condition of the nervous system. It is important to specify the method used in estimating protein, as the normal varies considerably with the different methods. After a series of parallel tests carried out with the help of pathologists of the R.A.M.C. (Hill, 1948), we decided that the Sicard-Canteloube method is the best for the purpose, as it gives a more accurate figure in the range of greatest importance—that just above the normal.

Adhesion Test

The test is based on the power possessed by the blood of infected animals to make trypanosomes of the same type sticky, so that platelets or blood cells adhere to them. In an endemic area we found that 91% of proved cases gave some degree of adhesion in this test, while 75% of negative controls gave none. Taking the strength of the reaction into consideration, we found that only 3% of the controls gave +++— or stronger, and only 11% ++— or stronger. The positive cases included some very early ones, and the negative controls included a few suspicious cases in which trypanosomes were not demonstrated. We found some evidence which suggested that the false positives might be due to tsetse injecting trypanosomes which were not numerous or vigorous enough to maintain themselves (Saunders, 1931).

Our technique was slightly modified from that of Johnson and Lester (1929). Blood from an infected animal, containing preferably 20–30 trypanosomes per field under 1/6-in. (4-mm.) objective, is taken into an equal volume of citrated saline and centrifuged slowly for five minutes. The supernatant suspension of trypanosomes is pipetted off. The plasma to be tested is prepared in the same way, or serum can be used. At first we set up the test in tubes, using equal volumes of the suspension and of the fluid being tested; later we found that two drops mixed on a slide gave the same results, and that incubation was not needed. A positive result is shown by platelets or blood cells sticking to the trypanosomes. In recording results we used the method of writing 1 to 5 crosses, as Johnson and Lester did, according to the number of trypanosomes seen with platelets or cells stuck to them.

Weak strains which do not produce numerous trypanosomes in infected animals were found to be unreliable for the test. In Nigeria starting or relapsing strains gave much the same result; in the Gold Coast our results were entirely erratic with relapsing strains.

Other Methods

Nelis (1944) and Fain (1944) found trypanosomes by sternal puncture when blood and glands were negative; but we have not found this method of value in the Gold Coast. Auto-agglutination of red cells certainly occurs in trypanosomiasis—but also without trypanosomes. We have not succeeded in getting clear results with the formol-gel test, possibly because we have not used carefully standardized tubes. The sedimentation rate will probably prove of value in studying the progress of the disease (Hollins and Lewis-Faning, 1947), but it is hardly of diagnostic value.

General Procedures

When we suspect trypanosomiasis we take a blood film, do a gland puncture, centrifuge the blood, and inoculate an animal in succession, and then carry out lumbar puncture. If necessary, the blood film is repeated daily. It is better to take the blood while the patient has fever. Dr. H. Bermingham, of Kumasi, diagnosed a case by taking blood films at hourly intervals over twenty-four hours. The gland puncture and centrifugation are repeated, if necessary, at intervals of a few days. Lumbar puncture is sometimes repeated, after a month because a case in which fluid is usually abnormal may have normal intervals (Barlovatz, 1934; Van Slype, 1935).

Summary

The simple routine laboratory methods used by the Gold Coast medical field units in the diagnosis of trypanosomiasis are described in detail.

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REFERENCES

- Barlovatz, A. (1934). *Ann. trop. Med. Parasit.*, 28, 1.
 Broden, A. (1920). *Ann. Soc. belge Méd. trop.*, 1, 3.
 Castellani, A., and Chalmers, A. J. (1919). *Manual of Tropical Medicine*, p. 1274. Baillière, London.
 Cates, J. E., and McIlroy, M. B. (1951). *British Medical Journal*, 2, 401.
 Fain, A. (1944). *Rec. Sci. méd. Congo belge*, 2, 127.
 Grieg, E. D. W., and Gray, A. C. H. (1904). *Proc. roy. Soc. Lond.*, 73, 455.
 Hill, K. R. (1948). *Trans. roy. Soc. trop. Med. Hyg.*, 41, 641.
 Hollins, C., and Lewis-Faning, E. (1947). *Ibid.*, 41, 217.
 Johnson, W. B., and Lester, H. M. O. (1929). *W. Afr. med. J.*, 2, 144.
 Kliger, I. J., and Weitzman, I. (1924). *Ann. trop. Med. Parasit.*, 18, 453.
 McGowan, D. (1951). *British Medical Journal*, 2, 546.
 Nelis, O. (1944). *Rec. Sci. méd. Congo belge*, 2, 124.
 Saunders, G. F. T. (1930). *Gold Coast Medical Annual Report*, p. 110.
 — (1931). *W. Afr. med. J.*, 5, 28.
 Sicé, A. (1937). *La Trypanosomiase humaine en Afrique Intertropicale*, p. 180. Vigot, Paris.
 Stefanopoulo, G., Caubet, P., and Duvalon, S. (1944). *Bull. Soc. Path. exot.*, 37, 296.
 Van Slype, W. (1935). *Trop. Dis. Bull.*, 32, 694.

