

Original Research Article

Management of pancreatic trauma in adult patients: a single centre experience

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ABSTRACT

Background: Pancreatic trauma is very rare and its management is complex. The aim of this study was to report our experience in the management of pancreatic trauma.

Methods: All patients who were admitted with pancreatic trauma from May 2017 to May 2019 were reviewed retrospectively. Demographic data and baseline characteristics were recorded. Grading of pancreatic trauma was carried out according to the American Association for surgery for Trauma (AAST). Data were represented by frequency and mean.

Results: A total of 24 patients were admitted with pancreatic trauma in the study period. Road traffic accident (n=17) was the leading cause followed by falls (n=5) and assault (n=2). Out of 24 patients, 3 patients had grade I pancreatic injury, 6 patients had grade II AAST injury, 9 patients had grade III injury and 6 patients had grade IV injury. No patients had grade V injury. Mean hospital stay was 12.3±4.2 days. One patient with grade 2 injury underwent surgery for liver laceration, all others were managed conservatively. Patients with grade 3 and 4 injuries were managed conservatively. One patient with grade 3 injury required, cystogastrostomy for pseudocyst 1 month after the index admission. Two patients of grade 4 injury underwent surgery, one patient for traumatic pseudocyst after 1 month and another patient for bleeding pseudoaneurysm of gastroduodenal artery 1 month after trauma. No patient underwent pancreatectomy. There was no mortality in the study population.

Conclusions: Pancreatic trauma can be managed conservatively irrespective of the grade of injury in haemodynamically stable patients.

Keywords: Pancreatic trauma, NOM pancreatic trauma, Pancreatic injury, Conservative treatment, Radiologic drainage

INTRODUCTION

The pancreas is a retroperitoneal organ, whose anatomical relationship with vascular and digestive structures is complex.¹⁻⁴ Pancreatic trauma is uncommon, affecting 0.5-8% of trauma patients. The first available data on pancreatic injury was published by Travers, where findings from an autopsy were described.⁵

Pancreatic trauma is associated with high mortality and morbidity in cases of delayed diagnosis, incorrect classification of injury and delay in treatment.^{6,7} These injuries are difficult to diagnose and pose a problem in treatment strategy. Penetrating injuries are more commonly associated with pancreatic trauma in countries such as USA and South Africa whereas in third world countries such as India, blunt trauma to abdomen is the

most common cause of pancreatic injury.⁸ Pancreas injury is not solitary, especially in blunt trauma patients, where more than 80% patients have at least one other abdominal organ injured.⁹ A computed tomography scan (CT scan) is useful in diagnosis and assessment of severity of pancreatic trauma. It is also helpful in detecting pancreatic ductal injury and associated intra abdominal bleeding.¹⁰⁻¹³ The aim of this retrospective study is to report our tertiary centre experience in management of pancreatic trauma.

METHODS

The present study is two year retrospective, single institution, observational review of 20 patients who underwent pancreatic trauma management between May 2017 to May 2019 in the Department of Surgical Gastroenterology, Bangalore Medical College and Research Institute. All medical records of these patients were retrieved from hospital information system and reviewed. Demographic data and baseline characteristics were recorded, including age, sex, medical comorbidities, mechanism of pancreatic trauma, length of the hospital stay and associated extra pancreatic injuries. All patients underwent CT scan for the diagnosis of pancreatic injury. Grading of pancreatic trauma was carried out according to the American Association for surgery for Trauma (AAST).¹⁴ Mode of management of pancreatic trauma such as conservative management, radiological drainage and surgical management were noted.

The data collected were tabulated and analysed. Simple descriptive statistics were used. Quantitative variables were expressed as mean±standard deviation. Qualitative variables were expressed as percentage.

Classification of traumatic injury of the pancreas according to the AAST

- Grade 1: minor contusion without ductal injury;
- Grade 2: major contusion/laceration without ductal injury or tissue loss;
- Grade 3: distal transection or parenchymal injury with ductal injury;
- Grade 4: proximal transection or parenchymal injury involving ampulla;
- Grade 5: mass destruction of the pancreatic head.

