

Diagnosis and Management of Blunt Pancreatic Trauma: A Case Report with Review of the Literature

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Summary

Details of a young logger who sustained a clean prevertebral transection of the pancreas to the left of the superior mesenteric vessels and a crush injury in segments 2 and 3 of the liver are presented. CT scan was not done but ultrasound scan revealed free intraperitoneal fluid and no comment was made about the pancreas. The pancreatic injury was discovered at laparotomy carried out 24 hours after admission and treated by resection.

Key words: Blunt trauma, pancreatic injury, diagnosis, pancreatic resection.

Introduction

Pancreatic injury continues to be a major source of morbidity and mortality in blunt abdominal trauma. Major ductal injuries result in a mortality of 13% to 31%, which increases with the number of associated visceral and vascular injuries^{1,2}. Exploratory laparotomy is undertaken either because of peritonitis or haemoperitoneum and not because of the isolated pancreatic injury, which is difficult to diagnose pre-operatively³. CT scanning is the best imaging modality in detecting pancreatic transections which are the typical injuries in blunt trauma⁴. Endoscopic retrograde cholangio pancreatography (ERCP) is useful in determining the location and extent of ductal injuries of the pancreas⁵.

Case Report

On 17th April 1991, A.M., a 19 year old Malay logger sustained blunt abdominal trauma when he was crushed under falling timber and rushed to his district hospital. He was pale, with a blood pressure of 90/60. There was no external injury and he was transferred to Hospital Universiti Sains Malaysia. At arrival, in the casualty, he complained of upper abdominal pain and was mildly tender in the epigastrium, with no guarding or rigidity. Blood pressure was 120/70, pulse was 110 per minute, haemoglobin was 9.7 g/dl, white cell count was 6.2×10^9 and serum amylase was 566 IU. The chest X-rays were normal. Ultrasound revealed free fluid (haemoperitoneum) but no organ injury was detected. He was managed conservatively, but 8 hours later he developed abdominal distention, with guarding and rigidity in the epigastrium.

An exploratory laparotomy was performed 24 hours after the initial injury. Six hundred cc of intraperitoneal blood and clots were removed and there was a pulp injury to segments 2 and 3 of the liver with some devitalisation. A transection of the neck of the pancreas was found after opening the lesser sac (Fig 1). A distal pancreatectomy with splenectomy was performed and the pancreatic stump was closed with Vicryl 2/0 (Ethicon). The lacerated area in the left lobe of the liver was resected (Fig 2). Post-operatively, he developed a left pleural effusion which was aspirated. Total parenteral nutrition was started post-operatively and discontinued after 12 days. One week after surgery, a low grade fever developed and CT scan (Fig 3) and

ultrasound scans confirmed the absence of any intra-abdominal collections. The fever settled a few days after removal of the central line. He was discharged 28 days after admission, is well 9 months after surgery and on long-term oral Penicillin.

Discussion

Pancreatic injuries are seen in 0.2% to 6% of all abdominal trauma and pose difficulties in diagnosis⁶. Certain findings are helpful in diagnosis, which include a persistently raised amylase above 500 IU, a raised white cell count, obliteration of the psoas shadow, retroperitoneal air and pleural effusion⁷. Transection occurs by direct compression against the vertebrae as in a steering wheel injury and in our case by falling timber. Associated injuries to the liver, spleen and duodenum are common and mainly responsible for the high mortality rate of 13% to 31%². Pleural effusions occur in the presence of a major ductal injury, as we discovered post-operatively in our patient. CT scan is better than ultrasound in detecting pancreatic injuries⁸ because of its deep location and the presence of blood and overlying bowel gas in traumatic paralytic ileus. Peritoneal lavage is not indicative of the organ injured, but is accurate in detecting injury requiring surgery⁹. Recent reports recommend ERCP in decision-making in pancreatic trauma based on the degree of ductal violation⁵. Minor ductal injuries can be treated expectantly or by drainage alone but major ductal transections need pancreatic resection. Pancreatic injuries have been classified by severity (Table I) from grades 1 to 4 by Smego *et al*¹⁰, and this protocol also serves as a guideline for management of these injuries.

The treatment of pancreatic trauma is controversial, whether to drain or to resect, but the general emphasis is on conservatism¹¹, although complications after resection are less¹². Simple drainage for grade 1, debridement and drainage for grade 2, distal pancreatic resection for grade 3 and for grade 4 a combination of debridement, drainage and resection depending on the location of injury. Whipples resection may be necessary in 2% to 3% of isolated pancreatic injury and in 10% of severe pancreaticoduodenal injury¹³.

