Annals of Medicine and Medical Sciences (AMMS)
Volume 04, 2025, *Page No.: 501 to 505*
Available at: *http://ammspub.com*

Original Article

OPEN ACCESS

Outcomes in Pancreatic Trauma: A Prospective Study

Javid Iqbal [1], Ab Hamid Wani [1], Bisma Latif [2], Gurbir Singh *[3], Satish Parihar [4]

[1]Assistant Professor, Department of General Surgery, Government Medical College, Jammu & Kashmir, India.
[2]Postgraduate, Department of General Surgery, Government Medical College, Jammu & Kashmir, India.
[3]Assistant Professor, Department of General Surgery, SMVDIME Kakryal, Jammu and Kashmir, India.
[4]Professor, Department of General Surgery, Government Medical College, Jammu & Kashmir, India.

*Corresponding author: Dr Gurbir Singh; *khalsagurbir2510@gmail.com*

Abstract

Background: Pancreatic trauma is a rare but challenging condition due to its retroperitoneal location and nonspecific clinical presentation. This study evaluates the outcomes of pancreatic trauma patients in a tertiary care center. ***Methods:*** A prospective study was conducted on patients diagnosed with pancreatic trauma between January 2019 and April 2025. Data on demographics, injury grading, management strategies, complications, and outcomes were analyzed. ***Results:*** Out of 18 patients with pancreatic trauma, 8 were managed conservatively, while 10 underwent surgical intervention. Morbidity was significantly higher in Grade III and above injuries ($p<0.05$). Mortality was observed in 2 cases, predominantly with associated injuries and delayed diagnosis. ***Conclusion:*** Early recognition and appropriate grading of pancreatic trauma significantly influence outcomes. Surgical intervention is often reserved for higher-grade injuries or those with complications such as ductal disruption or associated organ injury.

Keywords: ***Pancreatic trauma, Road traffic accident, Non-operative management, High grade injury.***

Introduction

Pancreatic trauma represents a rare but serious clinical entity, accounting for approximately 0.2% to 6% of all abdominal injuries and around 3% to 12% of all blunt abdominal traumas [1]. Due to the pancreas' retroperitoneal location, the clinical signs of injury are often subtle or delayed, making timely diagnosis and intervention a significant challenge. Injuries to the pancreas are frequently associated with trauma to adjacent organs such as the duodenum, liver, spleen, and major vasculature, further complicating clinical decision-making and management [2]. Mechanisms of injury can vary significantly, with motor vehicle accidents being the most common cause of blunt trauma and stab wounds or gunshot injuries representing the primary causes of penetrating trauma. The American Association for the Surgery of Trauma (AAST) grading system offers a standardized framework for categorizing the severity of pancreatic injury, ranging from minor contusions or superficial lacerations (Grade I-II) to major disruptions involving the pancreatic duct or head of the pancreas (Grades III-V) [3]. Management strategies have evolved over recent decades. Non-operative management is now commonly employed in low-grade injuries, especially in hemodynamically stable patients without evidence of ductal injury or ongoing hemorrhage [4]. Conversely, high-grade injuries may necessitate surgical interventions, including drainage, distal pancreatectomy, or pancreaticoduodenectomy in select cases [5]. Given the relative rarity of pancreatic trauma, most published data come from retrospective analyses and trauma registries, leading to a limited consensus on optimal treatment protocols. Moreover, outcomes are influenced not only by the severity of pancreatic injury but also by associated injuries, time to diagnosis, and institutional expertise [6].

This study aims to evaluate the outcomes of patients with pancreatic trauma in a tertiary health care setting, analyze the relationship between injury severity and clinical course, and identify predictors of morbidity and mortality.

Methods

This prospective study was conducted at Government Medical College, Jammu, a tertiary care center from January 2019 to April 2025. Institutional ethical clearance was obtained.

Sample size: 18 patients
Design: Prospective study.

Inclusion criteria: All patients admitted with pancreatic trauma during the study period were included.

Exclusion criteria:

1. Patients with non-traumatic pancreatic injuries/ pancreatitis were excluded.
2. Trauma patients without pancreatic injury.