RESULTS

Baseline characteristics

Twenty-four patients with pancreatic trauma were hospitalised in our department between May 2017 to May 2019. Males (n=21, 87.5%) outnumbered the females (n =3, 12.5%). Mean age was 26.7±6.2 years. Baseline characteristics of the population was described in (Table 1).

Mechanism of injury

Road traffic accident (RTA) (n=17, 70.8%) was the leading cause of pancreatic trauma in the study population followed by fall from height (n=5, 20.8%) and assault (n=2, 8.3%). No penetrating pancreatic trauma was observed in the present study.

AAST grading of injuries

Majority of study population had Grade III pancreatic injury (n=9, 37.5%) followed by Grade IV (n=6, 25%), Grade II (n=6, 25%) and Grade I (n=3, 12.5%) injuries. No patients had Grade V injury.

Table 1: Population characteristics (n=24).

| Characteristics | Patients (%) |
|---|---------------------|
| Sex (M/F) | 21 (87.5)/3 (12.5%) |
| Age (in years) | 26.7±6.2 years |
| Causes | |
| Fall | 5 (20.8) |
| Assault | 2 (8.3) |
| RTA | 17 (70.8) |
| AAST classification | |
| Grade I | 3 (12.5) |
| Grade II | 6 (25) |
| Grade III | 9 (37.5) |
| Grade IV | 6 (25) |
| Grade V | 0 |
| Associated extra pancreatic injuries | |
| Isolated pancreatic trauma | 11 (45.8) |
| Liver and spleen injury | 13 (54.2) |
| Renal trauma | 1 (4.1) |
| Extra abdominal injury | 6 (25) |

Associated extra pancreatic injuries

Isolated pancreatic trauma was seen in 11 patients (45.8%). Associated liver and spleen injury were seen in 13 patients (54.2%). Renal trauma was seen in 1 patient (4.1%). Extra abdominal injury was seen to be associated with pancreatic injury in 6 patients (25%).

Management of pancreatic trauma

Sixteen patients (66.6%) were managed conservatively. Six patients (25%) were managed by non-surgical intervention, 5 patients required pigtail insertion under radiologic guidance for peripancreatic collection and 1 patient required intercoastal chest drain (ICD) drain for post traumatic pancreatitis with pancreatopleural fistula 1 year after trauma. 4 patients (16.6%) required surgical intervention. One patient with grade II pancreatic injury underwent laparotomy and suturing of coexisting liver laceration for hemodynamic instability. Another patient with grade IV injury managed with pigtail for peripancreatic collection underwent laparotomy and

evacuation of hematoma and GDA ligation with loop ileostomy and feeding jejunostomy after 1 month for pancreatic trauma induced GDA pseudoaneurysm bleed. Remaining two patients, one with grade III and another

with grade IV injury underwent cystogastrostomy 1 month after the injury for traumatic pseudocyst of the pancreas. Details of pancreatic trauma management in the study population is given in (Table 2).

Table 2: Pancreatic trauma management.

| AAST grade | N | Conservative | Radiological/nonsurgical | Surgical |
|------------|---|--------------|--------------------------|----------------------|
| 1 | 3 | 3 (12.5%) | 0 | 0 |
| 2 | 6 | 5 (20.8%) | 0 | 1 (liver laceration) |
| 3 | 9 | 6 (25%) | 2 (8.33%) | 1 (4.1%) |
| 4 | 6 | 2 (8.33%) | 4 (16.6%) | 2 (8.33%) |
| 5 | 0 | 0 | 0 | 0 |

Length of hospital stay, interval to presentation after injury and mortality

Mean length of hospital stay (LOS) for the study population is 12.3±4.2 days. Mean LOS for patients with grade I injury was 6.6±1.9 days which was less than grade II (mean LOS- 8±4.9 days), grade III (mean LOS- 9.7±3.3 days) and Grade IV patients (mean LOS- 26.5±8.5 days). One patient with grade II pancreatic trauma had LOS for 21 days in view of emergency laparotomy for hemodynamic instability from grade III liver laceration.

Mean interval to presentation after injury was 4.45±1.2 days for all patients whereas it was 4.7±1.1 days for grade 3 and 4 injuries.

