

**Original Research Article**

# **Role of Therapeutic endoscopy vs surgery in the management of traumatic pancreatic injury - A tertiary referral center experience**

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## Abstract

**Background:** Pancreatic injury remains a complicated condition requiring an individualized case by case approach to management. In this study, we aim to analyze the varied presentations and treatment outcomes of traumatic pancreatic injury in a tertiary care center.

**Materials and methods:** All consecutive patients hospitalized at our center with traumatic pancreatic injury between 2013 and 2017 were included. The American Association for Surgery of Trauma (AAST) classification was used to stratify patients into five grades of severity. Outcome parameters were then analyzed based on the treatment modality employed.

**Results:** Of the 35 patients analyzed, 26 had an underlying blunt trauma with the remaining 9 presenting due to penetrating injury. Overall in-hospital mortality was 28%. 19 of these patients underwent exploratory laparotomy with the remaining 16 managed non-operatively. 9 patients had severe injury (>grade 3) – of which 4 underwent endotherapy, 3 had stents placed and one underwent an endoscopic pseudocyst drainage. Among those managed non-operatively, 3 underwent a radiological drainage procedure.

**Conclusion:** Mortality rates were clearly higher in patients managed operatively. This is likely a result of significantly higher degrees of major associated non-pancreatic injuries and not just a reflection of surgical morbidity. Despite this, surgical management remains the mainstay of therapy, especially in higher grades of pancreatic injury. However we would like to emphasize that endoscopic intervention definitely remains the preferred treatment modality when the clinical setting permits. This is especially applicable in cases of main pancreatic duct injury with ascites as well as pseudocysts.

## Key words

Traumatic Pancreatic injury, Surgery, Endotherapy, Non-operative management.

## Introduction

The retroperitoneal location and close proximity to numerous vascular, GI structures explains the complexity and severity of pancreatic trauma. These injuries remain difficult to diagnose and require a high index of suspicion when approaching cases of abdominal trauma. The acceleration–deceleration nature of blunt trauma causes the pancreas to be crushed against the first and second lumbar vertebrae. The body of the pancreas is most commonly injured in blunt trauma. Penetrating trauma (e.g. stab wound or gunshot wound) is rising in incidence and accounts for 70% of all traumatic pancreas injuries. Role of endotherapy in selected patient with pancreatic duct injury need to be considered in situation like pancreatic ascities, pseudocyst and pancreaticopleural fistula. Damage to the main pancreatic duct occurs in 15% of cases and is crucial to ascertain before or during laparotomy as it necessitates avoiding major

pancreatic reconstruction to reduce morbidity and mortality

## Materials and methods

All patients hospitalized for abdominal trauma with pancreatic injury at Madras Medical College were identified from the hospital registry between 2013 and 2017.

Data analysed included the total no of patients, primary as well as associated diagnoses, patient demographics, classification of pancreatic injury, type of management (Conservative vs operative) and outcomes.

**American Association for Surgery of Trauma (AAST) - Classification of traumatic injury of the pancreas**

**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

Predominantly descriptive statistics were used in view of the non-homogenous nature of the patient population. Qualitative variables were expressed as a percentage while the Mean $\pm$ standard deviation was used for the quantitative ones.

## Results

**Chart - 1** represents a total of 35 patients analyzed. The majority of them were male (74%) and the average age was 35 $\pm$ 18 years (10–70 years).

**Chart - 2** depicts the mechanism of abdominal trauma with a majority 26 (74%) being a result of blunt trauma.

**Chart - 3** depicts the extent of severity of pancreatic injury in the study population as

classified by the AAST. Class I, II, III clearly predominate accounting for 93% of patients.

