ORIGINAL RESEARCH PAPER
Volume-6 | Issue-12 | December-2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 93.98
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

MANAGEMENT OF PANCREATIC TRAUMA: A LESS AGGRESSIVE APPROACH IS SAFE

Surgery

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ABSTRACT

Background: Isolated pancreatic injuries are rare. There are no clear guidelines on management. Traditionally all low grade injuries are treated nonoperatively whereas high grade injuries are treated surgically. Recently a more conservative less aggressive approach is preferred. The aim of the study is to present outcomes of pancreatic trauma patients treated conservatively.

Methods: In this retrospective study, all patients admitted with isolated pancreatic injury between June 2009 and June 2017 was included. Outcomes of their management were analyzed.

Results: A total of 28 patients were analyzed. Majority were males (85%) with the mean age of 32 years and were caused by blunt trauma. 68% were Grade I & II and the rest were grade III & IV. All Grade I & II patients were managed nonoperatively without any morbidity. All Grade III patients underwent distal pancreatectomy without splenectomy. All Grade IV injuries were considered for initial nonoperative management. All these patients had either pseudocyst or fistula formation which was managed surgically without resection. No mortality was reported.

Conclusions: A more conservative less aggressive approach is safe and feasible in high grade (Grade IV) pancreatic injuries with expectant formation of pseudocyst or fistula which can be managed by nonresectional procedures with less morbidity and mortality.

KEYWORDS

Pseudocyst, Pancreatic fistula, Cystogastrostomy, Fistulojejunostomy

INTRODUCTION:

Pancreatic injuries are relatively uncommon representing less than 5% of abdominal trauma [1, 2]. These injuries pose a problem to the surgeon both in diagnosis and management. Severity of injury is graded according to the American Association for Surgery of Trauma (AAST) scale based on Computed Tomography (CT) findings [3]. Management strategies are based on grade of injury. Broadly injuries without disruption of main pancreatic duct (MPD) are treated conservatively and those with ductal disruption are managed surgically [4, 5]. But now a more conservative non operative approach is preferred [6, 7, 8]. But the results of conservative approach in patients with ductal disruption are not clear. The aim of our study is to report our experience in the conservative management of pancreatic trauma.

METHODS:

It is a retrospective study where all patients admitted with isolated pancreatic trauma in the department of Surgical Gastroenterology at our hospital between the period June 2009 and June 2017 were included. Data was collected regarding demographics and mode of injury. Severity of injury was graded in all patients based on CT scan findings according to AAST injury scale [3](Table 1). Mode of management in each patient and the complications were noted. Results were analyzed. Quantitative variables were expressed as mean ± standard deviation. The qualitative variables are expressed as a percentage.

RESULTS:

A total of 546 patients with abdominal trauma were admitted during the study period which includes 62 (11.3%) patients with pancreatic injury. Of these, 28(5.1%) patients had isolated pancreatic injury.

Patient and injury characteristics: Patient demographics, mode of injury and grading of injury are depicted in Table 1. Most of the patients were males (85%) with the mean age of 32 years. There was a mean delay of 34 hours from the time of injury to presentation to our centre. All patients underwent Contrast CT scan abdomen after initial evaluation and the severity was graded. Majority were grade I and II injuries which constituted about 68% of pancreatic injuries.

Table 1: Patient & Injury characteristics

Characteristics	No. of patients (n=28)
Sex (Male: Female)	24: 4 (85%:15%)
Age (Yrs) (Mean) (SD)	32.8 ± 11.4
Mechanism of injury	
Blunt trauma (Fall / Road traffic accidents)	28 (100%)
Penetrating	0 (0.00%)
AAST Injury scale	
Grade 1	10 (35.7%)
Grade II	9 (32.1%)
Grade III	6 (21.4%)
Grade IV	3 (10.7%)
Grade V	0 (0.0%)
Time to presentation after trauma (Hrs) (Mean ±SD)	34.2 ± 10.6

Management: Out of 28 patients with isolated pancreatic trauma, only 9 (32.1%) patients underwent surgical intervention. All Grade I and II patients were managed nonoperatively. None of these patients required surgical intervention. None of the patients developed any complication due to pancreatic injury such as pseudocyst or fistula. But all patients with Grade III and IV pancreatic injury required surgical intervention at some point of time during their treatment. All Grade III injury patients underwent surgery initially at presentation. These patients underwent resection procedure, distal pancreatectomy without splenectomy (Figure 1). There was only one patient with Grade III pancreatic injury with associated splenic injury and only this patient underwent distal pancreatectomy with splenectomy (case excluded due to other associated organ injury).

