be at a higher pressure than the blood in the lumen. When a portion of intima is already detached, the blood is at the same pressure on each side of it, and it has no impulse to move at all.

Blood pressure may, as in the prescribed circumstances, strip the media from the intima, but cannot strip the intima from the media.

The production of aneurysms is generally considered statically, as a pressure problem. There is a dynamic factor at hand in the motion of the blood. The velocity of the blood in the aorta varies considerably, its maximum is about 120 cm. per second; at this instant each centimetre length of the blood column has about 6,000 ergs of kinetic energy, or, in gravitation measure, about 2 centimetre-grams. A nearer calculation is not worth while, as we do not know how much of the energy is available for coat-stripping. The total kinetic energy even at a maximum is not great, but the maxima recur some 4,000 times an hour, and a fraction of the energy in each is capable, in time, of producing appreciable mechanical results.

It may be surmised that if an intima were already extensively undermined and perforated by atheroma, detachment might be accelerated by the energy of the moving stream. If tags of intima were partially detached, they could be projected into the lumen as flaps, so directing more of the kinetic energy towards stripping. Finally, a flap might be thrown right across the lumen, causing a dam; then the whole of the kinetic energy would be diverted to intima stripping, and, as well, a powerful pressure factor would be called into play; the blood pressure below the flap and within the intima would rapidly fall towards zero, while the pressure above the flap and outside the stripped portion of intima would rapidly rise towards ventricular systolic pressure. Here, then, is a possibility of sudden and violent stripping of the aortic intima, supposing there to have been a previous partial undermining and detachment; the preparatory process may be very gradual and insidious.

SUMMARY.

1. A man of 65, apparently in good health, fell down suddenly and nearly died; he recovered somewhat, and complained of intense substernal pain and of pain and paresis of the left leg. About thirty-eight hours later he died suddenly.

2. The *post-mortem* examination disclosed the greater part of the aortic intima lying free in the lumen. The aorta was extensively atheromatous.

3. The mechanism of the process, and of the so-called dissecting aneurysm, is discussed. It is maintained that, in the absence of bulging of the outer coats, static considerations alone do not provide an adequate explanation, but that the motion of the blood is a significant factor.

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NOTES ON LIVER ABSCESS.

FOUNDED ON CASES AT A STATIONARY HOSPITAL, PALESTINE.

BY

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THIS paper deals only with aspects of the disease presented in five cases of liver abscess seen in this hospital between September 28th and November 2nd, 1918.

The site of the abscess had an important relation to the result in these cases. According to the position of the abscess the cases may be divided into epigastric and subdiaphragmatic.

A. EPIGASTRIC.

In Cases I, II, and III the abscess was epigastric, was diagnosed comparatively easily, and the result of operation was apparently successful, the patients being transferred by ambulance train to Kantara on the twentieth, fourteenth, and twenty-eighth day respectively after operation, and subsequently to Cairo and Alexandria.

In these cases the abscess was large and single. No second abscess was discovered at operation, nor were there suspicious signs or symptoms during the time the patients remained under observation.

In one case (II) the abscess was in the left lobe, and the liver was adherent to the abdominal wall over it. In two cases (I and III) the abscess was in the right lobe, and no adhesions were present between the visceral and parietal peritoneum. In Case III, free sero-sanguineous fluid was present in the peritoneal cavity at operation.

B. SUBDIAPHRAGMATIC.

In the remaining cases the abscess was closely sub-diaphragmatic, diagnosis was rendered difficult by the presence of pneumonic signs, and was made certainly only at *post-mortem* examination. These cases are considered at length under differential diagnosis.

The accompanying synopsis of cases gives the history, symptoms, signs, bacteriological findings and results.

CASE I.

History of bacillary dysentery in June, 1918. Admitted September 28th, on the eleventh day of illness, with pain in the epigastric and right hypochondriac region, nausea, and constipation. Liver enlarged, four fingerbreadths below costal margin, with localized tenderness. General rhonchi present in lungs. Highest temperature 102.5°. The leucocyte count was 20,000. Three examinations of faeces showed large number of dead amoebae, variety doubtful, probably *A. histolytica*. Pus from abscess negative for amoebae.

Operation October 4th. Patient transferred on twentieth day after operation.

CASE II.