Data collected included demographics, mechanism of injury, AAST injury grade, management approach (operative vs. non-operative), complications, length of hospital stay, and mortality. Sample size calculated by taking incidence of pancreatic trauma with 95% confidence level and 5% margin of error. Frequency and percentage of age, gender, and grades of injury were calculated. Statistical analysis was performed using SPSS version 25, with $p<0.05$ considered statistically significant.

Received: May 09, 2025; **Revised:** June 22, 2025; **Accepted:** June 25, 2025

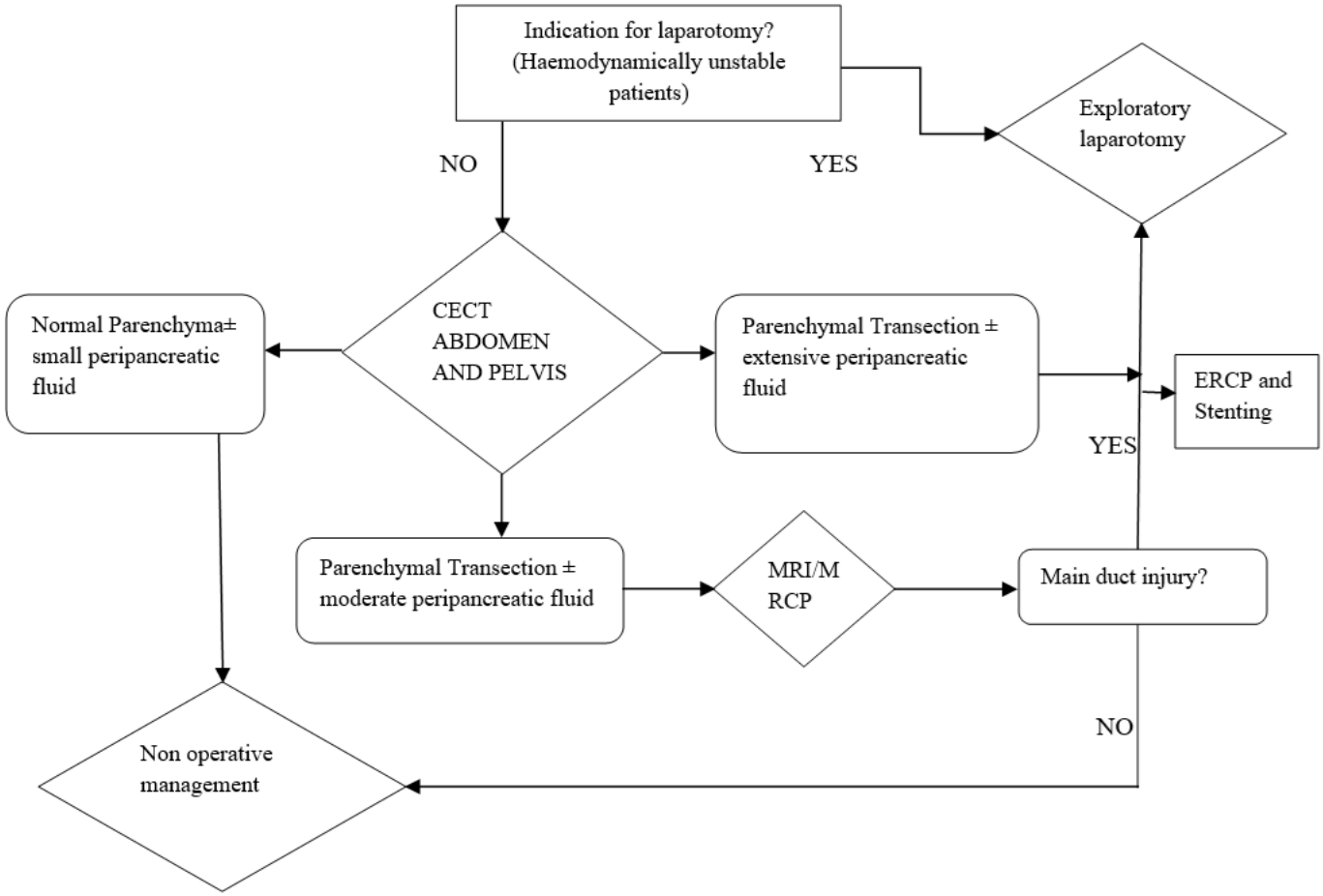


Figure I: Management algorithm in patients with pancreatic trauma.

