

Management of pancreatic trauma in adult patients at tertiary care institute of Gujarat, India

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Background and Aim: Pancreatic trauma is rare compared to other solid organ injuries of the abdomen. These injuries are difficult to diagnose and pose a problem in treatment strategy. This retrospective study aims to report our tertiary center experience in the management of pancreatic trauma. **Material and Methods:** The present study is one and half year observational study of 30 patients who underwent pancreatic trauma management in the Department of Surgery, tertiary care institute of Gujarat. Demographic data and baseline characteristics were recorded, including age, sex, medical co-morbidities, mechanism of pancreatic trauma, length of the hospital stay, and associated extrapancreatic injuries. All patients underwent a 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). **Results:** Road traffic accident (RTA) (n=20) was the leading cause of pancreatic trauma in the study population followed by fall from height (n=7) and assault (n=3). The majority of the study population had Grade III pancreatic injury (n=12) followed by Grade IV (n=8), Grade II (n=7), and Grade I (n=3) injuries. No patients had Grade V injury. Isolated pancreatic trauma was seen in 13 patients. Associated liver and spleen injury was seen in 15 patients. Renal trauma was seen in 2 patients. The extra-abdominal injury was seen to be associated with pancreatic injury in 7 patients. **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.

Keywords: Abdominal injury, Pancreatic trauma, Road traffic accident, Renal trauma

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Introduction

The pancreas is an organ located deep in the abdominal cavity, whose anatomical relationship with the digestive and vascular structures [1-4] explains the complexity and severity of pancreatic trauma which represents less than 5% of abdominal trauma [5,6]. Pancreatic trauma is rare compared to other solid organ injuries of the abdomen [7-9].

Incidence is difficult to properly calculate, but a Scottish population-based study found pancreatic injury to occur in 0.21% of over 52,000 trauma patients [2]. In the UK Trauma and Research Network (TARN) database there were 0.32% pancreatoduodenal injuries detected among over 356,000 injured patients [10]. A similar pancreatic injury incidence of 0.3% was noted in children in the United States National Trauma Data Bank [11].

While injuries to the liver, spleen, and kidneys are far more common, pancreatic injury occurs in less than 10% of all abdominal injuries, depending on the evaluation of the population at risk and the underlying etiology. Penetrating injuries are far more common in regions with a high prevalence of gunshot wounds, such as in North America and South Africa [12,13].

In most other regions, a blunt etiology following motor vehicle crashes or falls, or 'insignificant' trauma sustained during leisure activities is the prevailing mechanism leading to this rare injury.

Pancreatic trauma is potentially lethal when combined with duodenal perforation or closely related arterial bleeding. These injuries remain difficult to diagnose and undeniably pose a problem in therapeutic strategy. An abdominal computer tomography (CT) allows diagnosis and severity assessments of pancreatic trauma, presence of pancreatic duct injury, or associated bleeding [14-17].

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 the USA and South Africa whereas, in third world countries such as India, blunt trauma to the abdomen is the most common cause of pancreatic injury.

Pancreas injury is not solitary, especially in blunt trauma patients, where more than 80% of patients have at least one other abdominal organ injured. 18

A computed tomography scan (CT scan) is useful in the diagnosis and assessment of the severity of pancreatic trauma. It is also helpful in detecting pancreatic ductal injury and associated intraabdominal bleeding [19-22]. This retrospective study aims to report our tertiary center experience in the management of pancreatic trauma.

Material and Methods

The present study is one and half year observational study of 30 patients who underwent pancreatic trauma management in the Department of Surgery, tertiary care institute of Gujarat. All medical records of these patients were retrieved from the hospital information system and reviewed. Demographic data and baseline characteristics were recorded, including age, sex, medical co-morbidities, mechanism of pancreatic trauma, length of the hospital stay, and associated extrapancreatic injuries. All patients underwent a 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) [23]. Mode of management of pancreatic trauma such as conservative management, radiological drainage, and surgical management was noted.

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

Statistical analysis: The recorded data was compiled and entered into a spreadsheet computer program (Microsoft Excel 2007) and then exported to the data editor page of SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

Thirty patients with pancreatic trauma were hospitalized in our department. Males (n=25) outnumbered the females (n =5,).

The mean age was 27.8 ± 6.5 years. Baseline characteristics of the population were described in (Table 1).

