

Conservative Management of Traumatic Pancreatitis - Our Experience

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Abstract: ***Introduction:** Blunt trauma abdomen leading to pancreatic injury is not only rare, but moreover its management is still controversial for high grade injuries involving the main pancreatic duct. The aim of the study is to evaluate the outcomes of conservative management of high grade pancreatic injuries. **Material & Methods:** Review of patients of Blunt Trauma Abdomen with Pancreatic injury at our center between 2018-2020. Cases included had raised Serum Lipase (more than 3 times the normal upper limit), positive ultrasonography and/or Computed Tomography scan having evidence of pancreatic injury. **Results:** A total of 5 patients fulfilled the inclusion criteria, all male. Isolated pancreatic trauma in 3/5 cases (60%), Grade IV injury in 5/5 cases (100%). Pancreatic complications in 4/5 cases (80%), 2 cases had pseudocyst formation which were managed conservatively initially, and later endoscopically & laparoscopically. 2 cases had APFC formation which was managed by percutaneous aspiration. 4/5 patients are asymptomatic in follow up. **Conclusion:** Conservative management can be reserved for patients who are hemodynamically stable and is found to be a safe and effective way to treat High grade pancreatic injuries with good outcomes.*

Keywords: Conservative Management, Pseudocyst Pancreas, Acute Peri-Pancreatic Fluid Collection (APFC)

1. Introduction

Trauma is the leading cause of mortality around the world (1). Abdominal injuries are common in these patients, with solid organs at particular risk suffering blunt trauma abdomen. Liver and Spleen injuries comprise the majority of solid organ injuries and conservative management has become the choice of treatment, till the patient is hemodynamically stable. Pancreatic injuries are rare, comprising less than 10% of blunt abdominal injuries, moreover, they are particularly challenging to manage due to their association with significant patient morbidity. (2, 3)

Pancreatic injuries are uncommon, occurring in 0.2–2 % of all trauma patients and 3–12 % of patients with abdominal injury (4–10). At presentation, diagnosing a pancreatic injury can be a challenge. Because of the retroperitoneal location of the organ, clinical signs may be extremely subtle and may become apparent only after a period of time. Pancreatic injury occurs predominantly in males (68–90 % male) and in the young (mean age 27–35 years) (7–14). In the United States, penetrating trauma is responsible for the majority of pancreatic injuries in adults, 48–81 % (7, 8, 13, 15, 16). Outside of the United States, blunt trauma is the cause of the majority of pancreatic injuries [17–20].

In blunt injury, the pancreas is most commonly injured by crushing force applied to the abdomen resulting in compression of the pancreas against the vertebral column with crush injury or transection injury. Pancreatic injury can range in severity from traumatic pancreatitis, contusions, and minor lacerations to complete gland transection and main pancreatic ductal injury. Associated injuries occur in 50–100 % of patients with pancreatic injury. (8, 12, 15, 18,

18–21). The liver, major vessels, duodenum, stomach, spleen, small bowel, large bowel and kidney are the most commonly associated intra-abdominal injuries. Associated injuries to the chest, central nervous system, and skeletal system are also common. Isolated pancreatic injuries occur in 22 % of patients with blunt abdominal trauma (7, 15).

Trauma is the most common cause of acute pancreatitis and pancreatic pseudocyst in the paediatric population as well (22–25). Blunt trauma accounts for 75–100 % of pancreatic injuries in the paediatric population, mainly due to motor vehicle collisions, pedestrian injuries, bicycle accidents, child abuse and falls (2, 22–27).

2. Material & Methods

We included Patients with history of Blunt Trauma Abdomen with elevated Serum Lipase level at the time of presentation along with radiological (USG and/or CT) findings between January 2018 and December 2020 at our center.

Data collected included patient demographics, Mode of injury, Time of injury, Associated Injury(s), Type of pancreatic injury, AAST grading of the Pancreatic Injury (**Table 1**), Lipase Level at the time of admission, Complications related to the pancreas, Atlanta Classification for the pancreatic complication/collections (**Table 2**), Interventions of any kind during hospital stay, Length of stay, Follow up period, Need for Pancreatic interventions during follow up, Type of pancreatic intervention required.

Table 1: Classification of traumatic injury of the pancreas according to the American Association for Surgery of Trauma (AAST)

Grade I	minor contusion without ductal injury
Grade II	major contusion/laceration without ductal injury or tissue loss
Grade III	distal transection or parenchymal injury with ductal injury
Grade IV	proximal transection or parenchymal injury involving ampulla
Grade V	mass destruction of the pancreatic head

Table 1: Pancreatic and Peripancreatic Collections

Collection	Time after Onset of Pain (wk)	Pancreatitis Subcategory	Location	Imaging Features
APFC	≤4	IEP	Extrapancreatic	Homogeneous, fluid attenuation, conforms to retroperitoneal structures, no wall
ANC	≤4	Necrotizing pancreatitis	Intra- and/or extra-pancreatic	Inhomogeneous*, nonliquefied components†, no wall
Pseudocyst	>4	IEP	Extrapancreatic‡	Homogeneous, fluid filled, circumscribed, encapsulated with wall
WON	>4	Necrotizing pancreatitis	Intra- and/or extra-pancreatic	Inhomogeneous, nonliquefied components, encapsulated with wall

Sources.—References 2–4.

