arrived, according to the officer on duty, "recovered from his shock and in excellent condition." It seems probable that if this case had been transfused immediately he would never have developed the shock which, untreated, would undoubtedly have meant his death before he reached the casualty clearing station.

Conclusion.

Although there has been opportunity to carry out the operation on a very few cases as yet, there is no doubt that blood transfusion by the syringe method can be done easily in an A.D.S., and, in the writer's opinion, could be done in an average regimental aid post; and by its use some cases of severe primary haemorrhage which would in the natural course of events die in the forward area will live to reach the casualty clearing station.

Indebtedness is especially acknowledged to Captain Cowell and to the teaching of the — Army R.A.M.C. school, as well as to Lieut.-Colonel T. J. F. Murphy, D.S.O., C.A.M.C., commanding the field ambulance.

AMOEBIC ABSCESS OF THE LIVER.

BY

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AMOEBIC abscesses of the liver are by no means uncommon in Mesopotamia, and are of interest for the manner in which the signs and symptoms frequently differ from those usually described in surgical textbooks. During the last twelve months over twenty cases have come under my observation in this hospital, besides many others already treated and passing through in various stages of convalescence during the course of evacuation from other hospitals.

As thousands of men have returned and will continue to return to England with active amoebae in the large intestine, I venture to record some of the principal features of the last twenty cases admitted to this hospital among British troops.

Signs and Symptoms.

Patients usually give a history of former attacks of diarrhoea or actual passage of blood and mucus, and *Entamoeba histolytica* can usually be found in the stools. The onset of the disease is usually insidious, loss of appetite, malaise or wasting causing the patient to report sick. In a few cases, however, the disease runs an acute course and the onset is surprisingly rapid. In one case in which one abscess was opened and four more found *post mortem*, the patient was apparently well and doing full duty until eight days before the operation; as death occurred ten days later, the whole illness lasted only eighteen days. In another patient, who had been some days in hospital under observation, the temperature was not above 99° until three days prior to a large abscess being opened.

Pain may be a marked symptom, indicating that the abscess is near the surface of the liver, and is sometimes a useful guide to its position. Referred pain in the right shoulder suggests subdiaphragmatic irritation of the phrenic nerve, whereas pain in the epigastrium or loins may indicate an abscess in the lower part of the liver.

Vomiting occasionally occurs, but jaundice is rare; a slight icteric tint, with a trace of bile in the urine only, was noticed in one case.

With an abscess of large size or long duration, cachexia and signs of septic absorption—oscillating temperature, sweats, rigors, furred tongue, etc.—are well marked, but an interesting feature is that the pulse-rate is often relatively slow in proportion to the temperature. (The chart shows the temperature in a typical case.)

The cytological examination of the blood is of great importance; the leucocytosis and an increase in the percentage of polymorphonuclear cells so characteristic of pus are usually well marked. The most striking blood picture in this series of twenty cases was a total white cell count of 43,000 per cubic millimetre (with 89.8 per cent. polymorphs), and the least striking showed 12,500 white cells (74 per cent. polymorphs). There seem to be no other constant blood changes, and eosinophils are not usually present in greater numbers than normally.

The x-ray screen is useful in diagnosis in doubtful cases, or to afford confirmation where a liver abscess is suspected. Three points are of assistance: first, increase in the size of the liver in an upward direction; secondly, limitation of movement of the diaphragm, the normal 1 in. to 1½ in. being reduced to ½ in. or ¾ in. even on deep inspiration; and thirdly, the normal dome-shaped diaphragmatic convexity may be distorted by a bulging representing a pointing abscess.

Course.

There is some clinical evidence to show that small abscesses may be absorbed, and this is especially probable in cases where the resistance of the tissues to amoebic invasion has been increased by emetine injections.

The usual course in Mesopotamia seems to be rapidly progressive, and sometimes surprisingly so, and is well illustrated in one case in which the patient had never left England prior to his embarkation for Mesopotamia, so that the possibility of previous amoebic infection is very remote. He had been in Mesopotamia less than a month when he was admitted and an abscess containing nearly a pint of pus evacuated from the liver, amoebae being found in the pus in the course of a few days.

In most cases the abscess apparently increases steadily in size and may rupture through the diaphragm or into the peritoneal cavity; this being a comparatively slow process, it is well shut off by adhesions among the neighbouring organs.

