

A study of the clinical profile of acute pancreatitis and its correlation with Modified Glasgow score and modified CT severity indices

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Abstract

Although measurement of amylase and lipase is useful for diagnosis of pancreatitis, serial measurements in patients with acute pancreatitis are not useful to predict disease severity, prognosis, or for altering management. Routine abdominal computed tomography (CT) scan is not recommended at initial presentation because there is no evidence that CT improves clinical outcomes and the complete extent of pancreatic and peripancreatic necrosis may only become clear 72 hours after the onset of acute pancreatitis. This was a prospective observational study conducted in HIMS, Hassan from July 2020 to July 2021. Modified Glasgow score showed Mild Acute Pancreatitis in 93 and Severe Acute Pancreatitis in 47 Patients. Using the modified CT severity index, the observers graded severity of the acute pancreatitis as mild in 66, moderate in 31, or severe in 43 of the 140 patients with CT scans.

Keywords: Acute pancreatitis, modified Glasgow score, modified CT severity indices

Introduction

Acute pancreatitis is a common disease with wide clinical variation and its incidence is increasing. The average mortality rate in severe acute pancreatitis approaches 2-10% [1]. Severe acute pancreatitis (SAP) develops in about 25% of patients with acute pancreatitis. Severe acute pancreatitis is a two phase systemic disease. The first phase is characterized by extensive pancreatic inflammation and/or necrosis and is followed by a systemic inflammatory response syndrome (SIRS) that may lead to multiple organ dysfunction syndrome (MODS) within the first week. About 50% of deaths occur within the first week of the attack, mostly from MODS. The formation of infected pancreatic necrosis or fluid collection occurs usually in the second week. The factors which cause death in most patients with acute pancreatitis seem to be related specifically to multiple organ dysfunction syndrome and these deaths account for 40-60% of in-hospital deaths in all age groups. The mortality figures associated with MODS vary between 30-100%. Infection is not a feature of the early phase. Pro inflammatory cytokines contribute to respiratory, renal and hepatic failure. The "second or late phase" which starts 14 days after the onset of the disease, is marked by infection of the gland, necrosis and systemic complications causing a significant increase in mortality. The association between increasing age and death from acute pancreatitis is well

documented. Respiratory failure is the most common type of organ failure in acute pancreatitis [2]. According to the severity, acute pancreatitis is divided into mild acute pancreatitis (absence of organ failure and local or systemic complications, moderately severe acute pancreatitis (no organ failure or transient organ failure less than 48 hours with or without local complications) and severe acute pancreatitis (persistent organ failure more than 48 hours that may involve one or multiple organs) [3]. Initial evaluation of severity should include assessment of fluid loss, organ failure (particularly cardiovascular, respiratory, or renal compromise), measurement of the APACHE II score and systemic inflammatory response syndrome (SIRS) score [4, 5].

Although measurement of amylase and lipase is useful for diagnosis of pancreatitis, serial measurements in patients with acute pancreatitis are not useful to predict disease severity, prognosis, or for altering management. Routine abdominal computed tomography (CT) scan is not recommended at initial presentation because there is no evidence that CT improves clinical outcomes and the complete extent of pancreatic and peripancreatic necrosis may only become clear 72 hours after the onset of acute pancreatitis [6]. Several other scoring systems also exist to predict the severity of acute pancreatitis based upon clinical, laboratory, radiologic risk factors, and serum markers but can be used only 24 to 48 hours after disease onset and have not been shown to be consistently superior to assessment of SIRS or the APACHE II score. Several classification systems have been presented to assess the severity of acute pancreatitis. Presence of SIRS (Systemic inflammatory response syndrome), scores such as the Ranson, the Glasgow, and Acute Physiology and Chronic Health Evaluation (APACHE) are practical for assessing the severity of the disease but are not sufficiently well validated for predicting mortality. Early organ dysfunction predicts disease severity and patients require early intensive care treatment. Antibiotic prophylaxis is usually ineffective and early enteral feeding results in reduction of local and systemic infection [6, 7].