History of two attacks of diarrhoea, the first in August, 1918, with presence of mucus; the second on October 26th, at onset of illness, without blood or mucus. Admitted on November 2nd, on seventh day of illness, with pain in left epigastric and umbilical regions. The liver palpably enlarged and locally tender in the left epigastric region. Highest temperature 102°. General rhonchi present in lungs. The leucocyte count was 10,800. One faecal examination gave a negative result, but *A. histolytica* was present in pus from abscess.

Operation November 8th. Patient transferred on fourteenth day after operation.

CASE III.

History of two attacks of diarrhoea—the first in May, 1918, severe with presence of blood and mucus; the second in August, 1918, three days' diarrhoea without blood or mucus. Admitted October 19th (seventh day of illness) with severe pain, continuous with exacerbations in the right epigastric area. Liver enlarged to level of umbilicus in right mid-clavicular line. Liver tenderness present, but badly localized at first. Highest temperature 103.2°. General rhonchi present in lungs. Large quantity of muco-purulent sputum. He was much emaciated. The leucocyte count was 17,000. One examination of faeces was negative. Pus from the abscess was not examined.

Operation on October 28th. Patient transferred on twenty-eighth day after operation.

CASE IV.

No history of diarrhoea. Admitted on October 29th, third day of illness. History of abdominal pain, with vomiting at onset. Liver not enlarged downwards. Signs of pleurisy and consolidation at base of right lung, general rhonchi present in rest of lungs. Pain present in diaphragmatic region, in right mid-axillary line, and in right shoulder; tenderness present in same region, but not constant. Highest temperature 103°. One faecal examination was negative, but *A. histolytica* was found in pus from the abscess at *post-mortem* examination.

CASE V.

History of diarrhoea negative. History of pain in right hypochondrium off and on for one month. Pain more severe and accompanied by vomiting on November 12th. He was admitted on the eighth day, after severe pain. Liver not enlarged downwards; signs of consolidation present at base of right lung, and general rhonchi present over rest of lungs. Tenderness over right costal margin early, absent later. Two examinations of faeces negative. Two amoebic abscesses present on *post-mortem* examination on November 13th.

Admission to hospital in above notes signifies transfer from other hospital to the hospital referred to in particular.

Cases.	Operations.	Deaths.
Epigastric 3	3	0
Subdiaphragmatic 2	0	2

Diagnosis.

A history of diarrhoea or dysentery is of value when obtained, but a negative history may be given, as in Cases IV and V. In one case only did the patient state

that he had suffered from dysentery, and inquiry from the hospital at which he had been treated elicited the information that the diagnosis had been bacillary dysentery, for which he was treated, but that thirteen days previous to his discharge an immotile cell (? *Amoeba histolytica*) was seen on microscopic examination of the faeces.

Pain was present in all cases. A man with a large liver abscess has had severe pain during its formation.

Tenderness over some part of the hepatic area was present in all cases at some period of the illness, and was maximal over the site of the abscess.

Enlargement of liver was present in Cases i, ii, and iii, the firm edge being easily felt; it was not present in a downward direction in Cases iv and v, and was not observed in an upward direction, pneumonic signs being present at the right base on admission.

Pyrexia was swinging, possibly with less regularity than that due to other abscesses. There was slight jaundice in two cases. Sweating was pronounced in Case ii and in Case iv, but only during the terminal collapse.

Bacteriological Findings.—The presence of *Amoeba histolytica* in the faeces is very valuable; but failure to find it is of very little value unless several examinations have been made. To obtain satisfactory results the specimens must be examined shortly after evacuation. In none of these cases was *A. histolytica* definitely found in the faeces. In one case (i) the presence of large quantities of dead amoebae, probably *A. histolytica*, was reported; in the other cases findings were negative. It will be noted that *A. histolytica* was present in the pus of the abscess in two cases.

Leucocytosis.—In Case ii the leucocyte count was only 10,800, in spite of the presence of a large abscess. I am indebted to Captains R. T. Jones and J. W. Fox, R.A.M.C., of No. 1 Military Laboratory, for these results.

Differential Diagnosis.

I. The diagnosis from primary right basal pneumonia rests on the presence of some abdominal symptoms, swinging temperature, and tenderness over some part of the hepatic area, before any pulmonary signs are noted at the right base, showing clearly that the pathological condition at the right base is secondary to some condition causing these symptoms and signs—namely, liver abscess. Cases iv and v illustrate these points. They were admitted to hospital with right basal pulmonary signs at the time that epidemic pneumonia was prevalent, and their condition was attributed to this disease; but the pneumonic condition was secondary.