No mortality was observed in the study population.

DISCUSSION

This retrospective study evaluated the patients with pancreatic trauma admitted to our department over a period of 2 years. All injuries were caused by blunt trauma and the etiology was dominated by Road traffic accidents (RTA) (70.8%) followed by fall from height (20.8%) and assault (8.3%). Isolated pancreatic trauma was seen without extra pancreatic injuries in 45.8% of cases in our study, which goes against literature where associated extra pancreatic injuries are seen in >90% of patients: a possible explanation to this is, not all poly trauma were admitted and treated in our department.¹⁵ The average age of patients is 26.7 years, which correlates with other published series where age is <40 years in more than 80% and also 87.5% of patients in this study were males which is in conformity with the published literature.^{1,16,17} The main etiologies for pancreatic trauma in this study were RTAs, fall from height and assault, this is in contrary to data from united states where the main etiology for the trauma of pancreas is penetrating (gunshot wounds and knives).^{1,3,18-20} The reason for this could be stricter legislation in India regarding firearms.

Pancreatectomy in the setting of trauma is still controversial. In our series, no patient underwent pancreatectomy. In patients who underwent surgery, one patient had emergency laparotomy for liver laceration during index admission. Other three patients underwent surgery during second admission, two patients underwent cystogastrostomy for traumatic pseudocyst of the pancreas and one patient underwent emergency laparotomy for GDA pseudoaneurysm bleed. Non operative management (NOM) is the most effective treatment strategy for grade 1 and 2 pancreatic injury. morbidity is less than 20% and mortality is relatively low.^{19,21} Our results are in accordance with this, as 4 out of 5 patients with grade 2 injury were managed conservatively and one patient required emergency laparotomy for grade 3 liver laceration. For grade 3 and grade 4 pancreatic injuries distal pancreatectomy or surgical drainage is usually indicated.^{1,21} Distal pancreatectomy is preferred over surgical drainage because of decreased mortality and morbidity.^{1,19,22} In our series, 9 patients had grade 3 injury, out of which only one patient underwent cystogastrostomy one month after trauma for pseudocyst of the pancreas. Among 6 patients with grade 4 injury, two underwent surgery, one for pseudoaneurysm bleed and another for pseudocyst, both during their second hospital admission. In grade 5 pancreatic injury, possibilities vary from NOM to whipples resection. Early ERCP and pancreatic duct stenting has a role in management of ductal disruption in select cases of grade 3 and 4 injuries thereby avoiding laparotomy and resection.²³ However in our series mean interval of presentation after injury for grade 3 and grade 4 injuries was 4.7 days ruling out the role of ERCP. Literature favours NOM, even in cases of duodenal and common bile duct injury.²⁴ Whipples in the setting of trauma is associated with high mortality rate (45%) whereas NOM has lower mortality rate (22-25%).²⁴⁻²⁶ There were reports describing pancreatoduodenectomy in trauma in two steps where reconstruction is done after 24-48 hrs.²⁷ However we didn't encounter any case of grade 5 pancreatic injury in our study. No mortality is observed in our study. Mean length of hospital stay in our series was 12.3±4.2 days, length of hospital stay

correlated with grade of injury. This is in accordance with the published literature.²⁸

Limitations of our study include its retrospective nature, small sample size, no grade 5 injuries and no patients underwent surgery in acute setting directed at pancreas. No definitive conclusions can be drawn based on this present study, though results indicated a trend towards NOM even in grade 3 and 4 pancreatic injuries.

CONCLUSION

Pancreatic trauma can be managed conservatively irrespective of the grade of injury supported by radiological percutaneous drainage and pancreatic duct stenting in selective cases. Few patients with higher grades of injury develop pseudocyst of pancreas, which can be dealt with later on. Though literature suggests NOM in grade 1 and 2 injuries and operative intervention in grade 3 and 4 injuries, we have observed that even patients with higher grade injuries can be managed non surgically with high success rates. However, studies with larger sample size and comparison groups (surgery vs nonoperative) are required to draw definitive conclusions regarding management of the pancreatic trauma.

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Ethical approval: Not required

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