RUPTURED ANEURYSM OF THE SPLENIC ARTERY DURING PREGNANCY

BY

J. F. E. GILLAM, M.B., F.R.C.S.

Honorary Surgeon, Pembroke County Hospital, Haverfordwest

Aneurysm of the splenic artery is said to occur once in every 1,500 necropsies. A summary of 58 recorded cases was made by Anderson and Gray (1929), who reported a case, and subsequently Machemer and Fuge (1939) collected a further 24 cases and added one of their own. Analysis of these 84 cases reveals that rupture into the peritoneal cavity has occurred on 27 occasions, and 6 of these were in the later months of pregnancy. Operation was undertaken on 9 of the ruptured cases, splenectomy with removal of the aneurysm being performed in 3 of them; of these three, one patient died, one recovered (Brockman, 1930), while the third also recovered, but the aneurysm recurred in the splenic artery proximal to the ligature and fatal rupture followed twenty-two months after the operation (Parsons, 1937). Of 13 patients in these series treated by splenectomy and removal of the aneurysm before rupture had occurred 7 recovered.

The symptoms of an unruptured aneurysm are variable, and, as in the following case, may be completely lacking. According to Pasternack and Shaw (1939) pain of a colicky nature in the left epigastrium or hypochondrium may occur, and is characteristically increased by exertion or by changes of posture. There may also be symptoms referable to the stomach, gall-bladder, or colon. A pulsating tumour may be felt or a systolic bruit heard, and radiology has been of positive value.

Case Report

A Belgian woman aged 26, in the eighth month of her first pregnancy, was admitted to hospital on February 15, 1941. She had felt quite well and had had no abdominal symptoms until the previous night, when she had been seized with severe epigastric pain and had collapsed. She received an injection of morphine, and her condition improved during the night. On admission she was pale and shocked. Abdominal pain and tenderness were generalized, and there was a moderate degree of muscular resistance. The uterus felt tense, no contractions could be detected, and the foetal heart could not be heard. There was no oedema of the legs or elsewhere. The urine contained albumin, and the blood pressure was 130/80. On vaginal examination the os admitted one finger and the membranes felt tense. There was no external haemorrhage. A diagnosis of concealed accidental haemorrhage was made; the vagina was plugged and a tight binder applied. Twelve hours later the uterus was contracting regularly. The plugging was removed and the membranes ruptured. There was still no sign of haemorrhage. On rupturing the membranes an unusually large amount of liquor amnii escaped, and it was thought that her symptoms had been due to acute hydramnios. Two hours later she was delivered of a stillborn foetus, the placenta and membranes being normal.

The completion of labour did not bring about any improvement in the patient's condition. The pain was less severe, but a slight degree of epigastric distension noted during the third stage of labour became more pronounced, and she started to vomit small quantities of clear fluid, which was acid in reaction. A diagnosis of acute dilatation of the stomach was made, and treatment carried out by turning the patient on her face, raising the foot of the bed, aspiration of the stomach through a Ryle tube, and continuous intravenous saline. After twenty-four hours the general condition improved. She was then complaining of nothing but the discomfort of the treatment, which had resulted in considerable oedema of the face. The distension did not recur and there was no further vomiting after removing the Ryle tube, so the rest of the treatment was gradually discontinued without any ill effect. During the following fort-

night the patient made an uneventful recovery, apart from a slight icteric tinge noted on February 21. By March 1 involution of the uterus was satisfactory, there was no vaginal discharge, and she was feeling well, with no abdominal discomfort or tenderness. She was therefore discharged from hospital.

The next morning, immediately after an action of the bowels, she was again seized with severe epigastric pain and collapsed. When seen by her doctor she was pulseless, but on admission to hospital four hours later her condition had improved a little. The pulse rate was 96; blood pressure 80/56. The abdomen was tender all over and rather resistant; there was some impairment of percussion note in the left flank, elsewhere the note was tympanitic. Auscultation revealed that peristalsis was still active. Resuscitation with morphine and saline resulted in further improvement in her general condition, the blood pressure rising to 100/68 and the pulse rate remaining at 96. The abdominal rigidity increased and was most marked in the epigastrium. Loewi's test was negative.