Medical Memoranda

Two Unusual Cases of Intraperitoneal Foreign Bodies

Cases of peritoneal foreign bodies are reported from time to time in the literature. The following two patients were treated at the Cardiff Royal Infirmary recently.

CASE 1

A man aged 64 was seen in the out-patient department in January, 1949, and admitted a few days later. Six weeks previously he had first had pain in the right lower abdomen. This had been of gradual onset, but within 48 hours had become severe enough to cause him to cease work. It was severe for a period of four to five days, during which he was constipated. When he had his bowels opened at the end of this time the pain gradually lessened. Since then he had constantly been aware of "soreness," with occasional painful exacerbations. During the initial attack he had noticed a swelling in the right iliac fossa at the site of the pain. This had, he thought, decreased in size as the pain diminished, but since then it had remained constant. Except at the onset of the illness, his appetite had been normal and his bowels regular. There were no other symptoms or any past history of significance.

He was an obese man whose general condition was good apart from chronic bronchitis. There was no evidence of anaemia or any enlarged lymph nodes. His tongue was clean and moist. There was a fairly well defined, slightly tender swelling in the right iliac fossa measuring 6 by 8 cm. It appeared to be involving the abdominal wall and moved with it on respiration. With the abdominal wall relaxed the swelling was mobile. No other abnormality was found in the abdomen or on rectal examination.

During the week after admission the patient had evening pyrexia of 99–100° F. (37.2–37.8° C.) on three or four occasions. Blood count and stool examination were normal. A barium enema showed a filling defect proximal to the hepatic flexure which was suggestive of a neoplasm.

He was thought to have an appendix abscess or possibly a carcinoma of the caecum. A laparotomy was performed 10 days after admission. The caecum, ascending colon, and appendix were normal. The palpable mass was found to consist of oedematous indurated omentum adherent to the anterior abdominal wall. On freeing the omentum from the abdominal wall the latter was felt to contain a craggy

indurated mass thought to be due to chronic oedema. The omental swelling was about 10 cm. in diameter and appeared to be of a chronic inflammatory nature. The cause of the lesion remained obscure until, on exploring the omental mass, a sliver of bone was found buried in it near that aspect of the mass which had been apposed to the abdominal wall. There was no pus present. The bone was removed and the abdomen closed.

The bone was found to be about 3 cm. long, with a diameter of 3-4 mm. at its middle; it tapered to points at both ends.

The patient has remained well since. He had no knowledge of having swallowed the foreign body, which is believed to be a fragment of rabbit bone.

CASE 2

A man aged 41 was admitted as an emergency case in August, 1950, complaining of severe hypogastric pain. One week before admission he started to have abdominal discomfort. Four days before admission this had become worse, especially before and during micturition. He had had frequency of micturition for two days. A few hours before admission he had a sudden urgent desire to micturate, but had been unable to do so. This was followed by severe lower abdominal colic and rigors, which caused him to come to hospital. Up till then he had not vomited, but after admission he brought up a little bile-stained fluid. His bowel habits had been regular. He had been working until the day of admission. There was no antecedent history of significance.

When examined he was in severe pain. He had a pyrexia of 101° F. (38.3° C.) and a pulse rate of 100. His tongue was heavily furred. There were signs of lower abdominal peritonitis. Tenderness was slightly more marked on the left than on the right. No mass was identified, but rigidity made deep palpation impossible. On rectal examination there was pronounced tenderness in the recto-vesical pouch but no palpable mass. The urine was normal.

