IL-6 AND SERUM FERRITIN AS AN INDICATOR FOR GRADING SEVERITY AND EARLY MORTALITY IN INITIAL 72 HOURS OF ACUTE PANCREATITIS

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ABSTRACT

Background: Acute pancreatitis is an acute inflammatory condition of the pancreas with a clinical spectrum ranging from mild self-limiting disease to severe pancreatitis associated with multiorgan dysfunction and mortality. Early prediction of disease severity is essential for appropriate management. Serum interleukin-6 (IL-6) and ferritin have emerged as potential early biomarkers of severity and prognosis.

Objectives: To evaluate the role of serum IL-6 and serum ferritin as prognostic markers in acute pancreatitis and compare their predictive value with established scoring systems such as Ranson score and CT Severity Index (CTSI).

Materials and Methods: This prospective observational analytical study was conducted in the Department of Surgery, Dr. D. Y. Patil Medical College Hospital and Research Institute, Kolhapur, over a period of two years. Patients aged 18–70 years presenting within 48 hours of onset of first-episode acute pancreatitis were included. Clinical assessment, laboratory investigations including serum amylase, lipase, IL-6, ferritin, LDH, ABG, and BUN, along with radiological evaluation by ultrasonography and contrast-enhanced CT, were performed. Ranson score and CTSI were calculated and correlated with disease severity.

Results: Mild acute pancreatitis was the most common presentation. Increasing severity was significantly associated with higher Ranson scores, CT severity scores, LDH, serum lipase, IL-6, and ferritin levels ($p<0.0001$). SIRS at admission, ICU admission, local complications, and CT evidence of necrosis were significantly associated with severe disease. Mean IL-6 and ferritin levels increased progressively from mild to severe pancreatitis, demonstrating strong correlation with disease severity and adverse clinical outcomes.

Conclusion: Serum IL-6 and ferritin are valuable early prognostic biomarkers in acute pancreatitis and correlate strongly with disease severity. Combined with Ranson score and CT Severity Index, these markers facilitate early risk stratification, timely intervention, and improved clinical outcomes.

Keywords: Acute Pancreatitis, Interleukin-6, Ferritin, Ranson Score, Ct Severity Index, Prognostic Biomarkers, Disease Severity, Systemic Inflammatory Response Syndrome.

INTRODUCTION

Acute pancreatitis is defined as an acute nonbacterial pancreatic inflammatory process caused by activation, interstitial liberation and auto-digestion of pancreatic parenchyma, with peripancreatic and multi-organ involvement causing

Multi-organ dysfunction syndrome (MODS), with increased mortality rate. Acute pancreatitis is characterised by acute severe inflammation and necrosis of pancreatic parenchyma involving necrosis of fat and vessels leading to haemorrhage. Since the pancreas lacks a capsule, this inflammation and necrosis can spread to other organs in the vicinity which eventually leads to multi-organ dysfunction.

Gall stones and Alcohol have been attributed to approximately 70% of the cases of Acute Pancreatitis. It can be broadly classified into two