Four hours after admission laparotomy was performed through a right paramedian incision. The general peritoneal cavity was full of blood, with several large recent clots in the pelvis; the uterus and adnexa felt normal. Exploration of the rest of the peritoneal cavity revealed a rounded mass the size of an orange situated below the spleen. Exposure was increased by transverse division of the left rectus muscle, and the mass was found to consist of a comparatively old clot enclosed in the lesser sac below the spleen and between the stomach and left half of the transverse colon. The gastro-colic omentum in front of the mass was divided and some of the clot removed. This procedure was followed by alarming arterial haemorrhage welling up from behind the remaining adherent clot. The haemorrhage was partly controlled by grasping the lienorenal ligament between the finger and thumb and passing a ligature round it with an aneurysm needle. The ligature might have included the tail of the pancreas, which could not be identified owing to the necessity for speed and the presence of adherent clot. The spleen was removed as rapidly as possible and the abdomen closed with drainage. Owing to operative shock and loss of blood the patient's condition was critical, but transfusion of three pints of blood effected a dramatic improvement. Examination of the spleen showed no abnormality apart from the fact that it was smaller and paler than normal. Only a short part of the splenic artery was removed with the organ, and this appeared normal. The portion of the artery from which the bleeding occurred was presumably left in the abdomen distal to the ligature.

Progress for nine days after the operation was uneventful. The drainage tube was removed on the third day, a little serous fluid having been discharged. On the ninth day the patient complained of severe stabbing pain in the left hypochondrium associated with tenderness in this region and over the eleventh rib posteriorly. There were no physical signs in the chest, and radiographs showed no abnormality. Loewi's test was negative. The attacks of pain became more severe and frequent during the next week, and the area of tenderness spread across the midline to the right epigastric region. Fears were entertained that the aneurysm might not have been properly excluded by the ligature, which had been hastily and almost blindly applied, or, alternatively, that aneurysmal formation might be going on in the artery proximal to the ligature as in Parsons's case. It was therefore decided to operate again, on the principle that it was better to look and see than to wait and see.

Laparotomy was performed on March 18 through a left transrectus incision. Numerous adhesions were encountered. On separating the transverse colon from the site of the drainage tube a small abscess was opened. The splenic pedicle was eventually exposed. It was surrounded by adherent omentum and a little old blood clot, but no pulsation was visible. The splenic artery was felt pulsating above the upper border of the pancreas, but it appeared to fade out about one and a half inches proximal to the splenic pedicle. The pancreas itself was slightly swollen and congested. In view of this and difficulty of access owing to the numerous adhesions no attempt was made to trace the artery to the pedicle, but the impression gained was that the artery proximal to the ligature had been thrombosed as far as the last branch to the pancreas. The pulsating part of the artery did not appear to be dilated or

tortuous. After the operation the patient did not complain of any more pain, and the tenderness disappeared gradually. The symptoms may have been due to the abscess between the colon and the abdominal wall. A Wassermann test proved negative, and she was discharged on April 4.

Comment

The possibility of ruptured splenic aneurysm is not usually considered in the diagnosis of an obscure acute abdominal condition occurring during pregnancy or otherwise. As several of the recorded cases show, the fatal haemorrhage is often preceded by a comparatively innocuous rupture limited to the lesser sac. If the latter condition were recognized and appropriate treatment undertaken some lives would be saved. The case recorded was unusually fortunate in that the second haemorrhage did not prove immediately fatal; a second chance was thus given to atone for the failure to make the correct diagnosis in the first instance. The striking feature in this case was that the well-marked symptoms of sudden acute abdominal pain and collapse contrasted with the comparative absence of the usual physical signs of an acute abdominal catastrophe. In the first instance the fact that the patient was eight months pregnant confused the issue, and the diagnosis of concealed accidental haemorrhage seemed reasonable until the onset of uterine contractions failed to result in any external haemorrhage. On the second occasion, although the symptoms were even more marked, the physical signs were inconclusive. The tenderness and rigidity were not sufficient to suggest perforation of a peptic ulcer, the absence of vomiting or retching and a negative Loewi's test were against a diagnosis of intestinal obstruction or acute pancreatitis, and the persistence of active peristalsis did not favour an infective peritonitis. In this case experience of a similar set of circumstances led to a tentative diagnosis of torsion of the omentum.

