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Clinical Profile of Acute Pancreatitis and its Correlation with Modified Glasgow and CT Severity Indices

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ABSTRACT

Pancreatitis diagnosis often involves measuring amylase and lipase levels, but their serial monitoring during acute pancreatitis doesn't offer substantial value in predicting disease severity, prognosis, or guiding management decisions. Additionally, routine use of abdominal CT scans at initial presentation lacks clear evidence of improving clinical outcomes, as the full extent of pancreatic and peripancreatic necrosis may only become apparent after about 72 hours post-onset. This prospective observational study utilized the Modified Glasgow Score to identify cases of Mild Acute Pancreatitis and Severe Acute Pancreatitis in 167 patients. Researchers also employed the Modified CT Severity Index to categorize the severity of acute pancreatitis into mild, moderate and severe based on CT scans. The severity of acute pancreatitis, as assessed by the Modified Glasgow Score and Modified CT Severity Index, varied among the patients studied, with distinct proportions categorized as mild, moderate, or severe. Based on CT scans, classified 79 cases as mild, 37 as moderate and 51 as severe out of 167 patients. Based on the findings, it can be concluded that serial measurements of amylase and lipase levels and routine abdominal CT scans at initial presentation may not offer substantial benefits in guiding the management of acute pancreatitis. Other factors and diagnostic modalities may need to be considered to enhance the accuracy of prognosis and treatment decisions in patients with acute pancreatitis.

INTRODUCTION

Acute pancreatitis is a frequently encountered condition with a broad spectrum of clinical manifestations and its prevalence is on the rise. The estimated mortality rate in cases of severe acute pancreatitis ranges from approximately 2-10%^[1,2]. Approximately 25% of patients with acute pancreatitis progress to developing severe acute pancreatitis (SAP). SAP is characterized by a biphasic systemic disorder. The initial phase involves significant pancreatic inflammation or necrosis, followed by a systemic inflammatory response syndrome (SIRS) that can culminate in multiple organ dysfunction syndrome (MODS) within the first week. Roughly half of the fatalities occur within this initial week, predominantly due to MODS. The formation of infected pancreatic necrosis or fluid collection typically occurs during the second week. The primary causes of mortality in acute pancreatitis patients are closely associated with multiple organ dysfunction syndrome, accounting for 40-60% of in-hospital deaths across all age brackets. Mortality rates linked with MODS can vary widely, ranging from 30-100%. Notably, infection is not a prominent feature during the early phase. Pro-inflammatory cytokines play a significant role in respiratory, renal, and hepatic failures. The subsequent or "late phase," which emerges around 14 days after onset, is characterized by glandular infection, necrosis, and systemic complications, significantly escalating mortality rates. The correlation between advancing age and mortality due to acute pancreatitis is well-documented. Respiratory failure stands as the most prevalent form of organ failure in acute pancreatitis^[1]. Severity-wise, acute pancreatitis is categorized into mild acute pancreatitis (without organ failure and with local or systemic complications), moderately severe acute pancreatitis (absence of organ failure or transient organ failure lasting less than 48 hours, with or without local complications) and severe acute pancreatitis (persistent organ failure exceeding 48 hours, which may involve one or multiple organs). The initial assessment of severity should encompass fluid loss evaluation, organ failure assessment (with particular attention to cardiovascular, respiratory, or renal impairment), APACHE II score measurement and systemic inflammatory response syndrome (SIRS) score^[3-5]. Although amylase and lipase measurements are valuable for pancreatitis diagnosis, their serial monitoring in acute pancreatitis patients does not aid in predicting disease severity, prognosis, or altering management strategies. It is not recommended to perform routine abdominal computed tomography (CT) scans at the onset because there is insufficient evidence to support improved clinical outcomes through CT scans and the complete extent of pancreatic and peripancreatic necrosis may only

become evident 72 hours after acute pancreatitis onset. Various other scoring systems exist for predicting acute pancreatitis severity based on clinical, laboratory, radiological risk factors and serum markers but are applicable only 24-48 hours post-disease onset and have not consistently outperformed the assessment of SIRS or the APACHE II score. Several classification systems have been proposed for assessing acute pancreatitis severity. Although tools like the Ranson, the Glasgow, and the Acute Physiology and Chronic Health Evaluation (APACHE) scores, along with the presence of SIRS, are practical for assessing severity, they lack sufficient validation for mortality prediction. Early organ dysfunction serves as a predictor of severity, necessitating early intensive care management. Antibiotic prophylaxis typically proves ineffective, while early enteral feeding aids in reducing local and systemic infections^[6,7]. The management of acute pancreatitis has evolved significantly over recent years, emphasizing nonsurgical, primarily supportive early management, with intervention required for patients with infected necrosis and worsening sepsis. The implementation of early intensive care has notably improved patient outcomes. Genetic polymorphism and mutations also contribute to the challenges in predicting outcomes. The escalating costs associated with ICU care and the imperative to prolong the lives of critically ill patients underscore the importance of early identification of those individuals who would benefit most from intensive care^[8,9]. The current study aimed to assess various severity indices in acute pancreatitis.