In hollow visceral injuries, laparotomy is carried out early due to peritonitis but isolated pancreatic injuries are easily missed and can present as pseudocysts a few weeks later. If splenectomy is part of a distal resection then the patient should either get pneumococcal vaccine or receive long-term oral Penicillin. Splenic preservation has been shown to be possible even in severe trauma and the technique has been described by Warshaw¹⁴. The complications of pancreatic trauma can be early or late and include haemorrhage, sepsis, fistula, pseudocyst and pancreatitis both acute and chronic¹². Pancreatic stumps oversewn with non-absorbable sutures are associated with a higher rate of fistula and abscess than with absorbable sutures (58% vs 30%)¹⁵.

Our patient sustained a grade 3 injury using the grading system of Smego *et al* and was treated with a distal pancreatectomy and splenectomy. In the developing world, facilities of CT scanning are not readily available and a high index of suspicion is necessary if mortality and morbidity are to be reduced in pancreatic trauma.

Table I
Injury grading (Smego)

Grade	Type
1	Contusion/haematoma
2	Minor capsular and parenchymal disruption
3	Major ductal injury
4	Severe crush

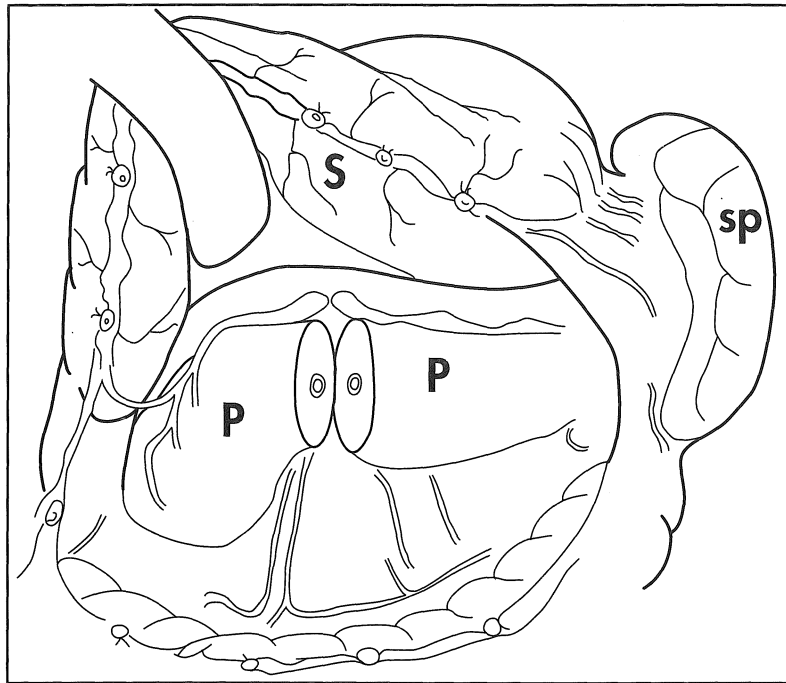


Fig 1: Line drawing showing transection of the neck of the pancreas seen after opening the lesser sac.
P=Pancreas, S=Stomach, sp=Spleen