Management of acute pancreatitis has changed significantly over the past years. Early management is nonsurgical, solely supportive and patients with infected necrosis with worsening sepsis need intervention. Early intensive care has definitely improved the outcome of patients [8]. Genetic polymorphisms and mutations also contribute to difficulty in predicting the outcome. The rising costs of ICU treatment and the need to prolong the life of critically ill patients creates a need for early identification of those patients who will benefit from intensive care.

The present study was aimed at evaluating the mortality and morbidity risk in relation to various severity indices and the role of procedural intervention.

Material and Methods

This was a prospective observational study conducted in HIMS, Hassan from July 2020 to July 2021.

Inclusion criteria

All patients with a diagnosis of acute pancreatitis getting admitted were included in this study.

Exclusion criteria

- Patients with incomplete clinical data.
- Doubtful diagnosis.
- Patients with chronic pancreatitis.
- Pancreatic Malignancy were excluded.

All patients with a diagnosis of acute pancreatitis are classified into mild, moderate and severe acute pancreatitis based on Modified Glasgow Score and Modified CT Severity index.

Table 1: Modified Glasgow score

1.	PaO ₂	<8kpa(60mmhg)	1
2.	Age	>55years	1
3.	WBC	>15X10 ⁹ /L	1
4.	Calcium	<2mmol/l	1
5.	Urea	>16mmol/l	1
6.	AST/ALT (OR) LDH	>200IU/L (OR) >600IU/L	1
7.	Albumin	>32g/l	1
8.	Glucose	>10mmol/l	1
Each carries 1 point.			
If Score < /=3 is Mild Pancreatitis.			
If Score >3 is Severe Pancreatitis.			

Table 2: Modified CT Severity Index

Pancreatic inflammation	Normal Pancreas	0
	Intrinsic Pancreatic abnormalities with or without Inflammatory changes in Peripancreatic fat.	2
	Pancreatic or Peripancreatic fluid collection or Peripancreatic fat necrosis	4
Pancreatic Necrosis	None	0
	</= 30%	2
	>30%	4
Extrapancreatic Complications	One or more of Pleural effusion, Ascitis, Vascular complications, Parenchymal complication, Gastrointestinal tract involvement	2
Mild Pancreatitis = 0 – 2 points.		
Moderate Pancreatitis = 4 – 6 points.		
Severe Pancreatitis = 8-10 points.		

3) Other investigations done for all acute pancreatitis patients

- Complete hemogram,
- Liver function tests,
- Renal function tests,
- Serum amylase,
- Serum lipase,
- Random blood sugar,
- Lipid profile,
- BUN
- Serum calcium and
- C-Reactive protein
- USG Abdomen and pelvis

Results

In the present study, 140 patients were diagnosed as acute pancreatitis within a Year. Most patients were in the age group of 25 to 55 years. We found that acute pancreatitis was found 3 times more common in males than in females.

Among 25 patients with MODS, 9 patients died. Death was high in patients with MODS inspite of adequate measures. 5 patients had hypotension, were managed with IV fluids and inotropes, 4 patients developed ARDS, were managed with ventilator support but there was

no death. There was no significant difference between alcohols induced pancreatitis and gall stone pancreatitis with regard to development of local, systemic complications and death. The mean duration of hospital stay was 4.5 in mild pancreatitis (Modified Glasgow score < 3), 9.5 in patients with complications who recovered (Modified CT severity score 4-6) and 10.55 in patients who died (Modified Glasgow score >3 and Modified CT Severity score 8-10). Among the 65 patients who required intensive care the minimum duration of stay was 7 days and the maximum was 20 days.

Table 3: Age and Gender Distribution

AGE in years (N)	Male	Female
<20years(4)	02	02
21-40 (66)	48	15
41-60 (53)	37	16
>60 (17)	11	06

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Table 4: Modified Glasglow score V/s Modified CT Severity score

Modified Glasglow score		Modified CT Severity score		
Mild(<3)	Severe(>3)	Mild (0-2)	Moderate(4-6)	Severe(7-8)
93	47	66	31	43

Discussion

The severe necrotizing form of acute pancreatitis is a life threatening condition with high morbidity. Mortality may increase, especially if bacterial contamination of the pancreatic necrosis occurs. An improved outcome in the severe form of the disease is based on early identification of disease severity and subsequent focused management of these high-risk patients. There are many Scoring systems and these scoring systems could be used as triaging tools for appropriate management.