Results

A total of 18 patients were identified. The mean age was 53.79± 15.87years, with a male predominance (66.66%) (**Table I**). Blunt trauma (e.g., road traffic accidents) was the most common mechanism of injury (72.2%) in patients with pancreatic trauma (**Table II**). Most of the patients had low grade Injury with grade I-II in 12 patients (66.66%) and grade III-V: 6 patients (33.33%) (**Table III**). Pancreatic trauma was most common in young patients constituting about 44.44 percent in age group of 21- 30 years. Management of patients with pancreatic injury depends on the type of injury, grade of injury and haemodynamic status of the patients. Patients with grade I injury, 3 patients were managed nonoperatively while 1 patient underwent surgical intervention. In patients with grade II injury, 5 patients were managed nonoperatively, while 3 patients underwent surgical intervention. Conservative management (NPO, IV fluids, antibiotics, and serial monitoring) was applied in 8 patients (44.44%), primarily Grades I-II. Surgical intervention (distal pancreatectomy, drainage, or debridement, splenectomy) was performed in 4 patients. Patients with grade III-V injury, all were managed by surgical intervention (**Table IV**). Complications occurred in 6 patients (33.33%), including pancreatic pseudocyst, pancreatic ascitis and sepsis. Mortality was 11% (2 patients), primarily in Grades IV-V injuries and those with delayed diagnosis beyond 24 hours (**Table V**).

Table I: Age and gender-based distribution of patients with pancreatic trauma.

Age group (in years)	Gender		No. of patients	Percentage (%)
	Male	Female		
0-10	2	0	2	11.11
11-20	2	1	3	16.66
21-30	6	2	8	44.44
31-50	1	2	3	16.66
51-70	1	1	2	11.11
Total	12	6	18	100

Mean:53.79, SD: 15.87.

Table II: Distribution on the basis of mode of injury.

Mode of trauma	No. of patients	Percentage (%)
RTA/BTA	13	72.22
Bicycle handle injury	2	11.11
Bull gore injury	1	5.55
Penetrating injury	1	5.55

Assault	1	5.55
Total	18	100

RTA: Road Traffic Accident, BTA: Blunt Trauma Abdomen.

Table III: Grades of injury in patients with pancreatic trauma.

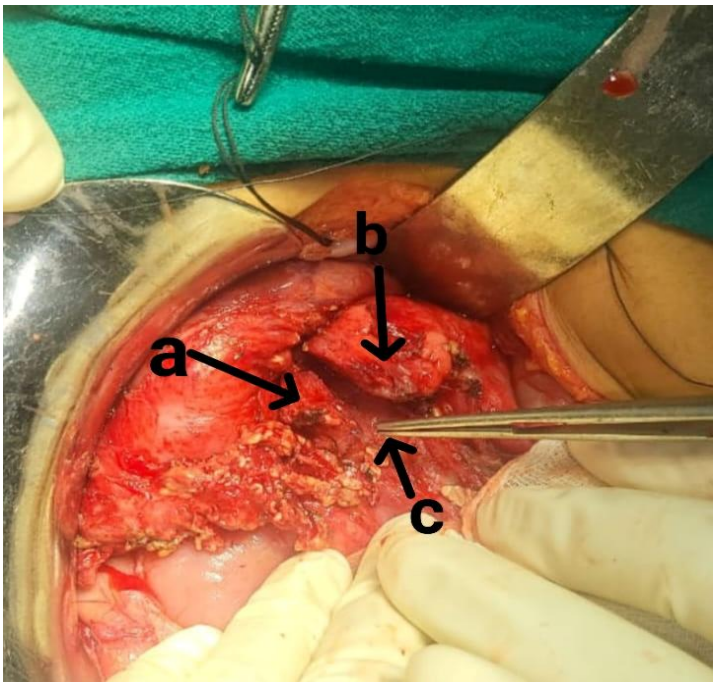
Grade	No. of patients	Percentage (%)
Grade 1	4	22.22
Grade 2	8	44.44
Grade 3	2	11.11
Grade 4	2	11.11
Grade 5	2	11.11
Total	18	100

Table IV: Management of patients with pancreatic trauma.

