CASE REPORT

Complete rupture of the pancreas after a kick into the abdomen during a football match

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Accepted 9 May 2014

SUMMARY

Pancreatic injury is uncommon, accounting for less than 7% of penetrating and 5% of blunt abdominal trauma. Blunt isolated pancreatic trauma in football has been rarely described in the literature and its diagnosis, detection and treatment still remains a challenge. We report a case of a young adult with an isolated complete rupture of the pancreatic body due to a blunt abdominal trauma during a football game. In order to preserve the pancreas and therefore retain function, we performed a terminolateral pancreaticojejunostomy. The postoperative course of the patient was uneventful. The diagnosis of isolated injuries of the pancreas in blunt abdominal trauma can be difficult and challenging and due to the nature of the game physicians should be highly alerted when dealing with football players sustaining abdominal trauma.

BACKGROUND

Pancreatic injury is uncommon, accounting for less than 7% of penetrating and 5% of blunt abdominal trauma.^{1 2} These injuries rarely occur alone and are often associated with other intra-abdominal injuries.³ Blunt isolated pancreatic trauma is even rarer and its diagnosis, detection and treatment still remains a challenge. Physical signs and symptoms are often poor and laboratory findings non-specific, making diagnosis more difficult and easily missed. This delay may result to severe complications with an increase in morbidity and mortality rates.^{1 4}

The management of pancreatic trauma remains controversial with treatment options ranging from endoscopic to simple open drainage or even pancreatoduodenectomy, depending on the patient status, the localisation and severity of damage. In cases where the main pancreatic duct is severed surgical treatment is necessary. For major lesions to the main duct or transection of the pancreatic body or tail, a distal pancreatectomy with splenectomy is usually recommended.⁵ However, this procedure involves the risk of subsequent endocrine dysfunction and drawbacks following a splenectomy.⁶⁻⁸

In this report, we present a young adult with an isolated complete rupture of the pancreatic body due to a blunt abdominal trauma during a football game, which was treated with a Roux-en-Y terminolateral pancreaticojejunostomy of the distal pancreatic portion and a primary hand-sewn closure of the proximal stump.

CASE PRESENTATION

We present a case of a 32-year-old male patient with an isolated pancreatic rupture after trauma.

The patient was kicked with a knee in his epigastrium during a football game. The pain was located at the left subcostal area. There were no signs of an acute abdomen and lipase was mildly elevated. In order to exclude a splenic trauma, we performed a focused assessment with sonography for trauma. The chest X-ray showed no signs of costal fracture. Consecutively, to preclude a secondary splenic rupture, the patient was admitted.

One day after admittance the patient developed signs of acute pancreatitis with subsequent clinical worsening of the abdomen. A CT scan was obtained (figure 1) and showed a pancreatic rupture. An MR cholangiopancreatography (MRCP) confirmed the involvement of the pancreatic duct.

An explorative laparotomy with a bilateral subcostal incision was performed. The gastrocolic ligament was divided and the lesser sac was opened. This revealed a severe haematoma with areas of steatonecrosis in the transverse mesocolon. The full-thickness rupture (figure 2) of the pancreas at the left side of the splenoportal confluence was confirmed and the peripancreatic haematoma and the necrotic tissues were removed. After meticulous debridement, a slice of the pancreas at both sides of the rupture was resected and the main pancreatic duct was safely identified in both stumps. The open duct in the proximal stump was closed separately with a 5-0 PDS (polydioxanone suture) and the stump was hand-sewn with PDS 4-0 overlapping interrupted mattress suture. The body and the tail of the pancreas were mobilised off the splenic vein and a terminolateral pancreaticojejunostomy was performed. Owing to the 'unfriendly' local conditions for our anastomosis, such as the surrounding haematoma and severe necrosis, a thin pig-tail catheter was placed in the distal pancreatic duct. The

Figure 1 Preoperative CT showing the pancreatic rupture.

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To cite: Papalampros A, Fard-Aghaie M, Maghsoudi T, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-204141

Figure 2 Severe peripancreatic necrosis and complete rupture of the pancreas.

proximal end of the pig-tail catheter was pulled through the jejunal loop and then channelled transcutaneously, as an internal–external stent (figure 3). Four easy-flow drains, two at the perianastomotic site and the other two near the pancreatic stump, were placed.

Octreotide was given intraoperatively and until the seventh postoperative day at a dose of 300 µg/24 h. On the third postoperative day, the biochemical control of the fluid of the drains next to the closed pancreatic stump revealed high levels of amylase (660 U/L) and lipase (2843 U/L). These decreased to normal serum levels at the 10th postoperative day. A postoperative control CT was performed at the 12th postoperative day in order to exclude the presence of intra-abdominal fluid collections. The pig-tail catheter and the drains were finally removed at the 13th and the 14th day after surgery, respectively. As the rest of the postoperative course was uneventful, our patient could safely be discharged on the 16th postoperative day.

Figure 3 Reconstruction via pancreaticojejunostomy and splinting of the pancreatic duct with an external stent.

