

## Evaluate the Outcome of Step-Up Management in Severe Acute Pancreatitis

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### Abstract

**Background:** The incidence of acute pancreatitis is increasing globally leading to tremendous economical, physical, and psychological burden. It has a wide clinical spectrum from mild to severe form. Early identification of severe form is one of the major challenges in managing severe acute pancreatitis, as it is associated with worsening of organ failure. Different prognostic indicators have been followed to predict the severity of SAP. Infection of the pancreatic and extra pancreatic necrosis occurs in about 20–40% of patients with severe acute pancreatitis and is associated with high mortality rate. Many trials and studies have been conducted for studying the management modalities of SAP to reduce morbidity and mortality. Over the past decade, new developments in etiology, diagnosis, classification, and management have been made. The second common cause is excessive alcohol consumption (25% cases). But nowadays alcohol-induced pancreatitis is increasing and is usually associated with heavy alcohol consumption exceeding 50g/day.

**Aim:** The aim of the present study is to Evaluate the Outcome of Step-up Management in Severe Acute Pancreatitis an Observational Study. To study complications of severe acute pancreatitis.

**Material and Method:** Prospective observational study of 47 patients admitted with severe Acute Pancreatitis was done in the Department of Surgery. The clinical course, complications and their management by step up approach and outcome has been analyzed in our study. The most common age group affected in my study population is 31 to 40 years with mean age of 38 years. Most common etiology in our study is alcohol, followed by Idiopathic and Gallstone, the other rare causes are Hypertriglyceridemia, Drug induced. Patients with local complications were 33, 3 patients had pseudocyst and 30 patients had necrotizing pancreatitis, 14 patients had Fluid collection and the rest 6 had interstitial pancreatitis. All patients were managed by step up approach. All patients were managed conservatively first, and with intervention like Percutaneous drainage, EUS, Necrosectomy.

**Results:** Patients with organ failure at the time of admission was. There is a significant relation between organ failure at the time of admission and length of hospital and ICU stay (thrice more) and Mortality. Patients presenting with organ failure at the time of admission had 43% mortality. Patients with Retrocolic, Epigastric and subhepatic collection had longer hospital and ICU stay. Patients with more Intrapancreatic collection has more morbidity. There is significant correlation between the size of collection and Hospital stay, Intervention. Larger the size, longer the stay. Patients with organ failure at the time of admission, longer ICU stay, larger intrapancreatic collection had high mortality.

**Conclusion:** Pancreatitis due to alcohol is increasing gradually due to heavy consumption. Organ failure at the time of admission is one the important factors that helps in deciding prognosis of the patient. The number, site and size of pancreatic and Extra-pancreatic

collection has significant effect on variable like length of hospital stay, ICU stay, Intervention to be taken and finally the mortality of the patient. Thus, step up management has effective role in reducing the mortality.

**Keywords:** Acute Pancreatitis, gastrointestinal tract, Systemic Inflammatory Response, Organ Failure, Cholecystectomy

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## Introduction

Acute Pancreatitis is the most common condition of the gastrointestinal tract requiring emergency hospitalization. Incidence of acute pancreatitis is increasing all over the world with the highest being in the USA of about 5 to 8 per 100000 population. [1,2] Over a period of time, the case fatality rate has decreased but the overall mortality rate is the same, that is 1 in 100000, ranking 9th most common cause of noncancerous Gastrointestinal death. [2] Acute Pancreatitis (AP) is defined as acute inflammation of the pancreas. The most common cause of AP is gall stone, followed by alcohol. According to Revised Atlanta Criteria of 2012, AP is classified into mild, moderately severe, and severe acute pancreatitis. About 80% cases have mild disease with uneventful recovery and mortality of 2-5 %. 15 to 20% cases progress to Severe Acute Pancreatitis (SAP), with a mortality of 8 to 35% [1,2]. The most common cause of death in SAP in the early stages (i.e < 1week) is Systemic Inflammatory Response Syndrome and Organ Failure. [2] This marks the importance of predicting SAP in the early stages. But there are limited accurate laboratory or radiological tools available in clinical practice. In late stages (i.e > 1week) mortality is due to local complications (pancreatic necrosis being most common) and sepsis. [2,4] Extra pancreatic necrosis is also a form of necrotizing pancreatitis and has a significant influence on the morbidity and mortality of the patient. [2,3,4] The traditional method of management of SAP

by open necrosectomy has a high rate of complications (34 to 95%) and death (11-39%). [4] Alternatively, the current step-up management of SAP with a minimally invasive approach aims to control and remove the infective foci, which prevents organ failure and has better survival rate. [2,3,5]