MATERIALS AND METHODS

This study was carried out as a prospective observational investigation at an Indian Medical college and hospital. For inclusion, all patients presenting with a verified diagnosis of acute pancreatitis who were admitted during the specified period at HIMs, Hassan, were considered eligible participants for this prospective observational study conducted from July 2020 to July 2021. Exclusion criteria encompassed patients lacking comprehensive clinical data, those with ambiguous or doubtful diagnoses, individuals with chronic pancreatitis and those diagnosed with pancreatic malignancies, all of whom were excluded from the study to ensure a focused and accurate analysis. Patients diagnosed with acute pancreatitis were categorized into mild, moderate and severe cases based on the Modified Glasgow Score and Modified CT Severity Index. In the case of acute pancreatitis patients, additional examinations are typically conducted to gather comprehensive clinical insights. These investigations encompass a complete hemogram analysis, liver function tests, renal function tests, serum levels of amylase and lipase, random blood sugar assessment,

lipid profile evaluation, measurement of blood urea nitrogen (BUN), serum calcium levels, C-reactive protein levels, as well as an ultrasound examination of the abdomen and pelvis. These tests collectively aid in assessing the overall health status, pancreatic function, and potential complications associated with acute pancreatitis.

RESULTS AND DISCUSSIONS

In this study, a total of 167 patients were diagnosed with acute pancreatitis over the course of one year. The majority of these patients fell within the age range of 21 to 40 years (refer to Table 1). We observed a threefold higher incidence of acute pancreatitis among males compared to females. We did not observe a significant distinction between alcohol-induced pancreatitis and gallstone pancreatitis concerning the development of local or systemic complications, as well as mortality rates. The severity of pancreatitis was assessed using the modified Glasgow score and modified CT severity index, as outlined in (Tables 2 and 3), respectively. (Fig. 1) illustrates the average duration of hospitalization based on the severity of pancreatitis. Among the 30 patients diagnosed with Multiple Organ Dysfunction Syndrome (MODS), 11 patients unfortunately succumbed to their condition. Despite the implementation of appropriate measures, mortality remained elevated in patients with MODS. Six patients experienced hypo tension and were managed with intravenous fluids and isotopic agents, while five patients developed Acute Respiratory Distress Syndrome (ARDS) and received ventilator support, however, there were no fatalities in this group. Our study aimed to evaluate the efficacy of the Modified Glasgow score and Modified CT severity indices in predicting morbidity and mortality risk when combined with initial measurements of serum amylase, lipase, CRP, LDH and clinical parameters in a teaching hospital setting^[10,11]. Alcohol-induced pancreatitis exhibited a higher prevalence compared to gallstone-induced pancreatitis, likely due to the higher incidence of alcohol abuse in India. Females were more prone to developing gallstones and gallstone-induced pancreatitis than males. The accuracy of prognosis

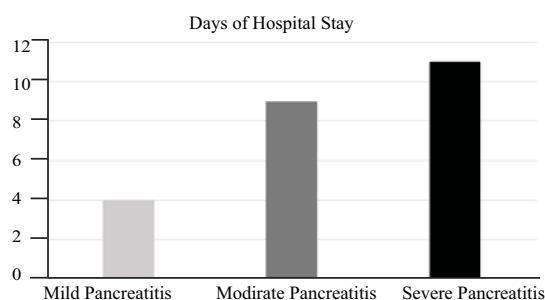


Fig. 1: Duration of Hospital Stay According to Severity of Pancreatitis

Table 1: Age and Gender Distribution of Patients

Age group in years	Male	Female
<20	2	2
21-40	60	18
41-60	45	20
>60	13	7
Total	120	47

Table 2: Modified Glasgow Score in Study Population

Modified Glasgow Score	n	Percentage
Mild Pancreatitis <3	111	66.47
Severe Pancreatitis >3	56	33.53
Total	167	100.00

Table 3: Modified CT Severity Score in Study Population

CT Severity Index	n	Percentage
Mild Pancreatitis (0-2)	79	47.31
Moderate Pancreatitis (4-6)	37	22.16
Severe Pancreatitis (7-8)	51	30.54
Total	167	100.00

increases with the severity scores in acute pancreatitis, with mortality and morbidity rising accordingly. The Modified Glasgow score and Modified CT score proved valuable in training patients for intensive care and aggressive therapy. While no single scoring index accurately predicted outcomes, they were beneficial in initial patient triage. A study by Bollen *et al.* indicated that the CT severity index correlated well with mortality and morbidity^[12]. Multi variate analysis highlighted the significant independent predictive value of LDH and CRP on admission. Elevated CRP levels at 48 hours were particularly noteworthy predictors of morbidity and mortality. Early fluid replacement within 24 hours was crucial for prompt recovery. Studies by Wu Bu *et al.*^[13] and Lankisch *et al.*^[14] underscored the predictive value of BUN levels on admission and normal creatinine levels, respectively, in assessing severity and outcome.

In recent years, the approach to treating acute severe pancreatitis has shifted towards aggressive intensive care management over early surgical intervention, known as the Step-up approach. Surgical procedures in severe acute pancreatitis are associated with high morbidity, complications and long-term pancreatic insufficiency. Delayed surgery is often preferable, especially in cases of sterile necrosis showing clinical improvement with intensive care. Minimally invasive strategies such as per cutaneous drainage, endoscopic transgastric procedures and minimally invasive procedures are increasingly explored due to their lower morbidity and mortality rates compared to open necrosectomy^[15-20]. Our study's strength lies in its inclusion of an adequate number of patients with comprehensive investigations, despite being conducted in a resource-limited setting without external funding. Monitoring renal function, amylase and lipase for all patients, along with utilizing detailed scoring systems, provided a significant advantage in risk assessment.

CONCLUSION

This study reiterates the importance of promptly assessing the severity of acute pancreatitis and implementing intensive care management. It has

revealed a correlation between the Modified Glasgow score and Modified CT severity index in predicting clinical outcomes for acute pancreatitis. This correlation indicates that severity prediction and identification of organ failure can be achieved upon admission using the Modified Glasgow score.

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