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types depending on pancreatic necrosis, namely Interstitial oedematous or Necrotising Pancreatitis.
Acute Pancreatitis can be assessed based on its severity, given by Revised Atlanta Criteria
i.e. Mild Acute Pancreatitis, Moderately Severe Acute Pancreatitis, Severe Acute Pancreatitis
Prompt and accurate triage of patients presenting with acute pancreatitis is essential, as stratifying disease severity early in the clinical course can meaningfully reduce both morbidity and mortality. A number of validated scoring systems exist to assist clinicians in this process, among them the Acute Physiological Assessment and Chronic Health Evaluation II (APACHE II), the Ranson Score, the Bedside Index for Severity in Acute Pancreatitis (BISAP), the Glasgow-Imrie criteria, and the CT Severity Index. These tools have been extensively validated and remain widely used across clinical settings. However, a common and significant drawback shared by most of these systems is that they cannot be reliably completed until 48 to 72 hours after symptom onset, limiting their utility during the critical early window when management decisions are most consequential.
In this context, serum biomarkers — specifically serum ferritin and IL-6 — present a valuable adjunct to conventional scoring methods. Both markers are measurable within the first 48 hours of presentation and have shown considerable promise as early prognostic indicators, capable of predicting disease severity and likely clinical trajectory before formal scoring systems can be fully applied. Incorporating these biomarkers into early clinical assessment may therefore allow for more timely risk stratification, better-informed treatment decisions, and ultimately improved patient outcomes.
Acute pancreatitis is a common and potentially serious condition marked by abrupt inflammation of the pancreas. This condition is the leading cause of hospitalization for gastrointestinal disease in the United States, accounting for more than 275,000 hospital admissions annually.1 The clinical course varies from mild, self-limited inflammation to severe disease with necrosis, systemic inflammatory response syndrome, multiorgan dysfunction syndrome, and high mortality.
Mortality depends on disease severity, ranging from approximately 3% in mild interstitial pancreatitis to 20% in necrotizing forms. 2 Although diagnosis is typically based on characteristic symptoms and elevated pancreatic enzymes, predicting clinical progression and long-term outcomes remains difficult. Early identification of high-risk patients is critical to determining the appropriate level of care, the need for intensive monitoring, and the timing of targeted interventions.3
The Revised Atlanta Classification provides standardized terminology for the morphological subtypes and severity of acute pancreatitis. Interstitial edematous pancreatitis involves inflammation of the pancreatic parenchyma and peripancreatic tissue without necrosis. This form is more common and generally less severe. In contrast, necrotizing pancreatitis includes varying degrees of pancreatic parenchymal or peripancreatic necrosis and is associated with a higher risk of complications and poorer clinical outcomes.
The clinical severity of acute pancreatitis is classified into three distinct grades. Mild disease is characterized by the absence of organ failure and the lack of any significant local or systemic complications, and generally follows a self-limiting course. Moderately severe disease is defined by either transient organ dysfunction resolving within 48 hours, or the development of local or systemic complications such as peripancreatic fluid collections. Severe acute pancreatitis, at the far end of the spectrum, is distinguished by persistent organ failure lasting beyond 48 hours and frequently affecting more than one organ system simultaneously.
The pancreas is a retroperitoneal gland that runs horizontally along the posterior abdominal wall, extending from the duodenum to the splenic hilum at the level of the first and second lumbar vertebrae. It is anatomically divided into four regions — the head, neck, body, and tail — and serves a dual physiological role. Its exocrine function involves the secretion of digestive enzymes into the duodenum via the pancreatic ducts, while its endocrine function is carried out by the islets of Langerhans, which release hormones including insulin, glucagon, and somatostatin directly into the bloodstream.
A thorough understanding of the anatomical structure, classification framework, and clinical spectrum of acute pancreatitis is fundamental to accurate diagnosis, early risk stratification, and coordinated management across specialties. These foundational elements directly shape prognostic expectations and inform the full continuum of care, from acute inpatient management through to longer-term outpatient follow-up.

MATERIAL AND METHODS

A Prospective Observational Analytical study was conducted at Department of Surgery, Dr. D.Y. Patil Medical College Hospital and Research Institute, Kolhapur on Patients admitted with Acute pancreatitis. After getting ethical approval from Institutional Ethics Committee study was started. The study was conducted for a duration of 2yrs. All participants fulfilling the exclusion and inclusion criteria were considered for study. The minimum sample size was 55.
Inclusion criteria- Patients >18 years and <70 years admitted with Acute pancreatitis, Patients who provide informed consent for the study, Patients presenting to hospital in initial 48 hours after onset of Acute Pancreatitis, Patients with first episode of

Pain in Abdomen and being diagnosed as Acute Pancreatitis.

Exclusion criteria- Patients with chronic pancreatitis, Patients not giving consent for study, Patients of Traumatic Pancreatitis, Patients with any previous systemic comorbidities, Patients diagnosed with Pancreatitis earlier and now in remission, Pregnant females, Patients with any chronic ailments.

METHODOLOGY

Patients of Acute pancreatitis was first be examined clinically and their history was taken on a primary basis.

Once, there is a clinical suspicion of the diagnosis of acute pancreatitis, patient was investigated further and was subjected to radiological and laboratory investigations simultaneously.

