

Case 94

A severe abdominal injury

A 28-year-old builder's labourer was brought by ambulance to the Emergency Department within 30 min of his injury. He was driving his motor cycle, coming home from work, along a wet and slippery road at some speed, when he skidded and crashed head on into a lorry on the other side of the road. He was aware of going head over heels over the handle bars of his bike, striking his upper belly against them, then landing on the road. He was wearing his crash helmet and, although he hit his forehead on the road, he did not lose consciousness. He now had a great deal of abdominal pain and felt faint and dizzy.

Examination after his motor cycling gear had been removed completely revealed a muscular, thin young man – pale, sweating and in obvious great pain. His blood pressure was 100/60 mmHg and pulse 110 beats/min. He was fully conscious, had no neck pain or tenderness. His chest was clear. There was no bruising to see over the abdominal wall, but there was marked generalized guarding of the abdomen and generalized tenderness, especially marked over the left upper abdomen. A striking finding was that, on pressing the left upper abdomen, he complained that this produced severe pain in his left shoulder tip. On percussion, there was dullness in the left flank and the abdomen was silent on auscultation. Full examination was otherwise negative, apart from some superficial abrasions to the face and hands.

Intravenous morphine was given, and an i.v. line set up with Hartmann's solution. Blood sent for urgent grouping and cross-match of 4 units of blood. The bladder was catheterized and clear urine obtained; it tested negative for blood. A portable anteroposterior chest X-ray was clear.

What would be your working diagnosis at this stage if you were managing this patient?

He is obviously bleeding – and seriously – into the abdominal cavity, hence the classical features of shock

associated with his obvious abdominal trauma. Clinical assessment and the simple investigations that have been carried out exclude other injuries to the CNS, spine, chest and urinary tract.

A splenic tear or rupture is the commonest cause of a haemoperitoneum after closed abdominal injury. Other viscera that may be injured and cause intraperitoneal bleeding are the liver, small bowel mesentery and diaphragm. Indeed, more than one organ may be involved.

The left upper quadrant pain and tenderness, the dullness to percussion in the left flank and the shoulder tip pain all strongly suggest splenic injury.

What is the explanation of the left shoulder tip pain?

The diaphragm is supplied with sensory as well as motor innervation by the phrenic nerve, which derives from cervical nerve roots 3, 4 and 5. Irritation of the diaphragm, in this instance by blood from the spleen under its left dome, produces referred pain to the cutaneous distribution of these nerves – the shoulder tip. Occasionally, remarkably, the patient's only complaint of pain is to the shoulder. Often it is necessary to enquire specifically for this symptom – the patient knows that he has been injured in the abdomen and disregards the fact that the left shoulder is also hurting unless directly questioned about this.

Over the next 15 minutes, the patient's condition deteriorated. His blood pressure fell to 90 mmHg, his pulse rose to 120 beats/min in spite of intravenous fluids and he was cold and clammy. He was taken directly to theatre, with a second intravenous line running and cross-matched blood, now available, was given in the transfusion. Laparotomy was carried on under general anaesthesia via an upper midline incision, which allowed access to the peritoneal cavity in under a minute. Blood and clots poured out. The spleen was palpated and felt to be severely damaged, and was rapidly mobilized and removed. No other abdominal injury was found. He

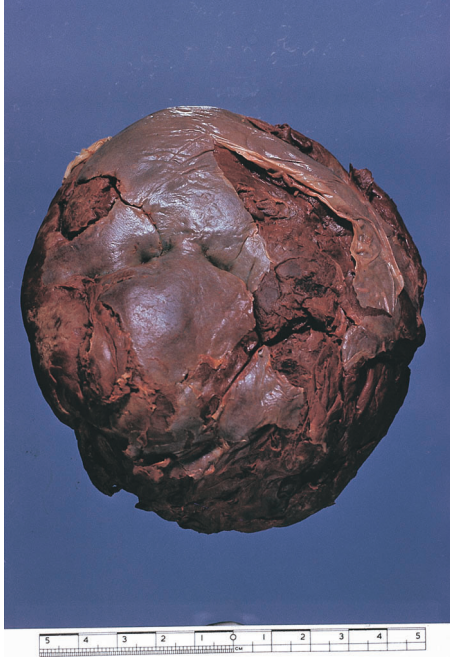


Figure 94.1 Shattered spleen.

received all 4 units of blood and his condition was stable by the end of the operation.

Figure 94.1 shows the specimen of shattered spleen that was removed.

This is an example of massive immediate bleeding from a shattered spleen, which calls for immediate splenectomy. What other clinical types of splenic rupture may occur?

- There may be progressive blood loss over several hours from a relatively small tear in the splenic capsule.

- Delayed rupture of the spleen may occur many hours, or even days, after the abdominal injury. There is an initial history of an abdominal injury, with pain resulting from the local blow. This may partly or entirely settle down, but then symptoms and signs of splenic rupture, as described above, become manifest. This is explained by the fact that the initial trauma has produced a subcapsular haematoma. As oozing of blood continues, the thin splenic capsule ruptures, with resultant brisk bleeding into the peritoneal cavity.

- Spontaneous rupture may occur in a diseased and enlarged spleen, for example in malaria, glandular fever or leukaemia, after quite trivial injury.

Are there any special investigations that may help confirm the diagnosis of splenic rupture in a less acute situation than with this patient?

In a relatively stable patient, the investigation of choice is a CT scan of the abdomen. This will usually demonstrate the splenic tear, the presence of fluid in the peritoneal cavity and possible injury to other viscera.

Are there any late dangers to the patient following splenectomy?

Splenectomy predisposes the patient, especially if a child, to infection, particularly from pneumococci, with shock and collapse – a condition termed ‘overwhelming postsplenectomy sepsis.’ For this reason, if a minor laceration of the spleen is found at laparotomy, attempts are made to preserve it by using fine sutures to repair the tear or by wrapping the organ in haemostatic absorbable gauze.

Following splenectomy, immunization against pneumococcus, meningococcus and *Haemophilus influenzae B* should be undertaken. In addition, children should receive prophylactic low dose penicillin daily until adulthood. Adults should receive daily penicillin for a year – for longer if they are immunosuppressed.