AP is caused primarily by gall stones in 40-70% cases. [3] Cholecystectomy for gall stone-induced pancreatitis prevents recurrent pancreatitis and its complications. [2, 6,7] The second common cause is excessive alcohol consumption (25% cases). But nowadays alcohol-induced pancreatitis is increasing and is usually associated with heavy alcohol consumption exceeding 50g/day. [2,3] Other causes include idiopathic, hypertriglyceridemia (>1000mg/dl of serum triglycerides), pancreatic tumors in patients more than 40 years, post ERCP pancreatitis, anatomical and physiological abnormalities like pancreatic divisum, annular pancreas, and Sphincter of Oddi dysfunction. Moreover, drugs like 6-mercaptopurine, azathioprine, dideoxyinosine [8] can also cause AP. It is the collection of the necrotic material in different pockets of the abdomen like lesser sac, right and left paracolic gutter, anterior and posterior pararenal spaces, epigastric, mesenteric collection, pelvic collection. Studies are under trial regarding the influence of site, size, the volume of extra pancreatic necrotic collection on the outcome of the patient

with regards to prognosis, ICU stay, and mortality. [9]

The traditional management of infected necrosis is open surgical debridement and peritoneal lavage, usually requiring multiple operative sessions. Complications of early surgical intervention are post-surgery stress, new onset organ failure, long hospital stay, surgical site infection, hemorrhage, perforation, and delayed complications like pancreatic fistula, diabetes, incisional hernia. Mortality was noted up to 40 to 65 % after early operative intervention. [2,10,11] However, these un-favorable outcomes have driven the clinicians towards prolonged conservative management and delayed surgical intervention. The Dutch PANTER trial (2010) showed that the step-up management with minimal invasive approach has reduced the above complications to great extent and also reduced the mortality. This is followed by many studies like PENGUIN trial and TENSION trial. [12] where the outcome of various minimal invasive technique like PCD, VARD and endoscopic necrosectomy were compared. Thus, over the past decade the management of SAP has evolved substantially to minimal invasive approach and evacuation of necrosis to obtain optimal outcome. [2,10] The association of site, size and volume of extra pancreatic necrotic collection on the outcome of the patient with severe acute pancreatitis is still being studied. [13]

### Material and Methods

This study was conducted on inpatients diagnosed and admitted with Severe Acute Pancreatitis in a tertiary care Hospital. This was a primary research, study design was observational study and sample was collected by non-probability sampling method of convenient sampling. Sample size was decided to be 50 which was calculated based on the prevalence of Severe Acute Pancreatitis admissions to the Hospital

### Inclusion criteria:

Patients diagnosed and admitted with severe acute pancreatitis in the age group of 10 to 80 years. The diagnosis of severe AP was done based on the presence of 2 of the following criteria.

1. Consistent pain abdomen in the epigastric and left hypochondrium, at times radiating to the flank and back.
2. Serum Amylase and Lipase values are three times more than the normal value.
3. Characteristic findings in the Radiological imaging, USG.

### Exclusion criteria:

1. Patients with chronic pancreatitis.
2. Patients with pancreatic malignancies.
3. Patients who underwent previous abdominal surgeries for the pancreas.

Standard of care was established for all patients and among them those who were willing, an informed written consent was taken both from the patients and their first-degree relatives. Each patient involved in this study was interrogated in detail for present and past clinical history. A detailed clinical examination, necessary investigations were undertaken. The results of the above, progress of the disease, complications, operations undertaken and the outcome was recorded in the prescribed pro forma.

- **Clinical History:** included history suggestive of acute pancreatitis viz. constant pain abdomen, nausea/vomiting, history of gall stone disease, alcohol intake, trauma, drugs, infections, endoscopic intervention.
- **Blood Sampling:** Hemogram, liver and renal function tests, serum amylase, lipase.
- **Radiological:** Plain radiographs of the abdomen and chest were done. The findings only suggestive of acute pancreatitis include localized ileus, diffuse haziness, pleural effusion, basal atelectasis, or ARDS in severe cases.

Computed Tomography of the abdomen was done in every patient with acute pancreatitis after 3 to 5 days from the onset of the pain. Both plain and contrast enhanced CT scan was done. The axial cuts of the abdomen were taken from the diaphragm domes through to the pubic symphysis using 10mm, 5mm cuts. CT scan films were examined for the presence of the following findings.

- Enlargement of the pancreas
- Irregularity of pancreatic contour
- Condition of peripancreatic fat planes
- Site and number of fluid collections
- Presence of necrosis and extent of necrosis and Extra pancreatic necrosis.

The patient presenting with constant pain abdomen was evaluated and diagnosed as SAP based on Atlanta criteria. The hemodynamic stability and presence of SIRS is assessed at the time of presentation and admitted in ICU (if required). Aggressive fluid resuscitation

and pain management is done within first 48 hours of the admission. Patients with symptomatic improvement are started on oral feeding as soon as the nausea subsides within first 24 hours. There is no role of prophylactic antibiotics in the 1st week of admission. In the absence of improvement by the end of 1<sup>st</sup> week, contrast CT or MRI is done for detecting the presence of pancreatic or extra-pancreatic collection. Patient is evaluated for the progression or regression of SIRS and presence of infection. In patients with infected necrosis Antibiotics are administered based on the culture report. Oral / enteral nutrition initiated at the earliest (24 to 48 hours) to reduce the complications. If the patient improves, then conservative management with antibiotics, analgesics and nutrition is continued and discharged. If the patient deteriorates further, then drainage of the infective foci is done.