Radiological investigations would involve an Abdominal CT scan after a primary sonography which was initially done and suggestive of acute pancreatitis.

Laboratory investigations sent was complete blood count, electrolytes, renal function tests, liver function tests, and coagulation factors along with a blood gas analysis.

Specific tests involving IL-6, Serum Ferritin, serum amylase and lipase, ABG, BUN levels would also be done necessarily.

A detailed patient history would be taken as the results of the investigations are awaited.

The Ransons, CTSI score was calculated.

In the final stage, a comparison would be done between the levels of IL-6, Serum Ferritin, and scores from Ransons, CT Severity Score system.

The patient was not be subjected to any unnecessary investigations during the course of this study.

RESULTS

In our study, 4 patients (7.3%) were aged lesser than equal 20 years, 4 patients (7.3%) were aged 21–30 years, 9 patients (16.4%) were aged 31–40 years, 9 patients (16.4%) were aged 41–50 years, 7 patients (12.7%) were aged 51–60 years, 10 patients (18.2%) were aged 61–70 years, and 12 patients (21.8%) were aged 71–80 years. It was statistically significant ($p = 0.031$).

In our study, 20 patients (36.4%) were female and 35 patients (63.6%) were male. The difference between the two proportions is statistically significant ($p = 0.0042$).

In our study, 29 patients (52.7%) had mild severity, 21 patients (38.2%) had moderate severity, and 5 patients (9.1%) had severe disease. It was statistically significant ($p < 0.001$).

In our study, 27 patients (49.1%) had SIRS on admission. The difference between the two proportions is not statistically significant ($p = 0.849$).

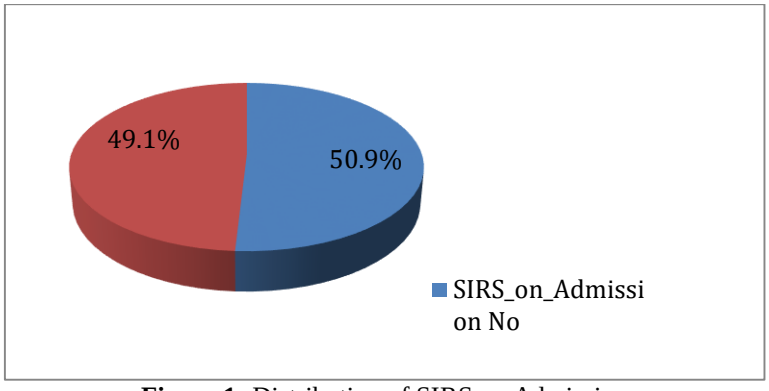

Figure 1: Distribution of SIRS on Admission

In our study, 34 patients (61.8%) had edematous pancreas on ultrasonography, 11 patients (20.0%) had normal ultrasonography findings, and 10 patients (18.2%) had peripancreatic collection. It was statistically significant ($p < 0.001$).

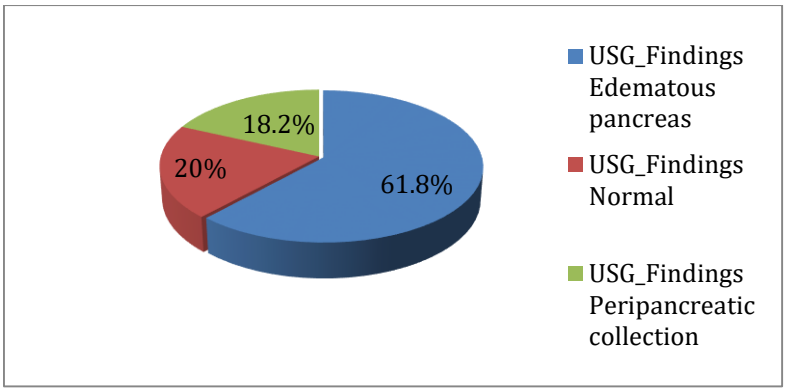

Figure 2: Distribution of USG Findings

In our study, 8 patients (14.5%) required ICU admission. The difference between the two proportions is statistically significant ($p < 0.001$).