All 3 patients with Grade IV injury were initially managed nonoperatively. Out of 3 patients, 2 patients had localized peripancreatic fluid collections without any features of infection. These patients later developed pseudocysts and presented with symptoms. Both patients underwent cystogastrostomy (Figure 2). One patient with Grade IV injury had diffuse peripancreatic and paracolic collections with features of infection (Fever, elevated leukocyte count). This patient initially underwent ultrasound guided percutaneous catheter placement into peripancreatic fluid collection.

Percutaneous catheter initially drained about 500 ml per day with drain fluid amylase of 6920 IU/L and drain gradually subsided but persisted at about 300 ml per day. In view of persistent pancreatic fistula even after 1month, patient underwent Magnetic Resonance fistulogram which showed a collection of 2x1 cms at the neck of pancreas with a fistulous tract. Patient underwent surgery, Fistulo-jejunostomy (anastomosis of Roux-En-Y loop of jejunum to the fistulous tract) after excision of fistula tract upto the neck of pancreas (Figure 3). There was no mortality. Management of all pancreatic trauma patients is shown in Figure 4.

DISCUSSION:

Pancreatic injuries are uncommon but are associated with major morbidity and mortality [9]. There is significant correlation between the injury to main pancreatic duct and morbidity [10]. The diagnosis and management of these injuries pose a challenge to the surgeon. The retroperitoneal location of pancreas masks signs and symptoms typical of intra-abdominal injuries. Hence high index of suspicion is necessary to diagnose these injuries. In our study, most of the patients with isolated pancreatic trauma presented after 24 hours of trauma. This is due to under suspicion of possible pancreatic trauma. Most of the injuries (75 to 85 percent) are due to blunt trauma. But all isolated pancreatic injuries presenting to our centre were due to blunt trauma due to fall or road traffic accident. In India, unlike west the incidence of stab and gunshot injuries are rare. CT scan is the diagnostic modality of choice to diagnose pancreatic injury with reported sensitivities of 91% to 95% and specificities of 91% to 100% [11,12]. In our study, in 2 patients initial CT scan did not show pancreatic injury. These patients underwent repeat CT scan due to persisting symptoms which revealed pancreatic injury. Repeat imaging is essential in patients with suspected pancreatic injury with normal initial imaging. Majority of pancreatic injuries are associated with adjacent organ injury. We have analyzed only isolated pancreatic injuries as the plan of management and outcomes are influenced by associated organ injury.

Majority of pancreatic injuries are Grade I and II, accounting for almost 60%. Most of the studies recommend nonoperative management for Grade 1 and II injuries as these do not have ductal injury. Nonoperative management appears to have low morbidity [13]. Even those requiring operative management, only nonresectional management is recommended [11]. Nonresectional management strategies include debridement and drainage. The incidence of pancreatic fistula, intra abdominal collections and mortality was significantly low in the non resectional group when compared to resectional group [5]. All 18 patients with low grade injury in our unit underwent nonoperative management without any morbidity and mortality.

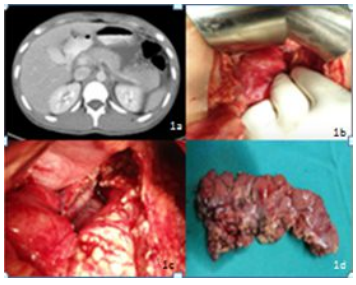

Figure 1. Grade III pancreatic injury
(a) CT showing transection of pancreas to the left of SMV
(b) Intraoperative picture of transection
(c) Pancreatic stump after distal pancreatectomy
(d) Distal pancreatectomy specimen

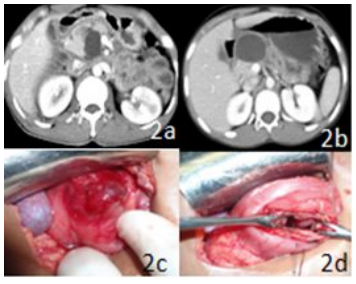

Figure 2. Grade IV pancreatic injury
(a) CT showing pancreas transection to the right of SMV
(b) Pancraetic pseudocyst after nonoperative management
(c) Intraop – Pseudocyst
(d) Cystogastrostomy being performed