In one case liver abscess was diagnosed, and it was decided to operate on the following day, but the patient suddenly collapsed and died in a few minutes. *Post mortem* it was found that two large abscesses were present, one of which had ruptured into the inferior vena cava, death occurring from the resultant haemorrhage.

Diagnosis.

In well marked cases the diagnosis presents little difficulty—the enlargement of the liver, signs of toxæmia, blood picture and x-ray screen, all pointing to the correct diagnosis. It may be difficult to distinguish between a right-sided empyema and a liver abscess. The latter, if situated in the upper right lobe, may cause compression of the lung, with dullness and feeble breath sounds as high up as the angle of the scapula; also some fluid in the pleural sac may accompany a liver abscess, as in one case admitted as pleural effusion in which the liver abscess was discovered subsequently. In these cases the final appeal may be to the exploring needle, the diagnosis resting on the site of the discovered pus.

The increase in the percentage of polymorphonuclear cells in the blood is of much assistance in distinguishing between simple and suppurative inflammation of the liver. A good illustration of the value of the differential cytological examination was that of a patient admitted with an enlarged and painful liver, slight fever, and diarrhoea. His total white cell count was 18,500 per c.mm., but of these only 60 per cent. were polymorphonuclear. A diagnosis of dysenteric hepatitis was made, and the condition cleared up with dieting and hypodermic injections of emetine.

In two cases where the abscess was in the lower part of the right lobe and situated near the mid-line, the

CHART I.—E, Emetine, gr. 1; o, operation. Quinine, gr. 30, was given on June 7th and June 8th. Blood film examined for malaria on June 6th, and blood culture for enteric group on June 12th; both gave negative results. The patient was sent to the base on June 30th.

physical signs so much resembled those of an enlarged and infected gall bladder that the diagnosis of liver abscess was only confirmed on the operating table. A liver abscess in the posterior part of the right lobe may simulate a perinephritic abscess, especially as this latter condition is frequently seen in connexion with dysentery. An examination of the urine and signs of psoas irritation help to clear the diagnosis. Other cases of subdiaphragmatic suppuration—for example, those of gastric or intestinal origin—can usually be traced to their primary lesion.

Treatment.

The presence of pus is confirmed by the exploring needle; the exploration should always be conducted in the theatre, so that, if successful, the complete operation can be proceeded with. It is important to use a wide-bore needle, as the pus is usually thick and contains clots of lymph liable to block the needle. In one case in which the presence of pus was a moral certainty eight punctures were made before the abscess was discovered, and thick pus aspirated; probably the needle had on one or more occasions tapped the abscess, but the pus did not flow.

In this hospital it is the practice to leave the needle in the abscess cavity and excise a sufficiency of the ribs immediately below the needle. Well formed adhesions may be found between the parietal pleura and the diaphragm; it is, however, safer not to trust to them to protect the pleural cavity, but to insert a few points of suture between the parietal pleura and diaphragm. The diaphragm is then incised, and, using the needle as a guide, liver tissue is gently broken down until the abscess cavity is reached, when a drainage tube wrapped in gauze is inserted. The sinus usually heals readily, and in some cases syringing with weak quinine solution or eusol expedites closure. A course of emetine, 1 grain daily for twelve days, is usually given. I have seen cases in which the abscess was aspirated and a solution of quinine bichloride (30 grains in 10 oz. of water) injected into the cavity; the patients apparently were convalescing satisfactorily, the evacuated pus doubtless being sterile. However, in one case which was drained in the usual manner the convalescence was retarded until a second abscess discharged itself into the existing sinus. This abscess was unsuspected.

When the abscess is in the lower part of the liver, or has already ruptured into the general peritoneal cavity, the abdomen is opened with the usual precautions for the protection of the peritoneum, and drainage carried out in the usual way.

Prognosis and Summary.

The prognosis of liver abscesses in Mesopotamia is unfavourable, the chief reason being that although one abscess may be satisfactorily drained others are present which may be undiscovered or undiagnosed. In one case in addition to one abscess drained, five others were found *post mortem*; live amoebae were found in the pus.

