Isolated pancreatic tail injury: A rare presentation

Ashok Y. Kshirsagar*, Mayank A. Vekariya, Akshay S. Pednekar, Abhishek Mahna, Vaibhav Gupta, Ritvij Patankar, Ashar Shaikh

Department of Surgery, Krishna Institute of Medical Sciences University, Karad, 415110 Maharashtra, India

HIGHLIGHTS
- Due to the retroperitoneal location of the pancreas isolated pancreatic injuries are very rare.
- An isolated pancreatic injury may be missed due to delayed presentation.
- Helical multislice CT scan has both high sensitivity and specificity for diagnosis of pancreatic injuries.

ABSTRACT

Introduction: Pancreatic injuries occur in up to 10% of all major blunt abdominal trauma events. Due to the retroperitoneal location of the pancreas, isolated pancreatic injury occurs in less than 5% of cases. Presentation of case: A 12 year old male child was brought to the emergency department with epigastric pain 12 days after alleged history of fall from bicycle. On admission, he had tenderness in the epigastrium. CT scan revealed a transection through the tail of the pancreas with no injury to any other organ. As there was no evidence of duct injury, he was treated conservatively.

Discussion: Morbidity and mortality rates for isolated pancreatic trauma are directly related to the presence of damage to the pancreatic duct. Helical multislice CT scan represents the best noninvasive diagnostic method for the detection of pancreatic injury. Hyperamylasemia should at least be considered as a sign of probable pancreatic injury in the setting of blunt abdominal trauma.

Conclusion: Trauma to the pancreas is not common, and isolated pancreatic trauma is even less common. An isolated pancreatic injury may be missed or the diagnosis may be delayed because the initial symptoms and signs of pancreatic injury are subtle.

© 2015 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Limited. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

Pancreatic injuries occur in up to 10% of all major blunt abdominal trauma events. Due to the retroperitoneal location of the pancreas, isolated pancreatic injury occurs in less than 5% of cases [1,2]. Age, severity of injury, amylase level, duration of shock, unrecognized diagnosis, and delay in treatment are the factors that significantly influence the outcome. Here we report a case of blunt abdominal trauma causing pancreatic rupture in a 12-year-old child. The aim of this case report is to highlight the current diagnostic tools and treatment options for this rare entity.

2. Presentation of case

A 12 year old male child was brought by his parents to the emergency department with epigastric pain 12 days after alleged history of fall from bicycle. He had suffered trauma due to the bicycle handle over the left side of abdomen but did not consult the doctor immediately, hoping that the pain would subside spontaneously. However, when the pain aggravated, he was brought to the emergency department. On admission, he was vitally stable (blood pressure: 120/70 mmHg) and mildly pyrexic (37.6 ºC). He had tenderness in the epigastrium. Investigations on admission revealed his white blood cell count of 9000/mm³, hemoglobin was 12 g/dl, and serum amylase was 800 IU/l. CT scan of the abdomen was performed (Fig. 1) and revealed a transection through the tail of the pancreas (class II according to Lucas classification) (Table 1); there was no injury to any other organ. As the patient was...
hemodynamically stable and there was no evidence of duct injury, he was treated conservatively (with bowel rest, nasogastric tube, and analgesia). He made a good recovery. Eight weeks later, he again complained of abdominal pain and vomiting. A CT scan was performed and showed a 7 cm pseudocyst of 6 mm thickness in the epigastric region. Patient underwent an exploratory laparotomy, in which operative drainage of the pseudocyst was performed with Cystojejunostomy. post-operative period was uneventful and the patient was discharged 10 days later.

3. Discussion

This case report shows that the diagnosis of a pancreatic fracture can be difficult at first. Trauma to the pancreas is not common, and isolated pancreatic trauma is even less common. The pancreas lies anterior to the vertebral column and may be compressed against it [3,4]. Injury to the pancreas is frequently combined with injuries to other organs, particularly the duodenum, and this may cause early death of the patient [2,5,6]. An isolated pancreatic injury may be missed or the diagnosis may be delayed because the initial symptoms and signs of pancreatic injury are subtle, and this may contribute to the morbidity and mortality associated with this injury.