**Result:** -

**Table 1: The association between number of collections and length of hospital and ICU stay.**

	No. of locules of collection									
	0		1		2		3		4	
	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD	Mean ±SD
<b>Hospital stays</b>	8	5	12	10	22	9	28	37	17	6
<b>ICU days</b>	3	5	6	8	10	10	8	10	15	5

All patients were managed conservatively initially followed by intervention procedures like percutaneous drainage in 25 patients, Endoscopic ultrasound guided cysto-gastrostomy in 3 patients and

Necrosectomy in 1 patient. This means that as per our study, as the number of collections increases, the necessity for intervention increases. A statistically significant.

**Table 2: Represents the association between duration of hospital stay, ICU stay with size of necrotic collection**

	Size of collection									
	Nil		Less than 5 ml		Between 5.1 to 10 ml		Between 10.1 to 15 ml		More than 15 ml	
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD
<b>Hospital stays</b>	7	5	6	1	13	7	24	21	19	10
<b>ICU days</b>	3	4	2	2	9	6	10	10	9	11

The mean duration of hospital stay for no collection is 9 days, < 5cm mean is

8 days, 5-10cm is 16 days, 10-15cm is 27days, > 15cm is 24 days. In our

study, as the size of the collection increases, duration of hospital stays increases.

### Discussion

A total of 50 patients admitted with severe acute pancreatitis were enrolled in the study. On the contrary to other studies in literature, our study finds alcohol as the most common etiological factor seen in 54.7% of our study population. Second common cause with 21.1% is idiopathic, and third commonest cause being gall stone induced pancreatitis.

On contrary to study conducted by Gupta P et al. 2019 [14] in which the most common site was lesser sac, the most common site of collection in our study was Retro colic 26.3%, 2nd most common pararenal in 21.1%, 3rd most common being lesser sac in 19.3%, followed by Intrapancreatic in 14%, epigastric in 10.5%, psoas collection in 8.8%, and sub hepatic in 1.8%. Among them each site of collection was individually analysed for the variables like duration of hospital stay, ICU stay, Intervention and mortality. [14]

Patients with intra pancreatic collection had high mortality. Based on site of collection and intervention used, in retro colic collection patients managed by PCD were 12, of them 4 died (30%) and 8 survived (60%). In Sub hepatic collection, patients managed by PCD were 1, and the patient died making mortality at 100%. In Lesser sac collection, patients who were managed by PCD were 5 out of which there we no death making survival at 100%. This means that intervention taken for these sites of collection has significant relation on the outcome of the patient as seen in study conducted by Koutrou m pakis et al 2016 [15]

The 3rd factor analyzed was the number of collections. The patients with collection had longer duration of hospital stay and ICU stay. The number of locules of the collection showed statistically significant relation to the intervention used, i.e as the

number of collections increase, the necessity for intervention increases. The result is similar to the study conducted by Gupta P et al in 2019 [14]. But however, the exact relation could not assess due to lesser sample size. And finally, the number of locules of the collection had no relation with the outcome of the disease. Meaning both patients with and without collection had comparable chances of survival.

The second factor analyzed was Organ Failure at the time of admission. Total patients admitted with of at the time of admission were 25 out of 47. Organ failure seems to have a statistically significant association between the duration of hospital stay and ICU stay. Hospital stay was two times more, whereas ICU stay is three times more in a patient with organ failure at the time of admission. Finally, effect of Organ failure at the time of admission was statistically significant on Mortality. Both the above findings match with the study conducted by Garg PK et al 2019 [16], Johnson CD et al in 2004 [17]. However, organ failure at the time of admission had no significant relation with the intervention.

There is a significant relation between organ failure at the time of admission and length of hospital and ICU stay and Mortality. Patients presenting with organ failure at the time of admission had 43% mortality. There is significant relation between the number of locules of collection and Intervention taken. The more the number of collections, more is the requirement of intervention. [18]

Patients with Retro colic, Epigastric and subhepatic collection had longer hospital and ICU stay. Patients with more Intrapancreatic collection has more morbidity. There is significant correlation between the size of collection and Hospital stay, Intervention. Larger the size, longer the stay. Intervention in such patients has reduced the mortality significantly.

### Conclusion

Pancreatitis due to alcohol is increasing gradually due to heavy consumption. Organ failure at the time of admission is one the important factors that helps in deciding prognosis of the patient. The number, site and size of pancreatic and Extra-pancreatic collection has significant effect on variable like length of hospital stay, ICU stay, Intervention to be taken and finally the mortality of the patient. Thus, step up management has effective role in reducing the mortality.

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