DISCUSSION

Isolated pancreatic injury after blunt abdominal trauma is a rare entity.^{3–8} In our literature review, we found only three reports presenting pancreatic injury after trauma in a football game in the past two decades. In table 1 case reports from 1990 to 2012 are listed. Of those reports only one showed an isolated pancreatic injury.⁹ Either they were associated with laceration of the splenic vessels or trauma to the mesocolon.^{10–11} Our research suggests that injuries to the abdominal organs during football remain very rare. Nevertheless, the extent and severity of these injuries should not be underestimated. Other than pancreatic trauma, there are reports of injuries to the intestines with subsequent perforation, transection and rupture.^{12–15}

The mechanism of injury in pancreatic trauma is often associated with crushing of the pancreas against the spine, usually after direct blows to the epigastrium during vehicle accidents or assaults.⁵ In our case, the patient suffered from a strong blow of a knee during a football game, causing a complete rupture of the pancreas body above the splenic vein.

The diagnosis of isolated injuries of the pancreas in blunt abdominal trauma can be difficult and challenging. However, early detection and treatment is of great importance, as these injuries are associated with high morbidity and mortality, with the rate of complications reaching as high as 80% when diagnosis is made 24 h after the initial trauma.¹ The retroperitoneal location of the organ can mask important clinical findings during physical examination, which also explains the delayed diagnosis in the present case. Non-specific epigastric pain with or without radiation to the back and biochemical alterations with leukocytosis and elevated amylase levels may be present. However, an increase of serum amylase is neither specific nor sensitive for pancreatic injury.¹⁶ In addition, Takshima *et al*¹⁷ reported that the presence of hyperamylasaemia after blunt pancreatic trauma is time dependent, a finding that is congruent with our case, where serum amylase levels were elevated not before 12 h after the patient's admission to our hospital.

CT is the imaging study of choice for the detection of pancreatic injury, in a haemodynamically stable patient, with a sensitivity and specificity rate of 80%.⁵ In cases, where a pancreatic duct disruption is suspected, an endoscopic retrograde cholangiopancreatography (ERCP) or MRCP should be performed. The former is a diagnostic and therapeutic tool, where the integrity of the duct system can be demonstrated and at the same time selected injuries can be successfully treated with stent placement and therefore avoiding major surgical intervention. MRCP is an accurate, non-invasive imaging method of the pancreatic duct, without the need of contrast medium or radiation.^{18–20} The preoperative imaging of our patient with CT scan and MRCP revealed a complete pancreatic rupture ventral

Table 1 Literature review of abdominal trauma during a football game (1990–2012)

Author	Year	Organ
Houshian <i>et al</i>	2000	Duodenum
Rawls <i>et al</i>	2001	Pancreas/colon
Dutson <i>et al</i>	2006	Colon
Sandiford <i>et al</i>	2006	Jejunum
Zaydfundim <i>et al</i>	2010	Pancreas
Kara <i>et al</i>	2011	Pancreas/splenic vessels
Vucetich <i>et al</i>	2012	Ileum

to the splenic vein, just to the left of the portal-splenic confluence. A pancreatic duct transection was diagnosed (Lucas grade II; American Association for the Surgery of Trauma grade III)^{21 22} and an explorative laparotomy was performed.

Patients with injuries of the Wirsung's duct always require surgical treatment. For ruptures at the level of the pancreas head an external drainage is recommended and when a pancreaticoduodenectomy is necessary, this should be performed as a two-step procedure.^{5 23} Injuries to the neck, body and the tail of the pancreas with main pancreatic duct transection are usually treated by distal pancreatectomy and splenectomy. This can also be combined with a Roux-en-Y pancreaticojejunostomy, in order to minimise the risk of a pancreatic fistula. Other surgical options are spleen preserving distal pancreatectomy, pancreaticojejunostomy to both segments and reconstruction over a stent or a T-tube.^{5 24}

Considering the age of our patient an extended distal pancreatectomy with splenectomy would have led to an important reduction of the pancreas volume with a high risk of an endocrine and exocrine dysfunction of the gland.⁶ Additionally, postsplenectomy findings, such as thrombocytosis and leukocytosis or the development of complications such as sepsis and some degree of immunodeficiency must be taken into account.⁷ As our patient was haemodynamically stable and had an isolated pancreatic rupture, without vascular involvement, we decided to perform a more complex and organ-preserving operation.

Postoperative complications will present in 20–40% of the patients, but in most cases they are self-limited or treatable with non-operative interventions. The most common of them are a pancreatic fistula or the formation of intra-abdominal abscesses. In the present case, a low-output pancreatic fistula was diagnosed at the fourth postoperative day, by measuring the amylase levels of the easy-flow drains. Considering the diffuse inflammation and oedema of the pancreas an anastomotic leakage seemed very unlikely.

Our technique seems feasible and safe, when performed by experienced surgeons in a dedicated centre. Nevertheless, distal pancreatectomy with splenectomy remains the safest and best surgical option in an unstable patient. The early diagnosis and treatment of pancreatic injuries is often crucial to achieve decent results. The surgeon should be highly alerted in patients with minor abdominal symptoms after blunt trauma even during football matches.

Learning points

- Pancreatic trauma remains very rare.
- Diagnosis is very challenging, especially in young athletes.
- Early diagnosis and subsequent treatment are crucial for the postoperative course.

Contributors AP and TM planned the study. MF-A submitted the manuscript. KO oversaw and was responsible for the project.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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