid over the culture medium. In order to carry out so thorough an examination, it is, of course, essential that every precaution should be used to prevent contamination of the fluid. The patient's back and the operator's hands must be thoroughly cleaned and the needle sterilized. One or more sterile test-tubes, plugged with cotton, are essential. These tubes should be sterilized by dry heat to 150° C. This may be done rapidly by passing the test-tube back and forth through the flame of an alcohol lamp or Bunsen burner until the cotton in the inside of the tube turns brown.

Microscopic examination of the sediment is essential because cloudiness may be caused by dust; by cotton fibres and the dust adhering to them, and by the products of bacteria in cases of septicemia. One or two drops of blood in the fluid will also cause a diffuse cloudiness.

The cloudiness in meningitis, which is caused by cellular exudation, is diffuse and very finely divided. A clear fluid containing small white particles should not be mistaken for it.

Finally, the diagnosis of meningitis at autopsy should never depend upon a macroscopic examination. A case recently autopsied showed no evidence of exudation in the meninges macroscopically. The cerebrospinal fluid, withdrawn during life, contained a great many polynuclear leucocytes. The microscopic examination of the brain and cord showed a well-marked and extensive encephalitis and myelitis and beginning meningitis.

REMARKS ON WIDAL'S "CLUMP REACTION" IN TYPHOID FEVER.¹

BY R. C. CAROT, M.D.

THE credit of the reaction is originally due to Pfeiffer, of Berlin, but this particular application to the diagnosis of typhoid was made by Widal, of Paris, in July of this year. The reaction is for diagnostic purposes. It consists in this: if to a bouillon culture of typhoid bacilli be added the blood serum of a typhoid patient in the proportion of one part of serum to ten parts of the bouillon, a certain reaction takes place which I am to demonstrate to you, namely, an aggregation of the bacilli into groups with a gradual loss of motility, the loss of motility being subsequent to the aggregation into groups and

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