Endoscopic Management of Pancreatic Injury after Blunt Abdominal Trauma

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ABSTRACT

Background and objectives: Pancreatic trauma is often missed during blunt abdominal trauma. We present our experience of endoscopic management of pancreatic duct injury (PDI) following blunt abdominal trauma.

Materials and Methods: Consecutive PDI patients were evaluated retrospectively. Pancreatic duct injury was defined as the appearance of pancreatic duct leak or stricture on endoscopic retrograde cholangiopancreatography (ERCP) or presence of pancreatic pseudocyst on CT scan following blunt abdominal trauma. The records of the mode of trauma, clinical presentation, laboratory investigations, ERCP findings, therapeutic interventions and outcome were retrieved.

Results: Seventeen patients with PDI (median age 11 years; range 2-45 years, M:F;15:2) were evaluated by us over a 4-and a-half-year period. The commonest mode of trauma was road traffic accident (n=8), followed by bicycle handlebar injury (n=5), fall from height (n=2), and hit by a heavy object (n=2). Clinical presentations were abdominal pain (n=17) and abdominal distension (n=10). Three patients who underwent surgery elsewhere were referred to us with the problems of persistent drainage from percutaneous drain. The median time interval between trauma and initial presentation to the hospital was 8 days (range 1-66 days) whereas the interval between trauma and ERCP was 54 days (range 19-172 days). Successful delineation of pancreatic duct (PD) was possible in 12(92%) of 13 patients. Seven (54%) patients had complete cut-off of the pancreatic duct without any obvious leak, 2 patients had complete cut-off with an associated leak and 3 had leak alone. Thirteen (76%) patients had pseudocysts: 4 (23%) underwent endoscopic cystogastrostomy; 6 (35%) underwent surgical intervention and spontaneous resolution occurred in 2 patients.

Conclusion: Pancreatic pseudocyst is a common manifestation of PDI in patients who survive the initial first period of pancreatic trauma. Patients in whom the pancreatic leak is demonstrated can be managed effectively by pancreatic ductal stenting. Surgical intervention should be reserved for those in whom endotherapy is not possible or fails. (J Dig Endosc 2011;2(4):209-12)

Keywords: Pancreatic duct injuries - Blunt abdominal trauma - Pancreatic duct disruption - Pancreatic duct stricture - Pseudocyst
Results

The details of all patients are summarized in Table 1. During the study period 17 patients with PDI following blunt abdominal trauma were admitted by us. The median age of the patients was 11 years (range 2 – 45 years) and 15 were males. The modes of trauma were road traffic accident (n= 8), cycle handle injury (n=5), fall from height (n=2), and fall of heavy object on the abdomen (n=2). The clinical presentation included abdominal pain in 17 patients and abdominal distention in 10 patients (Table 1). Three patients had undergone exploratory laprotomy prior to being referred to us. Three patients came with persistent percutaneous drainage; two after exploratory laprotomy and one after radiological intervention for pseudocyst. The median time interval between trauma and initial presentation to the hospital was 8 days (range 1- 66 days) whereas the median time interval between trauma and ERCP was 54 days (range 19-172 days). Thirteen (76%) of 17 patients had pancreatic pseudocysts at the time of presentation (Figure 1). Endoscopic retrograde pancreaticography was attempted in 13 patients; of them 12 had successful delineation of PD. Four patients underwent endoscopic cystogastrostomy for the pseudocyst. At ERP complete cut-off of the PD was seen in 7 patients, at head-neck junction in 5 (Figure 2) and at body-tail junction in 2. Free leak of contrast from the PD was seen in 3 patients and all 3 underwent the pancreatic stenting successfully. Site of the leak was demonstrated in body and tail in 1 patient each. None of the patients who underwent the endoscopic procedures had any complication except 1 patient who had transient malena which was managed conservatively.

Following the insertion of the PD stent a significant reduction of the discharge (less than 50ml) from the percutaneous drain occurred at a median interval of 4wks (3-6 wks) and percutaneous drains were removed in all the 3 patients after a median duration of 10 wks (range 8-12wks). Ultrasound or CT scan of abdomen were performed after removal of percutaneous drain and revealed no intra-

Materials and Methods

Over a period of four-and-a-half year between April 2004 to December 2008, 17 patients with PDI were evaluated at our centres. Pancreatic duct injury was defined as the demonstration of pancreatic ductal leak or stricture on ERCP or the presence of pancreatic pseudocyst on CT scan following blunt abdominal trauma. The records of modes of trauma, clinical presentation, laboratory investigations, ERCP findings, therapeutic intervention and outcome were evaluated. Ultrasoundography and CT scan or MRI of abdomen were done to assess pancreatic and other associated injuries. The records of time interval between trauma and endoscopic therapy, endoscopic therapy and healing of pancreatic leak and complication of endoscopic therapy were studied.

The ERCP was performed with therapeutic duodeno-scope (TJF 140R, Olympus Opticals Ltd., Tokyo, Japan). At ERP complete cut-off was defined as the inability of the contrast or guide-wire to cross the stricture; and leak was defined as extravasation of contrast from the main pancreatic duct (PD) into the retroperitoneum. At ERCP, pancreatic stenting was attempted if there was evidence of the pancreatic duct leak without cut-off, whereas if there was complete cut-off then pancreatic duct stenting was not attempted. Mature pseudocysts with an extrinsic impression on the stomach wall at endoscopy were treated with endoscopic cystogastrostomy. Post-cystogastrostomy the patients were followed up at weekly intervals. Stents were removed after confirmation of resolution of cyst on USG/CT scan. Healing of PDI was confirmed by cessation of drainage from percutaneous drains, resolution of pseudocyst and absence of ascites on USG/CT scans.