The abdomen was opened by a right lower paramedian incision a few hours after admission. There was lower abdominal peritonitis. The cause of this was rupture of a small abscess around the pelvic colon. Omentum and bladder as well as colon were involved in the inflammatory mass. Bladder and colon were separated from the mass without difficulty, and no lesion of either viscus was found. The lesion appeared to originate in the omentum, as in Case 1. A purposive search was now made for a foreign body, and one was found in an abscess cavity in the omentum containing a few millilitres of pus. The foreign body was removed and the abdomen closed.

The patient made an uneventful recovery. He had no recollection of having swallowed the foreign body, which is believed to be rabbit bone. The histologists were unable to identify it with certainty. The piece of bone was 2½ cm. long and sharp at both ends. Its middle was flattened and 2-3 mm. wide.

COMMENT

Some idea of the frequency of such perforation of the bowel may be gained from Perslow's (1935) finding of seven such cases among 225 patients admitted to hospital having swallowed foreign bodies. These cases occurred among 320,000 admissions to seven large Swedish hospitals over a 20-year period. Each of Perslow's seven patients came with peritonitis.

The first case recorded above is unusual in that it presented as a chronic lesion. It is assumed that the bowel through which the bone had passed was the caecum. Rather surprisingly, this is a common site for perforation to occur in, although no part of the alimentary tract is exempt.

At operation the striking fact about both of the above cases was that the omentum appeared to be the centre of the lesion. Even in the relatively acute Case 2 the walls

of the pelvic colon and bladder seemed to be only secondarily involved. There was no trace of the site of perforation, although this was searched for in the neighbouring colon. This omental protection was commented on in a paper by Watson (1915), who remarked that it occurs in many cases before the actual perforation. He gives no evidence for this statement, but the comparative mildness of the early symptoms in the present cases suggests rapid localization of the inflammation after perforation.

It is probable that the mechanism of perforation in these two patients was that a sharp end of the bone first pricked the mucosa of the intestine and stuck. The resulting irritation set up inflammation in the overlying visceral peritoneum and caused adhesion of omentum to the site. The oedematous area of bowel stimulated vigorous peristalsis, which, since it failed to dislodge the bone, brought about complete perforation of the bowel and completed the extrusion of the foreign body from the gut. The omentum was already in position to "take up" the extruded foreign body and localize the peritonitis. In Case 1 the protective process was completely successful, and no doubt the bone would eventually have found its way through the abdominal wall.

In Case 2 it is assumed that involvement of the bladder in the "walling off" mechanism resulted in a breakdown of the defences when the bladder contracted violently in an effort to empty itself. The severe pain of general lower abdominal peritonitis came on when the patient was trying to micturate, about a week after his first abdominal symptom.

I wish to thank Mr. J. B. Haycraft for permission to publish details of these two cases.

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REFERENCES

- Perslow, O. (1935). *Acta chir. scand.*, 76, 63.
Watson, F. S. (1915). *Boston med. surg. J.*, 172, 622.

Subacute Inversion of the Uterus Treated with Aveling's Repositor

Acute inversion of the uterus is uncommon, and it is impossible for anyone to gain very much experience in the management of these cases. The following case presented itself as a subacute complete inversion of the uterus. It was first seen and diagnosed some 66 hours after delivery. The division between acute and subacute cases has been used previously (Ocejo, 1947).

CASE REPORT

A primigravida aged 19 had a normal delivery of a living female child weighing 7 lb. 12 oz. (3.5 kg.) at 8 p.m. on October 22, 1949. The third stage was prolonged and a post-partum haemorrhage occurred. The patient's doctor was called by the midwife, and the placenta was expressed by Credé's method. The patient became very collapsed after this manœuvre and, at the request of the doctor, blood was taken to the house and a transfusion of 2 pints (1.14 litres) was given. The patient's general condition improved. The loss was normal and the blood pressure was also within normal limits. Approximately an hour later the loss became excessive and the patient's condition again deteriorated. She was admitted to hospital.

On admission the pulse rate was 110 a minute and the blood pressure 90/50. Loss was not excessive. She was given "omnupon," ½ gr. (22 mg.), and ergometrine, 0.5 mg. A further 2 pints (1.14 litres) of blood was given. She responded satisfactorily to this treatment. The following morning her general condition was fairly satisfactory. Lochia were noted as being rather heavier than normal.

On October 24 her temperature was 100° F. (37.8° C.) and pulse 106. A course of penicillin, 50,000 units intramuscularly three-hourly, and sulphadimidine, 2 g. and 1 g. four-hourly, was begun.