Grade of trauma	Management	Number of patients
Grade I	Splenectomy + lesser sac drainage.	1
	Non-operative management.	3
Grade II	Hepatorraphy + Debridement of pancreatic head + lesser sac drainage (LSD).	1
	Duodenal Repair+ Debridement of pancreatic head + Pyloric exclusion+GJ+ LSD.	1
	Repair of Gastric perforation + TG+ LSD +PL +PD.	1
	Non operative management.	5
Grade III	Distal pancreatectomy + Splenectomy + PL +PD.	1
	Distal pancreatectomy + Splenectomy + ICTD + PL +PD.	1
Grade IV	Debridement + Closure of proximal pancreatic duct + Roux- en- Y PJ for distal pancreas.	1
	Debridement + Closure of proximal pancreatic duct + omentopexy + Roux- en- Y PJ for distal pancreas.	1
Grade V	Pancreaticoduodenectomy (Whipple's procedure) +FJ.	1
	Hepatoraphy + Pancreaticoduodenectomy (Whipple's procedure) + FJ.	1

Table V: Complications in patients with pancreatic trauma and their management.

Grade of trauma	Major Complications	Number of patients	Management
Grade 1	None	-	-
Grade 2	Pancreatic Pseudocyst	2	Cystogastrostomy
	Pancreatic ascites	1	ERCP and Pancreatic stenting.
	MODS	2	
Grade 3	None	-	-
Grade 4	None	-	-
Grade 5	Colonic gangrene	1	Re-exploration



Picture 1: Pancreatic Neck Dissection

Discussion

The results of this study reinforce the well-established principle that the severity of pancreatic injury, particularly ductal involvement, plays a pivotal role in determining both the management strategy and the clinical outcome. Low-grade injuries (AAST Grades I-II) without pancreatic ductal disruption generally have a favorable prognosis and can be successfully managed with supportive care and close observation, as seen in our cohort [4]. Our findings are consistent with previous studies that suggest non-operative management is safe and effective in selected patients [7]. High-grade injuries, particularly Grades III-V, are significantly associated with increased morbidity and mortality. In our series, patients with ductal injuries and complex trauma patterns experienced longer hospital stays, higher rates of complications, and increased mortality. These findings echo those of Akhrass et al. and Krige et al., who reported that ductal involvement is a critical determinant of outcome [5,8]. One of the key challenges in pancreatic trauma is timely and accurate diagnosis. Patients with delayed diagnosis (more than 24 hours post-injury) had notably higher rates of sepsis, organ failure, and mortality. The retroperitoneal location of the pancreas allows injuries to remain occult on initial imaging or physical examination, particularly in polytrauma scenarios where more obvious injuries may distract clinical attention [6]. Advanced imaging modalities such as contrast-enhanced CT and MRCP, as well as serum amylase/lipase levels, can aid diagnosis but are not always definitive in the acute setting [9]. The treatment should primarily commence with non-operative and supportive management for grade I-II injuries. Only for grade III-V injuries, resection is considered rather than non-operative management [10]. The choice of operative technique depends on the anatomical location of the injury. Distal pancreatectomy was effective in injuries involving the body and tail, whereas proximal or head injuries posed greater complexity. These often-required drainage, reconstruction, or even pancreaticoduodenectomy, which carries substantial risk and should be reserved for patients with non-salvageable injuries or associated vascular damage [11]. In our study, patients who had low grade pancreatic injury (grade I and II) were managed by non-operative management (66.66 percent). Patients who underwent surgical management in this group were having associated splenic, hepatic and gastric injury for which intervention was done. These findings are similar to findings in the literature which show low morbidity and mortalilty in patients with low grade injuries without involvement of other associated organ injuries [12-14]. The patients who had high grade injury(grade III-V), all underwent surgical management. Distal pancreatectomy with splenectomy was done in two patients with grade III injury, closure of proximal pancreatic duct with Roux-en-Y PJ for distal pancreas in two patients with grade IV injury, and pancreaticoduodenectomy was performed in two patients with grade V injury. Similar surgical approach was documented by different authors in the literature [11-13]. The mortality rates are higher in patients with operative management for pancreatic injury, not necessarily due to pancreatic injury, but because of associated other injuries which had deleterious effect on the outcome of the patients. Our findings also underscore the importance of a multidisciplinary approach in managing pancreatic trauma. Collaboration between trauma surgeons, gastrointestinal surgeons, interventional radiologists, and intensive care specialists is essential for optimizing outcomes. Moreover, patients with high-grade injuries benefit from postoperative monitoring for late complications such as pancreatic pseudocyst, fistula, and abscess, all of which require tailored intervention strategies. While our study provides valuable insights, it is not without limitations. Being a single-center study, it may be subject to selection bias and limited generalizability. Additionally, variations in clinical judgment and treatment protocols over the +5-year period could influence outcomes. Nonetheless, the study highlights key prognostic factors and reinforces the need for timely, grade-based, and individualized management.