Statistical Analysis

The data were expressed as median and range. All analyses were done with SPSS for windows Version 15.0 (Microsoft Inc, Chicago, IL).
abdominal fluid collections. Six patients with symptomatic pseudocysts in whom endotherapy could not be done underwent surgery: 4 had cystogastrostomy; and 2 had cystogastrostomy with distal pancreatic resection. All the 4 patients in whom endoscopic cystogastrostomy was done underwent weekly USG for the assessment of the cyst size. In all four patients the stents were removed after 4 to 6 wks. None of the patients undergoing endoscopic cystogastrostomy had any complications.

**Discussion**

Pancratic injury has been estimated to occur in 2-5% of the patients suffering from abdominal trauma and may be as high as 3-12% in those with other intra-abdominal trauma[8,9]. Children are more vulnerable to pancreatic injury following abdominal trauma. Traditionally surgery was the mainstay of treatment for these patients but over the recent years endoscopic and radiological techniques have radically changed the management of this complex issue. The success of endotherapy is largely related to its relatively less invasive nature vis-a-vis surgery and its ability to restore the continuity of the main pancreatic duct following the acute injury. Percutaneously placed catheters have largely replaced open surgical drainage of the abdominal cavity.

Time of referral to tertiary centre following the trauma may determine the choice of the treatment modality. Lin et al reported that patients with pancreatic injury who were managed radiologically for the pseudocysts presented after 15-32 days whereas the patients who were managed surgically or endoscopically presented slightly early viz. after 7-20 days [10]. Successful endoscopic and radiological management of pancreatic injuries was reported by Blaauw et al where the mean time of presentation was within 50 hours of the abdominal trauma[11]. In patients with pancreatic trauma an early intervention in the form of pancreatic stenting is associated with good long term results. Canty et al reported successful stenting of the PD in two patients who underwent ERCP within few hours of the trauma[12]. The median duration between trauma and referral of the patient to our institution was 54 days (range 19-172 days). This duration seems to be significantly longer than experience from the West. The reason for this delay is lack of awareness of early recognition and management of pancreatic injuries sustained as a result of blunt injuries.
abdominal trauma in our country in secondary care hospitals.

ERCP has been shown to be the most reliable method for accurately defining the continuity of the main pancreatic duct. However, it is associated with inherent complications like pancreatitis and infection. In our report successful selective cannulation of the PD was possible in 12 (92%) of 13 patients. Complete cut-off without extravasation of the contrast was seen in seven patients who underwent ERCP. Cut-off was seen at head-neck junction in five patients and at the body-tail junction in the other two. The higher number of patients with complete cut-off may be due to delayed presentation to our center after the injury leading to fibrosis and subsequently a tight stricture. Extravasation of contrast from the pancreatic duct was seen in three patients. The site of leak was body and tail in one patient each whereas accurate localization was not possible in one patient. No major complications occurred in any of our patients undergoing therapeutic ERCP.

Pseudocysts may occur in up to 30% of cases following pancreatic trauma[14]. These may be managed surgically or non-surgically by either endoscopy or radiologically. Thirteen of the 17 patients had pancreatic pseudocysts at the time of presentation to our center. Four of 17 (23%) patients underwent endoscopic cystogastrostomy with successful outcome, whereas spontaneous resolution was documented in two patients. Two patients with ECG also underwent ERP for evaluating the status of pancreatic duct. Both these patients had normal pancreatograms. Patients with pseudocysts who lacked obvious bulge of the gastric wall were electively sent for surgery as our department does not have facilities for EUS drainage. Six patients with pancreatic pseudocysts underwent surgical intervention: four underwent surgical cystogastrostomy whereas two had cystogastrostomy with distal pancreatic resection. Of the six patients reported by Blaauw et al who needed drainage for the post traumatic pseudocysts, three were subjected to percutaneous drainage, two underwent Roux-Y procedure and one underwent cystogastrostomy[11]. Cantey et al reported seven patients with post traumatic pancreatic pseudocyst who were managed conservatively, spontaneous resolution occurred in 2 whereas five underwent surgical cystogastrostomy[15].

Clinical data though limited suggests that pancreatic duct stenting is an effective treatment for pancreatic duct injury[6,7]. We had three patients with pancreatic duct leak in whom pancreatic duct stenting was successful. Significant reduction of the discharge (less than 50ml) from the percutaneous drain occurred at a median interval of 4wks (3-6 wks) and percutaneous drains could be removed in all the three patients after a median interval of 10 wks (range 8-12 wks).

Conclusion

In conclusion pancreatic pseudocysts and pancreatic duct leakage are the two most important modes of presentation of patients who survive the initial first weeks of pancreatic trauma. The treatment of blunt pancreatic trauma is undergoing a paradigm shift. Endoscopy has carved a niche for itself in the management of this complex condition. The popularity of endotherapy for pancreatic trauma is essentially due to its less invasive approach vis-à-vis surgery and it ability to restore anatomic and physiological function without resorting to resection of pancreatic parenchyma. Surgical management in the form of distal pancreatic resection or cystogastrostomy should be considered if endoscopic management is either technically not possible or fails to achieve the optimal result.

References