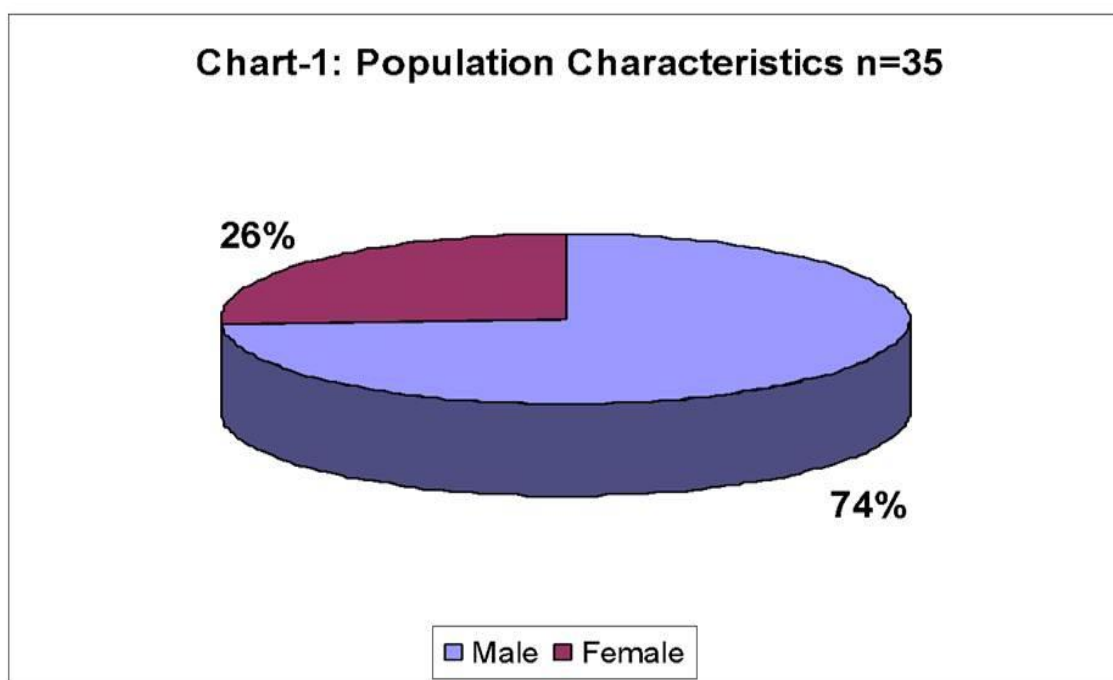
### Characteristics of patients who underwent exploratory laparotomy (n=19) in our study

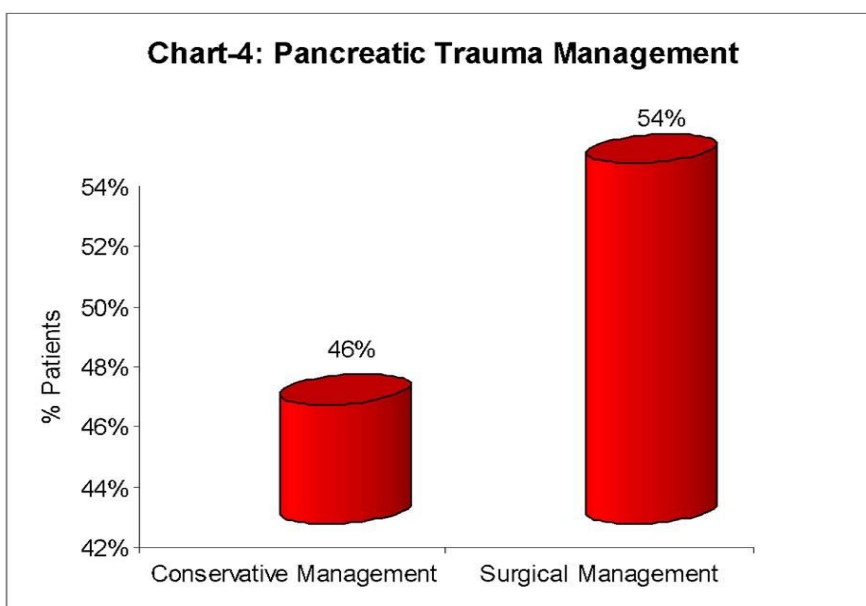
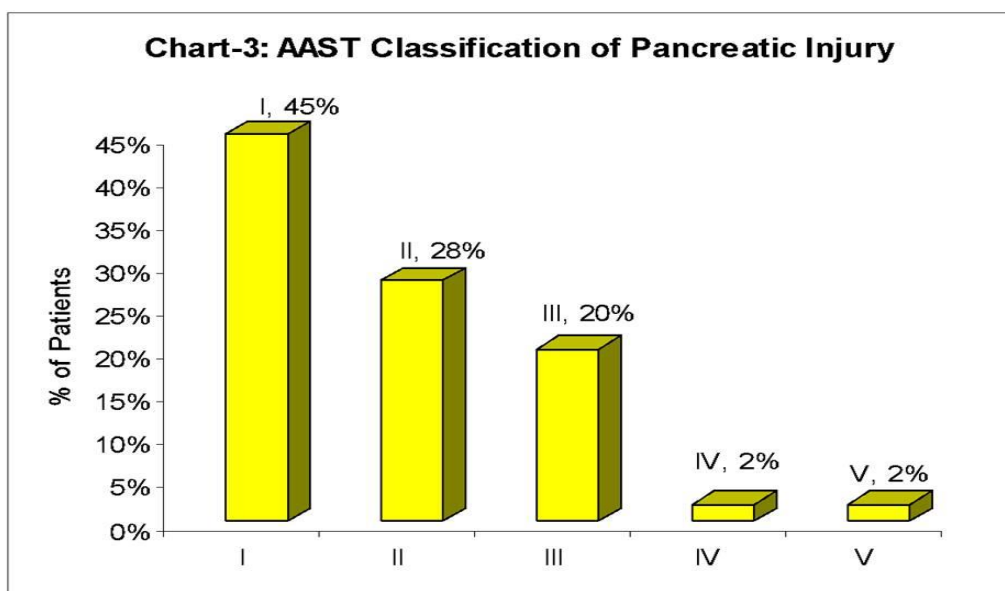
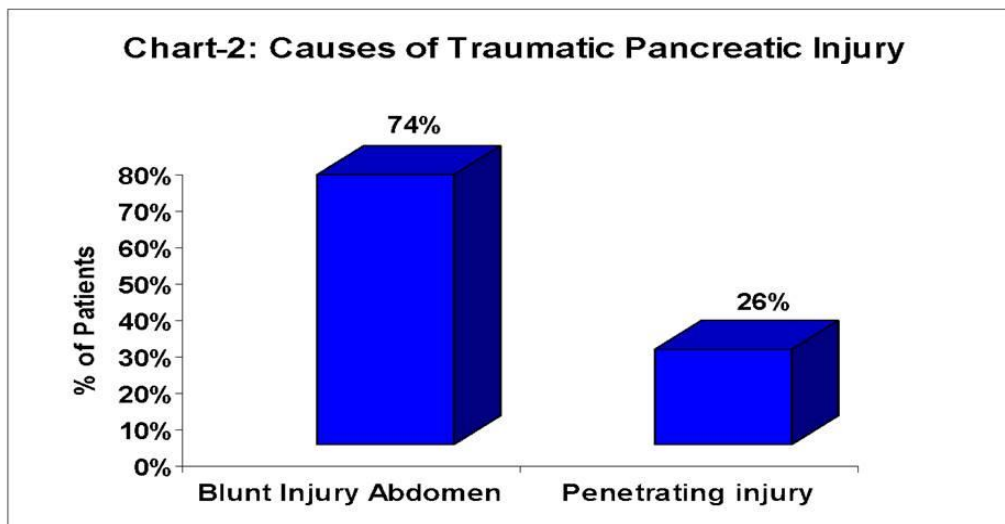
10 patients were diagnosed with pancreatic injury during exploratory laparotomy. Preoperative CT scan yielded the diagnosis of pancreatic duct injury in the remaining 9 patients. Among this group, 3 patients underwent a distal pancreatectomy with splenectomy and one underwent a pancreaticoduodenectomy