Case iv had abdominal pain, nausea, and vomited in the early stage of his illness. His tongue was very coated on admission, though the stools passed were normal in appearance.

Case v had general abdominal rigidity and tenderness and a dry coated tongue. He improved upon daily enemata, which caused the evacuation of scybalous masses. In neither of these cases was enlargement of the liver downwards found, and tenderness over some part of the hepatic area was a transient sign.

Among the patients with malaria who died of epidemic pneumonia and upon whom *post-mortem* examinations were made in the same period, the pneumonia was present at the right base in several, and the physical signs present were right basal pneumonia with an enlarged liver, in some cases showing slight general tenderness. The patient was already suffering from two clinical entities and it seemed unreasonable to expect that a third should be added. The possibility of liver abscess in these cases was considered and dismissed.

II. The diagnosis from malarial hepatitis depends on the presence of splenic enlargement. I saw one case only in which the diagnosis of amoebic hepatitis, probably with abscess, was definitely made, and, although the liver was enlarged, tenderness was neither marked nor localized, and a blood film, positive for malaria, cleared away any doubt. In none of the cases was the spleen enlarged.

Number of Abscesses.

As already stated, in those cases which came to operation one abscess only was found. On the other hand, in the cases which came to *post-mortem* examination, the abscesses were multiple. Recently I have seen a case in which two abscesses were drained at operation, one in the

left epigastrium, the other in the body of the right lobe, drained by resection of the rib. In Case iv the abscess had burst into the pleural cavity. This patient had severe pain in the right shoulder. In Case v the abscess had burst into the peritoneal cavity.

In conclusion, I thank Lieut.-Colonel F. E. Roberts, D.S.O., R.A.M.C., for permission to publish these cases, and my colleagues at — Stationary Hospital for their help.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

ANOXAEMIA IN NASAL OBSTRUCTION.

To convince a patient that his troubles—which were many and “vague”—were due to intermittent blockage of his left nostril, I instituted a series of tests of which one was a walk of four miles. The first walk was carried through with the left nostril blocked; the second with the left nostril clear. The patient described his sensations thus: “The first walk my feet were as lead; in the second I felt they had wings.”

Another test was that the patient walked four miles, and at intervals, regulated by the feeling of weight in his feet, he cleared his left nostril by pressing the nose to the left side. After his return he said, “I was surprised. When I pushed my nose to the left, and thus instantly gave free passage to air through my left nose, I found my pace of walking immediately increased enormously. I felt as if I had been shot from a gun.”

I thought this statement interesting at the time—October, 1917. I think it of more interest now. In the BRITISH MEDICAL JOURNAL of July 19th, 1919, I read in Dr. Haldane's lecture:

The senses become dulled without persons being aware of it, and if the anoxaemia is suddenly relieved by administration of oxygen or other means the correspondingly sudden increase in powers of vision and hearing is an intense surprise.

Presumably nasal obstruction must cause anoxaemia. What is true of the sensory powers must be true of the motor powers. My patient's word was “surprised.”

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DIAPHRAGMATIC HERNIA.

It may be interesting to record a case of diaphragmatic hernia I saw in India. I have not the exact data, but the sequence of events was as follows:

A private in the 1/10th Middlesex Regiment was admitted to Chakrata Hospital, Himalayas, suffering from acute abdominal pain with vomiting. He had been wounded in Mesopotamia in the left hypogastrium, and the exit wound was between the shoulder blades. Apparently treatment had been temporarily successful, and he was transferred to the hills, convalescent. He stated that he had eaten a large number of new walnuts, and considered this the sole cause of his trouble.

He was examined, and a diagnosis of probable diaphragmatic hernia made, as the left chest was tympanitic, and the patient was suffering severely from shock.

Arrangements were made for operation, and anti-shock measures were instituted, but he collapsed suddenly, and died almost immediately.

Post-mortem examination showed that the stomach had forced its way through a small hole in the diaphragm, and was lying in the left pleura. The organ was congested and full of gas, and had apparently become semi-strangulated.

It seems to me probable that the diaphragmatic hole was too small to interfere much with normal functions until the advent of gastric and intestinal irritation, which had produced strong peristalsis, and so helped to force part of the abdominal contents upwards. It may be the pressure was raised to a dangerous point by the continuous bending double of the patient, or again the hernia may have been the primary cause of the epigastric and hypogastric pain. Death, I think, was due to pressure on the heart causing syncope.

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