Conclusion

Pancreatic trauma, though rare, can have significant morbidity and mortality if not managed promptly. Early detection, accurate grading, and individualized management strategies are the key to improving outcomes. Surgical intervention should be considered in high-grade injuries or when conservative management fails.

Declarations

Ethical Approval

The study was approved by the Institutional Ethics Committee.

Conflict of Interest

None

Consent of Patients

All appropriate consent on patients consent form has been obtained by the authors.

Funding

None

Abbreviations

AAST: The American Association for the Surgery of Trauma
RTA: Road Traffic Accident
BTA: Blunt Trauma Abdomen
LSD: Lesser Sac Drainage
GJ: Gastrojejunostomy
PL: Peritoneal lavage
PD: Peritoneal Drainage
ICTD: Intercostal Chest Tube Drainage
PJ: Pancreatojejunostomy
FJ: Feeding Jejunostomy
MODS: Mutli Organ Dysfunction Syndrome
TG: ERCP: Endoscopic Retrograde cholangiopancreatography

References

[1] Jurkovich GJ, Carrico CJ. Pancreatic trauma. Surg Clin North Am. 1990 Jun;70(3):575-93.
[2] Phelan HA, Velmahos GC, Jurkovich GJ. Management of pancreatic trauma. Am Surg. 2009 Jul;75(7):628-35.
[3] Moore EE, Cogbill TH, Malangoni MA, Jurkovich GJ, Champion HR, Hirshberg A. Organ injury scaling: Spleen and liver (1994 revision). J Trauma. 1995 Mar;38(3):323-4.
[4] Akhrass R, Yaffe MB, Brandt CP, Reigle M, Fallon WF, Malangoni MA. Pancreatic trauma: a ten-year multi-institutional experience. Am Surg. 1997 Jul;63(7):598-604.
[5] Bradley EL 3rd. Operative management of pancreatic trauma. Am J Surg. 1985 Dec;150(6):726-8.

[6] Gupta A, Stuhlfaut JW, Fleming KW, Lucey BC, Soto JA. Blunt trauma of the pancreas and biliary tract: A multimodality imaging approach to diagnosis. Radiographics. 2004 Sep-Oct;24(5):1381-95.

[7] Patton JH Jr, Lyden SP, Croce MA, Pritchard FE, Minard G, Kudsk KA, et al. Pancreatic trauma: A simplified management guideline. J Trauma. 1997 Mar;42(3):582-6.

[8] Krige JE, Nicol AJ, Navsaria PH. Emergency pancreatectomy for complex pancreatic trauma. Arch Surg. 2009 Aug;144(8):745-51.

[9] Heitsch RC, Knutson CO, Fulton RL, Jones CE. Delineation of critical factors in the treatment of pancreatic trauma. Surgery. 1976 Dec;80(6):523-9.

[10] Soreide K, Weiser TG, Parks RW. Clinical update on management of pancreatic trauma. HPB 2018, 20:1099-1108.

[11] Degiannis E, Boffard K, Du Toit DF, Van Der Merwe R. Pancreatic trauma: A management guideline based on a review of 147 consecutive patients. Injury. 1996 Oct;27(8):543-7.

[12] Kaman L, Iqbal J, Pall M, Bhukal I, Behera A, Singh G, et al. Current management of pancreatic trauma. Tropical Gastrenterology. 2012 Jun;33(2): 200-6.

[13] Sharpe JP, Magnotti LJ, Weinberg JA, Zarzaur BL, Stickley SM, Scott SE, et al. Impact of a defined management algorithm on outcome after trauamatic pancreatic injury. J Trauma Acute Care Surg. 2012,72: 100-5.

[14] Menahem B, Lim C, Lahat E, Salloum C, Osseis M, Lacaze L, et al. Conservative and surgical management of pancreatic trauma in adult patients. Hepatobiliary Surg Nutr. 2016;5(6): 470-7.