In the present study we had the objective of analysing the Modified Glasgow score and Modified CT severity indices. In a teaching hospital we wanted to find out whether initial measurement of serum amylase, lipase, CRP, LDH along with clinical parameters could be used as a simple tool for morbidity and mortality risk.

Out of 140 patients alcohol induced pancreatitis was higher (53%) than gall Stone Induced pancreatitis. This can be explained by the greater incidence of alcohol abuse in India. Females were more predisposed to develop gall stones and gall stone induced pancreatitis than men. Scoring system in acute pancreatitis increases accuracy of prognosis, mortality and morbidity increases with increasing scores.

Mean Amylase was 343 for discharged patients and 918 in patients who had death. Mean lipase was 436 for discharged patients and 1006 in patients who died. Mean Modified Glasgow score was 3 in discharged patients and 5.5 in patients who had death. Mean Modified CT score was 4 in discharged patient and 8 in patient who had death.

Modified Glasgow score and Modified CT score can be used for triaging patients to intensive care and aggressive therapy. Studies done for comparison of various scores have found out that no single scoring index could accurately predict the outcome but they were useful in initial triaging of patients ^[10, 11].

A study by Bollen T *et al.* suggested CT severity index correlated well with mortality and

morbidity^[12]. Multivariate analysis revealed LDH and CRP on admission showed greatest independent significance in predicting Outcome. In our study mean LDH was 394 in discharged patients and 636 in patients who had death. Mean CRP was 2.1 in discharged patients and 3 in patients who had death. It was with great interest we observed the significance of CRP and LDH in predicting the outcome. As per the available literature and studies high level of CRP at 48 hours is a significant predictor of morbidity and mortality.

In the present study high CRP levels at admission was associated with high morbidity and mortality.

Fluid replacement in the initial 24 hours was crucial for early recovery. In a study by Wu Bu *et al.* BUN > 20 meq/dL on admission or any increase in BUN in the first 24 hours was associated with high risk of mortality^[13]. Lankisch PG *et al.* observed that normal creatinine on admission had a negative predictive value for severity^[14].

In recent years, treatment of acute severe pancreatitis has shifted away from early surgical treatment to aggressive intensive care management (Step up approach). Surgery in severe acute pancreatitis is a morbid procedure associated with complications in most of the patients. Surgery is also known to lead to long term pancreatic insufficiency. The high mortality encountered with surgery essentially reflects the hazard of operating on a critically ill, septic patients with multi organ failure. Delayed surgery is always a better option especially in patients with sterile necrosis and who show clinical improvement with intensive care. High morbidity and mortality is involved in operative necrosectomy, hence minimally invasive strategies are increasingly explored by gastrointestinal surgeons, radiologists and gastroenterologists. Percutaneous drainage (PCD), endoscopic transgastric procedures and minimally invasive procedures have all been proposed as alternatives to open necrosectomy. It has been reported that a reversal of sepsis along with a reversal in organ failure (26%) is seen in patients managed by step up approach using PCD alone or along with multiple drainage insertion and high volume lavage^[15, 16, 17, 18, 19, 20].

In the present study 111 patients (80S%) did not undergo any intervention, 5 patients (3.5%) underwent open necrosectomy surgery, 3 patients (2.1%) underwent laparoscopic necrosectomy and 11 patients had Pseudocyst formation. 7 Patient got resolved by conservative treatment, 3 patients undergone Cystogastrostomy and 1 patient undergone Cystojejunostomy. Total 9 Patient had death.

Limitations of the study

The strength of the study is that it included an adequate number of patients with necessary investigations. It was done in a resource limited setting with no external funding. We could do the minimum required investigations for assessment of acute pancreatitis. We monitored renal function, amylase and lipase for all patients. The detailed scoring systems offer significant advantage of risk assessment.

Conclusion

The present study again emphasizes the significance of early assessment of severity and intensive care management in acute pancreatitis. The study has demonstrated the concordance between Modified Glasgow score and Modified CT severity index as predictors of clinical outcome in acute pancreatitis. This concordance shows that prediction of severity and organ failure can be done at the time of admission with the Modified Glasgow score.

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