Table 1: Population characteristics of study participants

Characteristics	Patients (%)
Sex (M/F)	25 (83.3)/5 (16.6%)
Age (in years)	27.8 ± 6.5 years
Causes	
Fall	7 (23.3)
Assault	3 (10)
RTA	20 (66.6)
AAST classification	
Grade I	3 (10)
Grade II	7 (23.3)
Grade III	12 (40)
Grade IV	8 (26.6)
Grade V	0
Associated extrapancreatic injuries	
Isolated pancreatic trauma	13 (43.3)
Liver and spleen injury	15 (50)
Renal trauma	2 (6.6)
Extra abdominal injury	7 (23.3)

Road traffic accident (RTA) ($n=20$) was the leading cause of pancreatic trauma in the study population followed by fall from height ($n=7$) and assault ($n=3$). No penetrating pancreatic trauma was observed in the present study.

The majority of the study population had Grade III pancreatic injury ($n=12$) followed by Grade IV ($n=8$), Grade II ($n=7$), and Grade I ($n=3$) injuries. No patients had Grade V injury.

Isolated pancreatic trauma was seen in 13 patients. Associated liver and spleen injury was seen in 15 patients. Renal trauma was seen in 2 patients. The extra-abdominal injury was seen to be associated with pancreatic injury in 7 patients.

Twenty-one were managed conservatively. Six patients were managed by non-surgical intervention, 5 patients required pigtail insertion under radiologic guidance for peripancreatic collection, and 1 patient required intercostal chest drain (ICD) drain for post-traumatic pancreatitis with pancreatopleural fistula 1 year after trauma.

3 patients 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.

The remaining 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 are given in (Table 2). The mean length of hospital stay (LOS) for the study population is 12.7 ± 4.4 days. Mean LOS for patients with grade I injury was 6.8 ± 2.0 days which was less than grade II (mean LOS- 8.1 ± 4.6 days), grade III (mean LOS- 9.5 ± 3.6 days) and Grade IV patients (mean LOS- 26.9 ± 8.1 days).

One patient with grade II pancreatic trauma had LOS for 21 days because of emergency laparotomy for hemodynamic instability from grade III liver laceration. The mean interval to presentation after injury was 4.60 ± 1.4 days for all patients whereas it was 4.6 ± 1.3 days for grade 3 and 4 injuries.

Table 2: Pancreatic trauma management of study participants.

AAST grade	N	Conservative	Radiological/ nonsurgical	Surgical
1	3	3	0	0
2	7	6	0	1 (liver laceration)
3	12	9	2	1
4	8	3	4	1
5	0	0	0	0

Discussion

All injuries were caused by blunt trauma and the etiology was dominated by Road traffic accidents (RTA) followed by fall from height and assault. Isolated pancreatic trauma was seen without extrapancreatic injuries in 43.3% of cases in the present study, which goes against literature where associated extrapancreatic injuries are seen in >90% of patients: a possible explanation for this is, not all polytrauma were admitted and treated in our department [24]. The average age of patients is 27.8 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 are in conformity with the published literature [25,26].

The main causes of pancreatic trauma in this series were motor vehicle accidents and stab wounds, unlike data from the United States where the main cause of pancreatic trauma is penetrating (firearms and knives) [27-30]. 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. 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 [31].

In our series, 12 patients had grade 3 injury, out of which only one patient underwent cystogastrostomy one month after trauma for pseudocyst of the pancreas. In grade 5 pancreatic injury, possibilities vary from NOM to Whipple's resection. Early ERCP and pancreatic duct stenting have a role in the management of ductal disruption in select cases of grade 3 and 4 injuries thereby avoiding laparotomy and resection [32].

However, in our series mean interval of presentation after injury for grade 3 and grade 4 injuries was 4.6 days ruling out the role of ERCP. Literature favors NOM, even in cases of duodenal and common bile duct injury [33].

There were reports describing pancreatoduodenectomy in trauma in two steps where reconstruction is done after 24-48 hrs. However, any case of grade 5 pancreatic injury was not encountered in the present study. No mortality is observed in the present study.

The mean length of hospital stay in our series was 12.7±4.4 days, length of hospital stay correlated with the grade of injury. This is in accordance with the published literature [34].

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 the pancreas, which can be dealt with later on.

What does the study add to the existing knowledge

Though the literature suggests NOM in grade 1 and 2 injuries and operative intervention in grade 3 and 4 injuries, it was observed that even patients with higher-grade injuries can be managed non surgically with high success rates.

Author's contribution

Dr. Krunal Chandana: Concept, study design

Dr. Priyank Patel: Manuscript preparation

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