Studies have demonstrated that the elevation of amylase in both serum and peritoneal lavage fluid is neither sensitive nor specific for the diagnosis of pancreatic injury [7]. Bradley, in a review of more than 400 cases reported in literature of blunt pancreatic injury, found that serum amylase levels were elevated in 82% of people with documented pancreatic injuries [5]. Because hyperamylasemia has been observed in more than 75% of patients with blunt abdominal trauma and proven pancreatic injury, it should at least be considered as a sign of probable pancreatic injury in the setting of blunt abdominal trauma and should indicate the need for further testing [5].

Helical multislice CT, which has both sensitivity and specificity as high as 80%, represents the best noninvasive diagnostic method for the detection of pancreatic injury. However, particularly in the initial phase, CT may miss or underestimate the severity of the damage; normal initial findings do not exclude pancreatic injury, and repeated CT in the light of continuing symptoms may improve its diagnostic efficacy [8].

Morbidity and mortality rates for isolated pancreatic trauma are directly related to the presence of damage to the pancreatic duct. Preoperative endoscopic retrograde pancreatography is the only diagnostic test that has consistently shown a high specificity and sensitivity for pancreatic ductal injury. It is also valuable for planning the appropriate surgical correction (open surgery, internal transpancreatic duct stenting, or transduodenal drainage) for those patients who develop post-injury complications such as pseudocyst or distal chronic pancreatitis [8].

A nonoperative conservative course of management is common in pancreatic trauma. It is necessary to determine if there are signs of Wirsung duct injury and duodenal injury. In the absence of injury to the duct, close monitoring is done in a surgical unit. Medical treatment includes diet; rehydration, with correction of any electrolyte imbalance; nasogastric tube drainage in cases of vomiting; and analgesia. Preventive antibiotic therapy and octreotide are advocated.

If an injury of the Wirsung duct is likely or certain, treatment depends on the location of the pancreatic lesion. Acute endoscopic stenting of the disrupted main pancreatic duct has yielded excellent results in the hands of trained teams. Surgical intervention is usually undertaken in order to evaluate the pancreatic duct injury, to establish the presence of a devitalized pancreas, and to find out whether concomitant duodenal, biliary, or vascular injuries are present. Injuries of the pancreatic head are managed by external drainage, if there is no devitalization of the pancreatic head and if the duodenum and the ampulla are intact. In massively destructive lesions (with involvement of the pancreas, duodenum, and common bile duct) the decision to do a proximal pancreatecoduodenectomy is unavoidable. Injury to the neck, body, or tail of the pancreas with duct injury is best treated by distal pancreatectomy and splenectomy. Endocrine and exocrine insufficiencies are very unusual after resection for pancreatic trauma.

In the long term, pseudocyst formation can present weeks or months after the original injury. Pseudocyst arising from body and tail of pancreas are best treated with Cystojejunostomy.

Magnetic resonance cholangiopancreatography (MRCP) is recently added to the list of useful pancreatic duct delineation techniques and in the future it can replace endoscopic retrograde panreatography as a first-line investigation, particularly with the development of rapid MRI imaging techniques [9].

Since the integrity of the pancreatic duct is the main factor determining outcome following pancreatic injury and is used to guide therapy, evaluation of the duct is essential. In the past, ERCP was the only method available for evaluating pancreatic duct integrity. More recently, MR pancreatography has emerged as an attractive option for direct imaging of the pancreatic duct [10]. MR pancreatography has the advantage of being noninvasive, faster, and more readily available than ERCP. The main pancreatic duct can be identified by MR pancreatography within the pancreatic head in up to 97% of cases and within the pancreatic tail in up to 83% [11]. In addition, MR pancreatography may demonstrate abnormalities not visible at ERCP, such as fluid collections upstream of the site of duct transection, and is helpful in assessing parenchymal injury [12]. For assessing the parenchyma, fat-suppressed T1- and T2-weighted sequences are performed. MR pancreatograms are acquired by using heavily T2-weighted breath-hold or non-breath-hold sequences. Fast spin-echo (two-dimensional or three-dimensional) and rapid acquisition with relaxation enhancement (RARE) sequences performed in the coronal and axial planes are usually sufficient.

Complications after pancreatic injuries include pancreatic fistula, intra-abdominal abscess, pancreatitis and pseudocyst. These complications may present at variable periods following pancreatic injuries ranging from days to years. Majority of complications related to pancreatic injuries are self limiting or treatable but development of sepsis and multi system organ failure results in most of the late deaths. Post-operative hemorrhage requiring blood transfusion may develop following inadequate external drainage after pancreatic debridement or development of intra-abdominal...