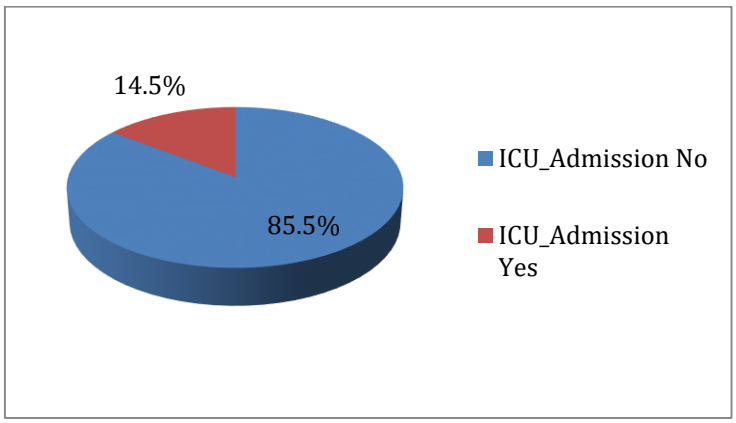

Figure 3: Distribution of ICU Admission

In our study, 13 patients (23.6%) developed local complications. The difference between the two proportions is statistically significant ($p < 0.001$).

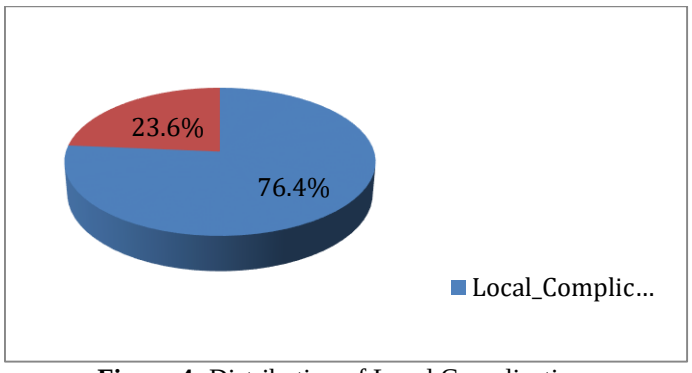

Figure 4: Distribution of Local Complications

In our study, 44 patients (80.0%) did not develop systemic complications, while 11 patients (20.0%) developed systemic complications. The difference between the two proportions is statistically significant ($p < 0.001$).

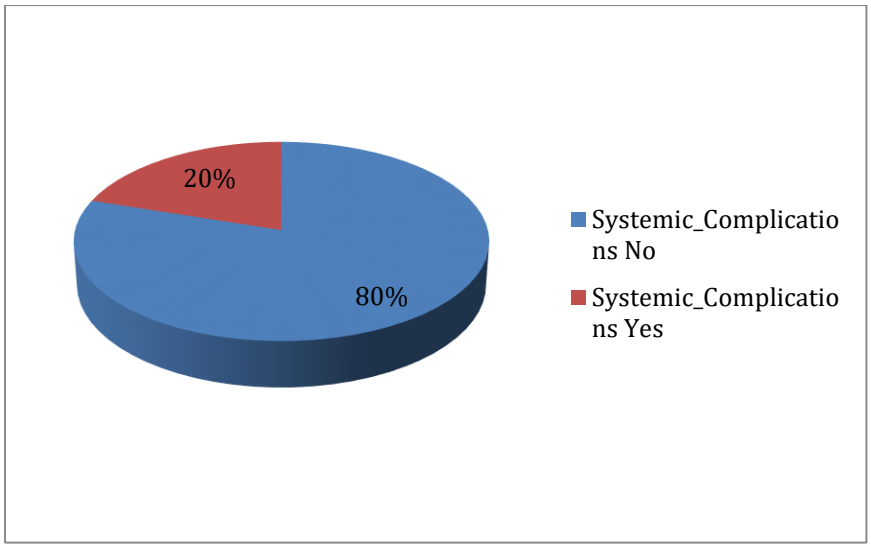

Figure 5: Distribution of Systemic Complications

In our study, mortality was observed in 2 patients (3.6%). The difference between the two proportions is statistically significant ($p < 0.001$).