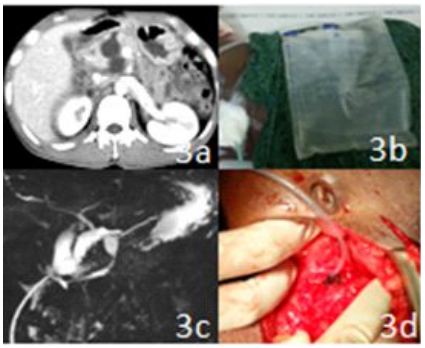

Figure 3. Grade IV pancreatic injury
(a) CT showing pancreas transection to the right of SMV
(b) Pancraetic fistula after PCD into collection
(c) MR fistulogram showing pancreatic fistula
(d) Fistula excised and prepared for Fistulojelunostomy

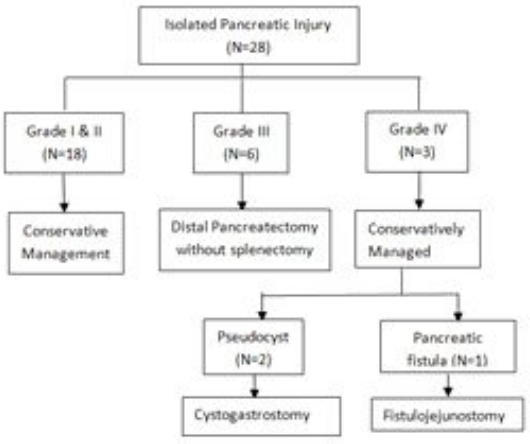

Fig 4. Management of Pancreatic injuries

Grade III and IV injuries are less common and are associated with pancreatic ductal disruption. When duct is injured, management depends on whether the injury is to the right or left of superior mesenteric vein (SMV). Pancreatic transection or parenchymal injury to the left of SMV is managed with distal pancreatectomy. Distal pancreatectomy can be done without splenectomy especially in hemodynamically stable patients [14, 15]. Distal pancreatectomy is safe even in emergency setting as it does not have pancreaticoenteric anastomosis. It also avoids complications such as pseudocyst or fistula which occurs in almost all patients with MPD disruption managed nonoperatively. Hence all our patients with Grade III injury were managed surgically with spleen preserving distal pancreatectomy without any significant morbidity and mortality. But various options are available for pancreatic injuries on the right of SMV. Options depend on the extent of parenchymal disruption, associated adjacent organ injury and hemodynamic status. Options include debridement with wide drainage, extended distal pancreatectomy, central pancreatectomy and pancreaticoduodenectomy. But the resectional surgeries are associated with high morbidity and mortality in emergency setting with high chances of pancreaticoenteric anastomotic leak and also lead to loss of pancreatic parenchyma with exocrine and endocrine insufficiency. Hence a more conservative operative approach is preferred which includes debridement and drainage. But with the advances in image guided interventions, a nonoperative approach can be adopted for Grade IV injuries. We have adopted nonoperative approach in all 3 patients with Grade IV injury. We have considered image guided percutaneous catheter drainage of collections only if they are infected as evident by fever, increased leukocyte count. If there is no evidence of infection, these collections were left alone with expectant formation of a pseudocyst. Only one patient required percutaneous catheter drainage and that patient developed pancreatic fistula. Other 2 patients had no intervention and they formed pseudocysts.

Pancreatic pseudocysts and fistula occur in about 30% of patients with

pancreatic trauma[16]. These almost always occur with high grade injuries where there is pancreatic ductal disruption[14, 17, 18]. Low output pancreatic fistulas usually resolve with conservative management [18]. High output fistulas require surgical intervention such as pancreatic resections or drainage procedures such as fistulojejunostomy [19]. Pseudocysts may resolve in few patients with high grade injury. Persistent pseudocysts require intervention similar to that of nontraumatic cysts.

Grade IV (parenchymal injury involving ampulla) and Grade V (massive disruption of pancreatic head) are usually associated with hemodynamic instability. These injuries require operative intervention such as debridement with drainage in case of hemodynamic instability or pancreaticoduodenectomy. Even if patients require major resections such as pancreaticoduodenectomy, it is performed as a staged procedure. Initially only resection and hemostasis is achieved and reconstruction is performed later in a stable patient. We have not encountered any patient with grade V injury.

CONCLUSION:

In India, Most of the pancreatic injuries are due to blunt trauma seen in young males. Majority are low grade injuries and are managed nonoperatively. Initially even high grade (Grade IV) injuries can be safely managed nonoperatively with expectant formation of pseudocyst or fistula which can be managed by nonresectional procedures with less morbidity and mortality.

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