Fig. 1. A computed tomography scan revealing a transection through the tail of the pancreas with the pseudocyst (as shown by the arrow).
infection [13]. This usually requires re-operation for control.

4. Conclusion

This case report shows that the diagnosis of a pancreatic fracture can be difficult at first. Trauma to the pancreas is not common, and isolated pancreatic trauma is even less common. An isolated pancreatic injury may be missed or the diagnosis may be delayed because the initial symptoms and signs of pancreatic injury are subtle, and this may contribute to the morbidity and mortality associated with this injury.

Conflicts of interest

None.

Funding

None.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Acknowledgments

We are thankful to Mrs. M.C. Deshingkar from Surgery Dept.

Office for her secretarial help.

References

[1] M.H. Craig, D.S. Talton, C.J. Hauser, G.V. Poole, Pancreatic injuries from blunt trauma, Am. Surg. 61 (1995) 125–128.
[2] B.C. Lin, R.J. Chen, J.F. Fang, Y.P. Hsu, Y.C. Kao, J.L. Kao, Management of blunt major pancreatic injury, J. Trauma 56 (2004) 774–778.
[3] M.O. Deirdre, S. Colette, M.F. Helen, P. Gerry, Traumatic transection of the pancreas, Am. J. Surg. 183 (2002) 191.
[4] J. Dubois, J. Porcheron, M. Lacroix, N. Menaoui, Isolated pancreatic neck rupture, Ann. Chir. 126 (2001) 863–868.
[5] E. Bradley, P. Young, M.C. Chang, J.E. Allen, C.C. Baker, W. Meredith, et al., Diagnosis and initial management of blunt pancreatic trauma (guidelines from a multi-institutional review), Ann. Surg. 227 (1998) 861–869.
[6] A.P. Campagnoni, D. Cossard, F. Biandrate, M. Piccolini, L. Francia, C. Ambrosino, et al., Traumatic rupture of the pancreatic isthmus complicated by concomitant rupture of the duodenum and right kidney, Chir. Ital. 57 (2005) 109–113.
[7] W.R. Olsen, The serum amylase in blunt abdominal trauma, J. Trauma 13 (1973) 200–204.
[8] G.J. Jurkovich, Duodenum and pancreas, in: K.L. Mattox, D.V. Feliciano, E.E. Moore (Eds.), Appleton and Lange, Trauma, Northwalk CT, 2005, pp. 709–734.
[9] K.D. Boffard, A.J. Brooks, Pancreatic trauma injuries to the pancreas and pancreatic duct, Eur. J. Surg. 166 (2000) 4–12.
[10] A.S. Fulcher, M.A. Turner, J.A. Yelon, et al., Magnetic resonance cholangiopancreatography (MRCP) in the assessment of pancreatic duct trauma and its sequelae: preliminary findings, J. Trauma 48 (2000) 1001–1007.
[11] A.S. Fulcher, M.A. Turner, G.W. Capps, A.M. Zfass, K.M. Baker, Half-Fourier RARE MR cholangiopancreatography in 300 subjects, Radiology 207 (1998) 21–32.
[12] J.A. Soto, O. Alvarez, F. Munera, N.L. Yepes, M.E. Sepulveda, J.M. Perez, Traumatic disruption of the pancreatic duct: diagnosis with MR pancreatography, AJR Am. J. Roentgenol. 176 (2001) 175–178.
[13] J.B. Moore, E.E. Moore, Changing trends in the management of combined pancreaticoduodenal injuries, World J. Surg. 8 (1984) 791–797.

Table 1

Modified Lucas classification of pancreatic injury.

| Grade  | Description                                                                 |
|--------|-----------------------------------------------------------------------------|
| Grade I | Simple superficial contusion or peripheral laceration, with minimal parenchymal damage; any portion of the pancreas can be affected, but main pancreatic duct is intact. |
| Grade II | Deep laceration, perforation or transection of the neck, body or tail of the pancreas, with or without pancreatic duct injury. |
| Grade III | Severe crush, perforation or transection of the head of the pancreas, with or without pancreatic duct injury. |
| Grade IV | Combined pancreaticoduodenal injuries: (a) minor pancreatic injury, (b) severe pancreatic and also duct injury. |