The aetiology of aneurysm of the splenic artery remains uncertain, and it would be interesting to hear of any suggestions as to why it should occur with disproportionate frequency during pregnancy. It is a remarkable fact that after the initial bleeding the interval of quiescence should have persisted in spite of the strain of labour and the ordeal of treatment for acute dilatation of the stomach, either of which might have been expected to initiate a recurrence. This would seem to indicate that in a case of arterial haemorrhage, once clotting has occurred, external factors have little influence on the recurrence of haemorrhage. It suggests that a stage is reached in the autolysis of the clot when the latter is no longer capable of performing the haemostatic function, and gives food for thought on the aetiology of secondary haemorrhage.

Summary

A case of aneurysm of the splenic artery with rupture during the later months of pregnancy is recorded. It illustrates two facts of some importance, in which it resembles previously recorded cases. First, that rupture often occurs in two stages; the initial bleeding into the lesser sac is not fatal, and if recognized the appropriate treatment by splenectomy gives an excellent chance of curing the condition: in most cases the second rupture, occurring about a fortnight later, has proved fatal before treatment could be undertaken. Secondly, that this unusual condition is liable to complicate the later months of pregnancy.

REFERENCES

- Anderson, W., and Gray, J. (1929). *Brit. J. Surg.*, **17**, 267.
 Brockman, R. St. L. (1930). *Ibid.*, **17**, 692.
 Machemer, W. L., and Fuge, W. W. (1939). *Arch. Surg.*, **39**, 190.
 Parsons, C. G. (1937). *Brit. J. Surg.*, **24**, 708.
 Pasternack, J. G., and Shaw, J. R. (1939). *New Orleans med. surg. J.*, **92**, 94.

THE ARM-TO-TONGUE CIRCULATION TIME IN CHRONIC ASTHMA

BY

J. D. COTTRELL, M.R.C.P., M.R.A.C.P.

AND

D. C. CUDDIE, M.B., Ch.B.

(From the Department of Medicine, University of New Zealand, Dunedin)

It is at times very difficult to decide the cause of attacks of nocturnal dyspnoea, especially when it is necessary to rely on descriptions given by the patient or onlookers. The difficulty is accentuated in patients who at the time of examination present the raised blood pressure, enlarged heart, and crepitations at the lung bases of left ventricular failure, but whose clinical state or known allergic constitution makes a diagnosis of bronchial asthma appear more probable.

Several authors (Fishberg, 1937; Bernstein and Simpkins, 1939; Tarr, Oppenheimer, and Sager, 1933) have suggested that a determination of the time taken for the blood to flow from the arm to the tongue is of great help in distinguishing between cases of "cardiac asthma" and bronchial asthma. This time is spoken of as the arm-to-tongue circulation time. Changes in this circulation time are usually brought about by variation in the rate of flow of blood through the lungs.

It is generally agreed that in patients suffering from attacks of nocturnal dyspnoea due to left ventricular failure the arm-to-tongue circulation time is persistently raised during and between attacks to above 18 seconds, and may be double or treble the normal rate. Hitzig, King, and Fishberg (1935) state that they have found this so in over eight hundred cases. The range of times varied from 18 seconds to 60 seconds, and the average was 33 seconds. They also report an occasional exception with all the signs and symptoms of left heart failure and a normal circulation time. The explanation they offer is that "the right ventricle is sufficiently powerful to maintain a normal velocity of the blood flow through the lungs despite the increased resistance due to the insufficiency of the left side of the heart."

So far as we can discover, studies of the pulmonary circulation time in asthma have not been very extensive, and usually have been incidental to a general study of circulation times in various conditions.

Bernstein and Simpkins (1939) report an accelerated arm-to-tongue circulation time in seven cases of bronchial asthma, and also state that in two cases with "heart disease and bronchial asthma cardiac decompensation was excluded by the rapid circulation times obtained." They suggest that the arm-to-tongue time should be of great value not only in separating bronchial and cardiac asthma, but also in the presence of emphysema with symptoms—exertional dyspnoea, cyanosis, etc.—in helping to decide whether or not there is an element of cardiac failure. Tarr, Oppenheimer, and Sager (1933) report a further small series of circulation times in bronchial asthma.

It was decided to attempt a rather more extensive investigation into the arm-to-tongue times in bronchial asthma. Owing to the departure of one of us (J. D. C.) on active service, it was possible to obtain the results in only twenty-one cases of uncomplicated asthma. There are also three cases of bronchial asthma plus an apparently symptomless hypertension, and one case thought to be that relatively rare condition of cardiac failure secondary to chronic asthma and emphysema.