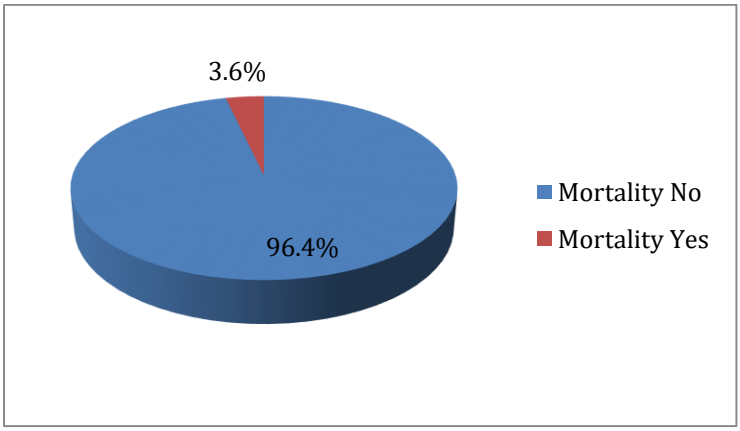

Figure 6: Distribution of Mortality

In our study, 3 patients (5.5%) had acute pancreatitis with peripancreatic fluid collection, 32 patients (58.2%) had interstitial edematous pancreatitis, 10 patients (18.2%) had necrotizing pancreatitis with peripancreatic collection. It was statistically significant ($p < 0.001$).

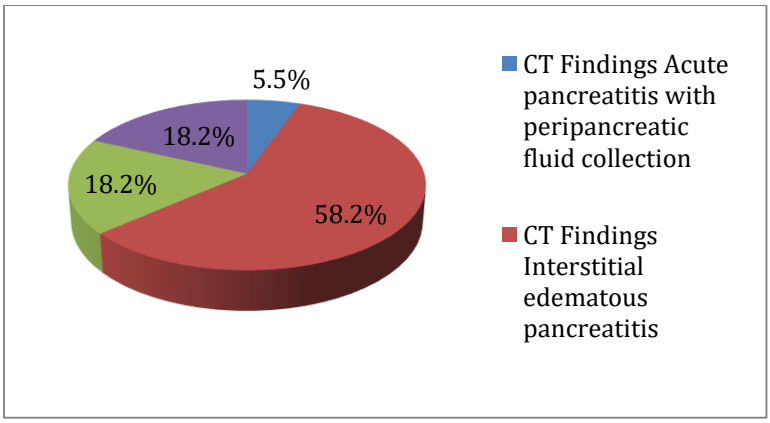

Figure 7: Distribution of CT Findings

Table 1: Distribution of Mean Age, LDH, and Length of Stay Days

	Age	LDH	Length Of Stay Days

N	55	55	55
Mean	52.47	384.62	6.31
Std. Deviation	18.811	108.399	2.284
Minimum	19	188	2
Maximum	79	588	12
Median	55.00	372.00	6.00

The mean age of the participants was 52.47 ± 18.811 years. The mean LDH level was 384.62 ± 108.399. The mean length of stay was 6.31 ± 2.284 days.

Table 2: Distribution of Mean Ranson on Admission, Ranson at 48 Hours, CT Severity Scoring Systems

	Ranson On Admission	**Ranson At 48 Hours**	**CT Severity Scoring Systems**
N	55	55	55
Mean	3.51	4.55	4.35
Std. Deviation	1.914	2.210	1.734
Minimum	1	1	1
Maximum	8	9	8
Median	3.00	4.00	4.00

The mean Ranson score on admission was 3.51 ± 1.914, while the mean Ranson score at 48 hours was 4.55 ± 2.210. The mean CT severity scoring system score was 4.35 ± 1.734.

Table 3: Distribution of Mean Serum Amylase, Serum Lipase, Serum Il-6 Level (Pg/Ml), Serum Ferritin Level Ng/Ml

	Serum Amylase	**Serum Lipase**	**Serum IL-6 Level (Pg/Ml)**	**Serum Ferritin Level Ng/Ml**
N	55	55	55	55
Mean	679.56	923.20	102.56	353.85
Std. Deviation	232.067	319.160	80.592	204.790
Minimum	261	373	16	134
Maximum	1121	1501	298	980
Median	697.00	893.00	46.00	305.00

The mean serum amylase level was 679.56 ± 232.067 U/L, while the mean serum lipase level was 923.20 ± 319.160 U/L. The mean serum IL-6 level was 102.56 ± 80.592 pg/mL, and the mean serum ferritin level was 353.85 ± 204.790 ng/mL.