### Characteristics of patients who underwent non-operative management (NOM) (n=16) in our study

Of the 16 patients managed Non-operatively, 4 underwent endotherapy (3 stent placements and 1 endoscopic pseudocyst drainage). 3 patients underwent a radiological drainage procedure and the remaining 9 were managed conservatively.

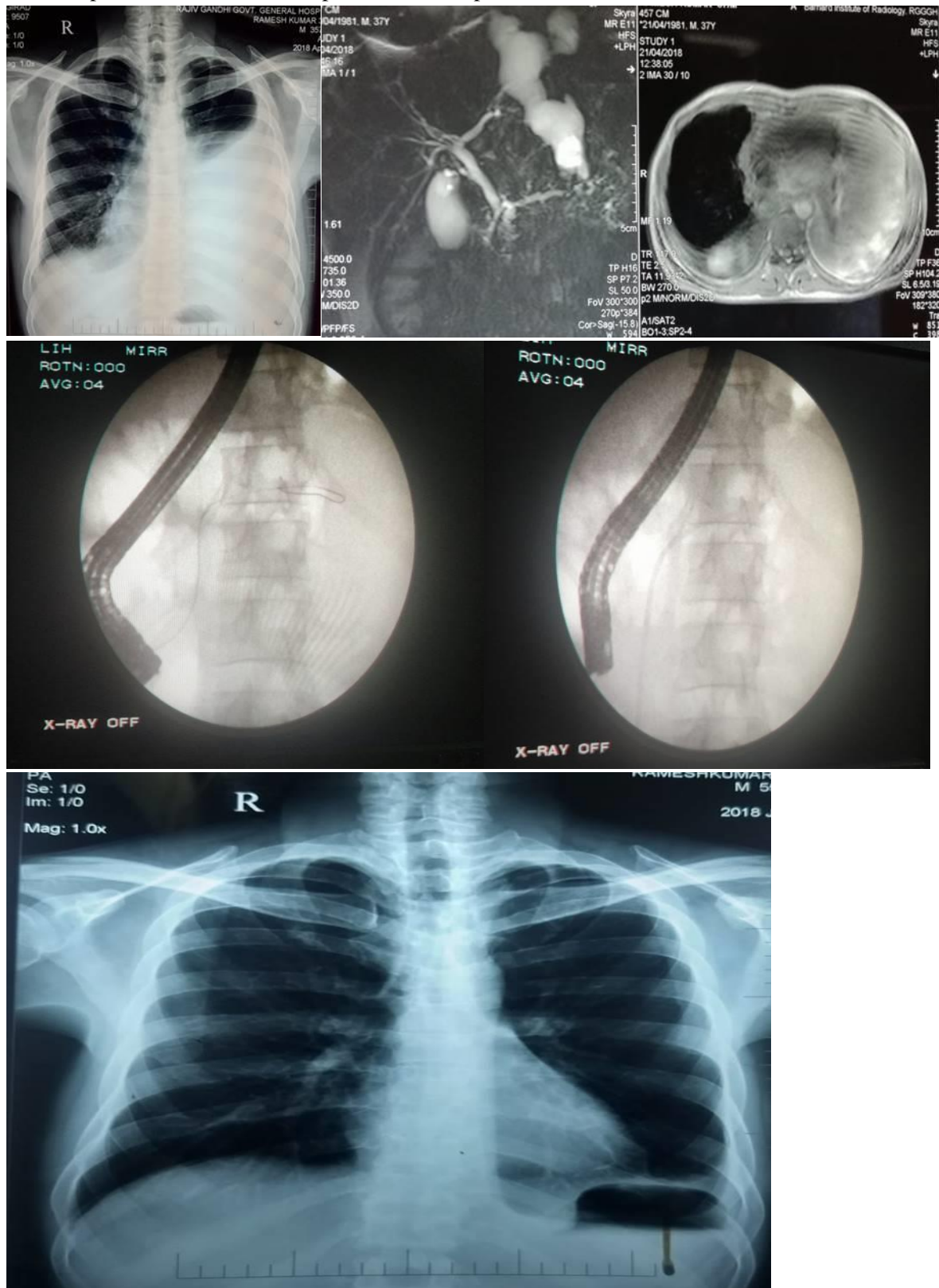
Images of traumatic pancreatitis case from admission to follow up were as per **Photo – 1 to 5**.





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**Photo – 1 to 5:** First X-ray of patient with traumatic left sided pleural effusion. Second, Third image of same patient MRCP showing Left sided pleural effusion with leak of pancreatic duct at tail. Fourth image of same patient following placement of guide wire across the pancreatic duct. Fluoroscopic image showing straight pancreatic stent into tail of pancreatic duct. Last image X-ray of same patient Follow up of after two months of pancreatic stent placement



## **Discussion**

Our retrospective analytical study data revealed the prevalence of pancreatic trauma to be 8% of all abdominal traumas, with an overall mortality of 28%. Motor vehicle accidents were by far the most common etiology and the mechanism was blunt abdominal trauma in 74% of patients. This differed from the data from the United States where penetrating trauma (knives and firearms) predominated [1, 3]. The main causes of pancreatic trauma in this series were motor vehicle accident and stab wounds, unlike data from the United States where the main cause of pancreatic trauma is penetrating (firearms and knives) [1, 3].

For non-operative arm, four patients underwent endotherapy, three patients had a stent placement in the pancreatic duct and one patient underwent endoscopic drainage of a pancreatic pseudocyst.

Endotherapy place major role in managing pancreatic duct injury with Ascites, Pancreatic pleural effusion and pancreaticopleural fistula in greater extent. It can avoid Major surgery, Reduce Morbidity and Mortality in some extent.

The decision to perform a pancreatectomy in the setting of trauma remains controversial. For pancreatic injury grades 1 and 2 – conservative/nonoperative management appears to be most effective, as long as the main pancreatic duct is uninjured. This mode of management is associated with morbidity below 20% and very low mortality rates [4].

Distal pancreatectomy or surgical drainage appears to be the modalities of choice for grade 3 and 4 pancreatic injury [1-7]. For pancreatic injury grade 5 several treatment options exist right from NOM to surgical drainage and even pancreaticoduodenotomy.

## **Conclusion**

Despite the small sample size and retrospective nature of the study, we believe that operative management of patients with pancreatic trauma is associated with worse outcomes.

This conclusion is not necessarily related to purely procedural or pancreas related factors and it is very likely that the high incidence of severe associated injuries contribute in large part to the worse outcomes in this subgroup.

We therefore strongly recommend that Non-operative management and Endotherapy always be considered when appropriate prior to attempting surgical intervention.

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