Another factor which increases the severity of the disease is the acuteness of the course and the consequent grave toxæmic symptoms. Coupled with this is the fact that the patient is often already debilitated from trying conditions in a climate which taxes the resources of the most robust, and consequently has little resistance to any infection.

I append a summary of twenty cases upon which these notes are based:

Apparently cured and patient evacuated*	8
One or more abscesses drained at operation, but further abscesses found <i>post mortem</i> ...	8
Abscess suspected, undiscovered on needling, found <i>post mortem</i> to be in the Spigelian lobe ...	1
Two abscesses, one of which ruptured into the inferior vena cava; death from hæmorrhage ...	1
Death due to post-operative shock (no other abscesses) ...	1
Single abscess drained, but patient did not respond and died seventeen days later from asthenia ...	1
Apparently cured ...	7
Minimum mortality, 65 per cent.	

* One of these cases subsequently died at another hospital from a second abscess.

It will thus be seen that liver abscess contributes substantially to the mortality and disablement among troops

in this campaign, and during the last hot season in this hospital more cases of liver abscess found their way to the *post-mortem* room than cases of actual dysentery. Owing to the numbers of men who will return to England infected with *Entamoeba histolytica* there is every possibility that this disease will manifest itself among them. Practically every one who has been resident in Mesopotamia for a few months is a carrier of *E. histolytica*, besides many another protozoon, and until we know more about the amoebic group it is difficult to trace their connexion with suppurative processes.

We are told by Knowles and Cole¹ that the "different species" of amoebae "are all one and the same organism... *Entamoeba coli communis*." Probably the *E. histolytica* is on the same pathological basis as the *B. coli*, and decreased resistance of the tissues or some stimulus applied to the organism causes it to become pathogenic, in which case the majority of the Mesopotamian Expeditionary Force are potential cases of liver abscess.

The most striking features of the condition as seen in Mesopotamia are the severity of the disease, often the acuteness of the onset and rapid course, and frequently the multiple nature of the abscess (in contradiction to the old name of "solitary abscess").

I am indebted to Lieut.-Colonel Davis, R.A.M.C., for permission to publish these notes, and to Captain J. Maitland Downie, R.A.M.C.(S.R.), for his assistance in collecting them.

REFERENCE.

¹ *Ind. Journ. Med. Research*, vol. iv, No. 3, 1917.

ACUTE INTESTINAL OBSTRUCTION BY TAPEWORMS (*T. SAGINATA*):

MECHANICAL BLOCKING OF ILEO-CAECAL VALVE, NECESSITATING LAPAROTOMY.

BY

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AMONGST the causes of intestinal obstruction due to the impaction of foreign bodies in the lumen of the bowel, accumulation of faeces, gall stones, intestinal calculi, and articles swallowed, such as teaspoons, are perhaps the best known.

The occurrence of intestinal worms causing acute obstruction is so infrequent in those countries where surgical textbooks are compiled, that authors as a rule do not even mention them as a possible cause. Nevertheless intestinal parasites are a very real source of danger in tropical countries, and they should be borne in mind as a possibility when exploratory operations are undertaken for acute intestinal obstruction.

Perret and Simon¹ summarize the histories of eleven cases of intestinal obstruction all due to *Ascaris lumbricoides*, all recorded since 1887. Most of these cases were diagnosed at the necropsy or during operation. They themselves record in the same paper another case. De Mello² and Masters³ have each recorded one case of intestinal obstruction due to *Ascaris lumbricoides*; in none of the three last was laparotomy resorted to.

No doubt *Ascaris lumbricoides* is the principal offender amongst intestinal worms, but the following case proves that laparotomy may have to be done for acute intestinal obstruction due to tapeworms (*Taenia saginata*).

O. H., male, Sudanese, aged 40, working as a gardener in the Palace Gardens at Khartoum, was admitted into Khartoum Civil Hospital with a very much distended belly and total suppression of faeces and flatus for sixteen hours. The attack seemed to come on suddenly but without pain at 5 p.m. He vomited twice during the night and the belly became more and more distended.

On admission to hospital the following morning the belly was much distended and tense, and the coils of intestines were very evident; peristalsis was plainly seen, and considerable discomfort was experienced owing to the distension, but there was no obvious pain; the pulse was 84, full and regular. He could pass neither faeces nor flatus; rectal examination revealed only an empty rectum. Two or three enemata were given without