Note.—Any collection may become infected. ANC = acute necrotic collection, APFC = acute peripancreatic fluid collection, IEP = interstitial necrotizing pancreatitis, WON = walled-off necrosis.

*Early ANCs may be homogeneous; follow-up computed tomography (CT) performed in 2nd week may help clarify status.

†Includes solid-appearing components or fat globules within fluid.

‡Rarely, persistent pancreatic leak or disconnected duct may lead to intrapancreatic pseudocyst.

Diagnosis

Early diagnosis of pancreatic injury especially in patients with blunt abdominal trauma remains a challenge. Pancreatic injuries are easily missed in primary and secondary survey because of very subtle signs. The patients in our study were only included after they had undergone Ultrasonography whole abdomen and Contrast Enhanced Computed Tomography Scan of whole abdomen, and both showing pancreatic injury.

Conservative Management - Included insertion of Nasogastric Tube, IV Antibiotics, IV Analgesics, IV Fluids, Regular blood investigations, Total Parenteral Nutrition.

Discharge Protocol - Patients were discharged once they were symptomatically stable, hemodynamically stable, tolerating full oral diet and with normal bowel and bladder habits.

Follow up Protocol - They were followed up at weekly intervals. An ultrasound was done on each follow up and database was maintained. Presence or increase of volume of previous collections were noted.

3. Case Summary

Table 2: Revised Atlanta Classification for Acute Pancreatitis

	CASE 1	CASE 2	CASE 3	CASE 4	CASE 5
Age / Sex	15yr / Male	12yr / Male	26yr / Male	22yr / Male	27yr / Male
Mode Of Injury,	Blunt Trauma Abdomen by Road Traffic Accident	Blunt Trauma Abdomen by Road Traffic Accident	Blunt Trauma Abdomen by Road Traffic Accident	Blunt Trauma Abdomen by Road Traffic Accident	Blunt Trauma Abdomen by Road Traffic Accident
Date Of Injury	09-04-2018	08-12-2018	07-02-2019	21-03-2019	28-01-2020
Pancreatic Injury	Complete transection of pancreatic body	Body transection	Pancreatic neck laceration	Complete transection in the body of pancreas	Laceration in head of pancreas with large fragment of uncinate process completely separated.
AAST Grading	Grade IV	Grade IV	Grade IV	Grade IV	Grade IV
Associated Injury(S)	Mild hemoperitoneum	1) Fracture right humerus 2) Left auto-nephrectomy 3) Liver laceration	Hemoperitoneum and retroperitoneal hematoma	1) Left renal injury- Grade IV 2) B/L multiple rib fractures 3) Partial collapse of D12 vertebrae along with grade II	Hemoperitoneum

		4) Multiple undisplaced pelvic fractures		retrolisthesis, fractures in posterior elements of D11-D12 vertebrae.	
				4) Fracture in right transverse process of right L1-L2 vertebrae	
				5) Mild effacement of sulcal spaces are seen in left fronto-parietal lobes and frontal horn of bilateral lateral ventricles.	
LIPASE	2322	2000	3504	1896	9514
Pancreatic Complications	Pseudocyst formation after 8 weeks	None	Peri-pancreatic collection then pseudocyst formation in Follow up	Peri-pancreatic collection	1. Peri-pancreatic collection 2. large well defined located hematoma around head of pancreas and the separated fragment causing mass effect over 2nd and 3rd parts of duodenum and displacing the mesenteric vessels anteriorly.
Atlanta Classification Terminology	Pseudocyst in Follow Up	-	Pseudocyst in Follow Up	APFC	APFC
Intervention(S) During Stay	None	Right arm ORIF	Drain insertion in abdomen for collected hemoperitoneum	1. Drain insertion in abdomen 2. Peripancreatic collection aspiration- twice 3. Neurosurgical intervention for spinal fracture and b/l lower limb weakness 4. Feeding Jejunostomy	1. Drain insertion in abdomen due to gastric symptoms. 2. Endoscopic NJ tube insertion
Length Of Stay	8 days	19 days	21 days	40 days	21 days
1ST Follow Up (from day of injury)	15 days	28 days	28 days	-	-
Need For Pancreatic Intervention in Follow Up	Interval Laparoscopic Cystogastrostomy	None	1. USG guided peripancreatic collection aspiration- 08/03/19 2. Endoscopic cysto-duodenostomy	-	Peri-pancreatic collection aspiration under USG guidance (SMS Hospital, Jaipur)
Type of Intervention	Laparoscopic	None	Endoscopic	Open Cystogastrostomy	Percutaneous
LAST Follow Up (from day of injury)	33 months	25 months	24 months	Underwent Open Cystogastrostomy- ultimately died because of multiple associated injuries and poor nutritional status.	12 months