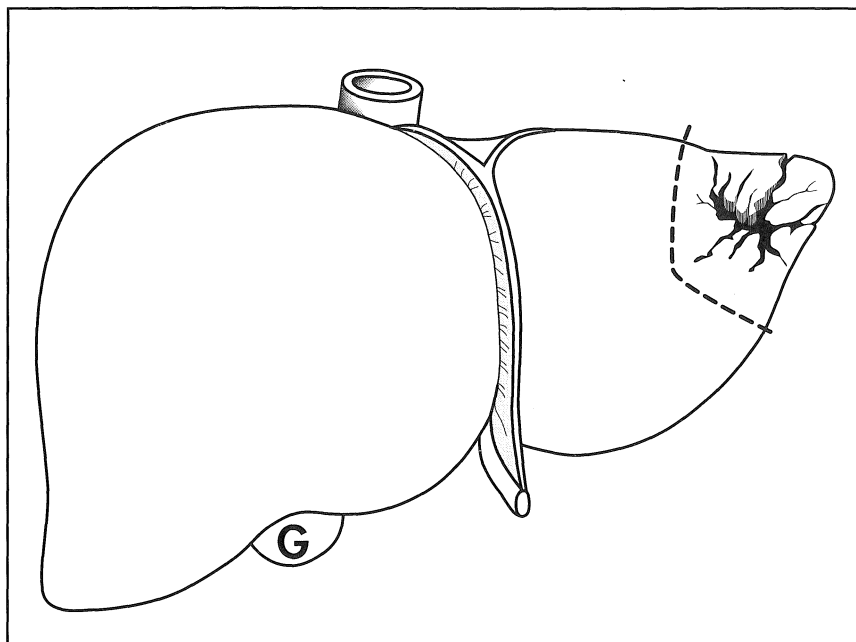


Fig 2: Line drawing showing liver injury in segments 2 and 3.
G=Gall bladder

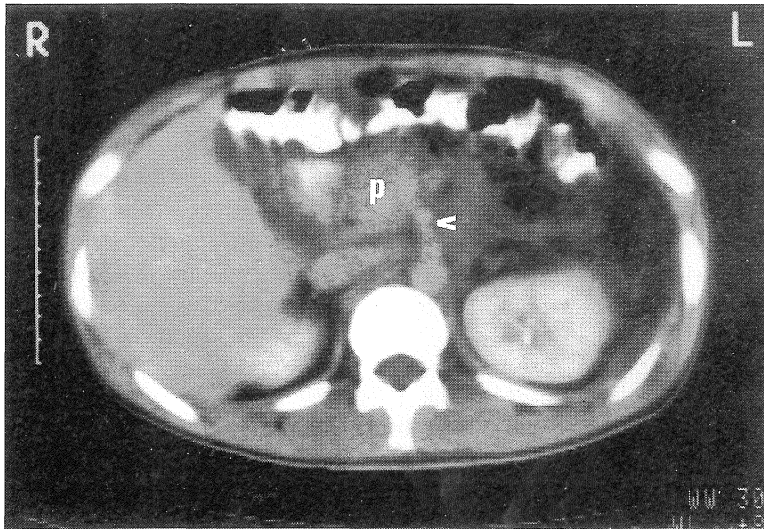


Fig 3: Post-operative CT scan showing the remaining head of the pancreas (P) to the right of the mesenteric vessels (arrow). No visible peripancreatic abscess or fluid collection.

References

1. Sims EH, Mandal AK, Schlater T *et al*. Factors affecting outcome in pancreatic trauma. *J Trauma* 1984;24 : 125-8.
2. Karl HW, Chandler JG. Mortality and morbidity of pancreatic injury. *Am J Surg* 1977;134 : 549-54.
3. Salonen IS, Aarnio P. Treatment of acute pancreatic injuries in childhood. *Ann Chir Gynaecol* 1985;74 : 167-71.
4. Schrek JP, McCort JJ, Oakes DD. Computed tomography in thoraco-abdominal trauma. *J Trauma* 1984;24 : 1015-21.
5. Stone A, Suguwa C, Lucas C, Hayward S *et al*. The role of endoscopic retrograde pancreatography (ERP) in blunt abdominal trauma. *Am Surg* 1990;56 : 715-20.
6. Cox EF. Blunt abdominal trauma. A 5 year analysis of 870 patients requiring celiotomy. *Ann Surg* 1984;199 : 467-74.
7. Hoyt DB, Mackerie RC. Abdominal injuries. In: Cushieri A, Giles GR, Moosa AR (eds). *Essential Surgical Practice*. London: Butterworth International Edition, 1988: 291-304.
8. Chambon JP, Quandalle P, Lemaite L *et al*. Computed tomography of the abdomen in 8 cases of pancreatic trauma. *Ann Chir (France)* 1990;44(7) : 575-80.
9. Lempinen M. Management of major abdominal trauma: Pancreas. In: Carter DC, Polk Jr HC (eds). *Surgery 1: Trauma*. London: Butterworths 1981: 117-28.
10. Smego DR, Richardson JD, Flint LM *et al*. Determinants of outcome in pancreatic trauma. *J Trauma* 1985;25 : 771-6.
11. Jones RC. Management of pancreatic trauma. *Ann Surg* 1978;187 : 555-64.
12. Lappaniemi A, Haapiainen R, Kiviluoto T, Lempinen M. Pancreatic trauma: acute and late manifestations. *Br J Surg* 1988;75 : 165-7.
13. Feliciano DV, Martin TD, Cruse PA *et al*. Management of combined pancreatoduodenal injuries. *Ann Surg* 1987;205 : 673-80.
14. Warshaw AL. Conservation of the spleen with distal pancreatectomy. *Arch Surg* 1988;123 : 550-3.
15. Wisner DH, Wold RL, Frey CF. Diagnosis and treatment of pancreatic injuries. An analysis of management principles. *Arch Surg* 1990;125 : 1109-13.