4. Results

Demographics

A total of 5 patients were included in the study, 5/5 (100%) were Male. The mean age was 20.4 years (Range- 15-27 years) and Mechanism of injury was Road Traffic Accident in 5/5 (100%) leading to Blunt Trauma Abdomen (From steering wheel of the car or handle of the motorcycle). 3/5 (60%) patients had isolated Pancreatic injuries, 5/5 (100%)

had Grade IV Injuries according to AAST grading. The mean length of stay was 23.8 days (Range- 8 to 40 days) and Mean Follow-up period was 23.5 months (Range is 12 - 33 months). In the observed data, 2/5 (40%) patients had associated injuries- Renal and Liver Injury in 1 and Renal, Vertebral in the other.

Pancreatic Complications

Pseudocyst formation occurred in 2/5 (40%) patients, 1 underwent Laparoscopic Cysto-Gastrostomy and other Endoscopic Cysto-Duodenostomy. APFC (Acute Peri-Pancreatic Fluid Collection) occurred in 2/5 (40%) patients, 1 of the patients of APFC was managed by aspiration during first hospital stay after 4 weeks of trauma as he developed symptoms like Biliious vomiting, Pain abdomen, Abdominal distention, decreased appetite, Weight loss. Naso-jejunal drainage tube was also put for feeding/nutrition. The other patient with APFC underwent USG guided aspiration (outside MGMCH) after 6 weeks of trauma. He is currently in our follow up and is asymptomatic with no significant fluid collection.

None of the patients in our study have any endocrine or exocrine insufficiency

Mortality

A single patient in our study 1/5 (20%), who suffered from multiple injuries and underwent multiple procedures, first was Endoscopic placement of Naso-Jejunal tube. Second, Percutaneous fluid APFC aspiration. Third, Drain placement for APFC as fluid accumulated within 2 days after percutaneous aspiration. Fourth, Surgical Fixation of spinal injuries and Feeding Jejunostomy and finally Fifth, Open Cysto-gastrostomy (Outside MGMCH). His general condition kept on deteriorating. He lost significant weight, had abdominal symptoms due to the massive abdominal collection. He finally succumbed to his injuries and was the only mortality noted in our study.

5. Discussion

In this study, we managed hemodynamically stable patients with Grade IV or higher pancreatic injuries (AAST Grading) conservatively, thus, preventing Distal pancreatectomy in all 5 patients along with nephrectomy in 2 patients with or without splenectomy. Conservative management is highly recommended for low AAST grades i.e. Grade I and Grade II but this study demonstrates conservative management is effective for high grade pancreatic injuries in only a select group of patients, who are hemodynamically and clinically stable and in whom we can pro-actively wait for pseudocyst formation and then plan for a less invasive and less radical surgical approach. Non-operative management of liver and splenic injuries is the standard of care these days, with provisions of clinical and hemodynamic stability, but conservative management of high grade pancreatic injuries still remain controversial. (28-31)

Pseudocysts formation is the main complication related with Pancreatic Trauma/Acute Traumatic Pancreatitis. The management of pseudocysts is well established and is initially conservative. Sometimes, when their size increases, the cysts can become symptomatic, mainly due to compression of adjacent organs, or can cause occlusion or pain. Medical treatment is efficient in more than half of the patients. However, when required, many further options are available, including percutaneous puncture, or internal drainage by endoscopy. Other major complication in APFC, which can be managed by aspiration of the collection. In our study, 2/5 (40%) patients developed pancreatic pseudocyst,

which is the same incidence as mentioned in recorded literature (2, 32-34), they were managed by endoscopic and laparoscopic techniques and 2/5 (40%) patients had APFC which were managed by percutaneous fluid aspiration.

Other authors report high morbidity and mortality rates with operative management of pancreatic injuries (8). The study by Lin et al reported a complication rate more than 60% in emergency procedures. This rate was just above 20% when the surgery consisted of distalpancreatectomy (35). In our opinion, this is the main argument for attempting primary Conservative Management in hemodynamically and clinically stable patients even with high grade injuries. Indeed, because of the high morbidity rates, even for elective surgery (36), we consider that surgery should be reserved for haemodynamically unstable patients or patients with hollow organ injuries. Even as regards to Length of Stay (LOS), Wood et al reported that though operative management significantly decreased the rate of pseudocysts, it failed to reduce the initial LOS in these patients (37). Conservative Management is usually associated with increased average hospital stay, but in our study it is at par with those in previously described studies i.e. 20 days vs 26 days for Grade IV injury (37).

There are several limitations to our study like the sample size is very small and long term outcomes are not known.

6. Conclusion

We propose a watch and wait (not wait and watch) strategy for high grade pancreatic injuries and surgery should be avoided in hemodynamically and clinically stable patients. This reduces surgery related morbidity and mortality. Pancreatic complications are high in cases with AAST Grade IV injuries. These complications can be managed conservatively in the initial phase and pro-actively wait for pseudocyst formation and then tackling it by less invasive procedures.

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