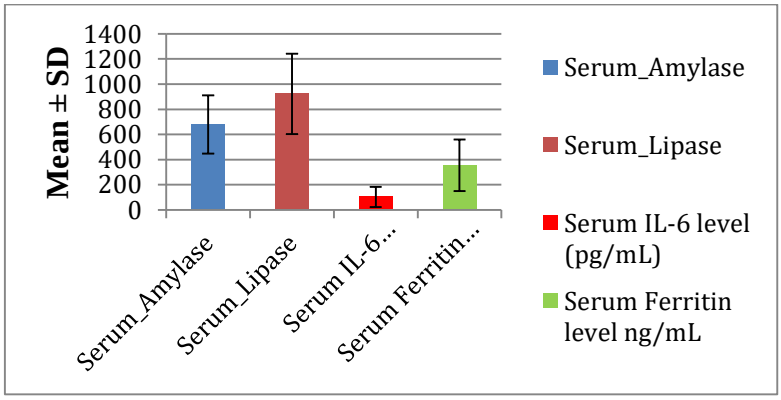

Figure 8: Distribution of Mean Serum Amylase, Serum Lipase, Serum IL-6 Level (Pg/Ml), Serum Ferritin Level Ng/Ml

In our study, among patients with mild disease, 2 patients (6.9%) belonged to the lesser than equal 20years age group, 2 patients (6.9%) belonged to the 21–30 years age group, 5 patients (17.2%) belonged to the 31–40 years age group, 5 patients (17.2%) belonged to the 41–50 years age group, 2 patients (6.9%) belonged to the 51–60 years age group, 6 patients (20.7%) belonged to the 61–70 years age group, and 7 patients (24.1%) belonged to the 71–80 years age group. Among patients with moderate

disease, 2 patients (9.5%) were aged ≤20 years, 2 patients (9.5%) were aged 21–30 years, 3 patients (14.3%) were aged 31–40 years, 2 patients (9.5%) were aged 41–50 years, 5 patients (23.8%) were aged 51–60 years, 3 patients (14.3%) were aged 61–70 years, and 4 patients (19.0%) were aged 71–80 years. Among patients with severe disease, 1 patient (20.0%) belonged to the 31–40years age group, 2 patients (40.0%) belonged to the 41–50years age group, 1 patient (20.0%) belonged to the 61–70 years age group, and 1 patient (20.0%) belonged to the 71–80 years age group. The association between age group and severity was not statistically significant (p = 0.835).

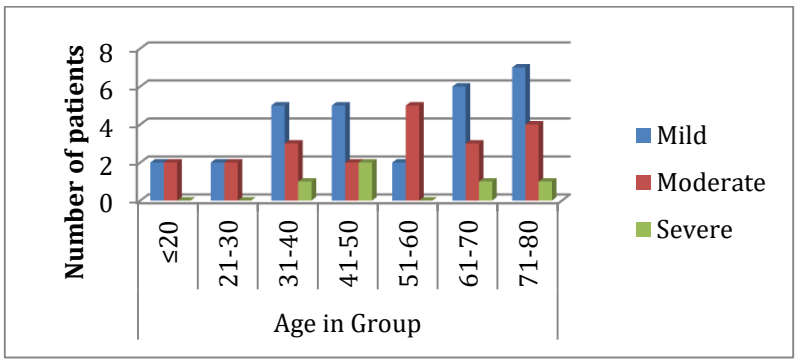

Figure 9: Association between Age in Group * Severity

In our study, among patients with mild disease, 12 patients (41.4%) were females and 17 patients (58.6%) were males. Among patients with moderate disease, 7 patients (33.3%) were females and 14 patients (66.7%) were males. Among patients with severe disease, 1 patient (20.0%) was female and 4 patients (80.0%) were males. The association between Sex and severity was not statistically significant (p = 0.613).

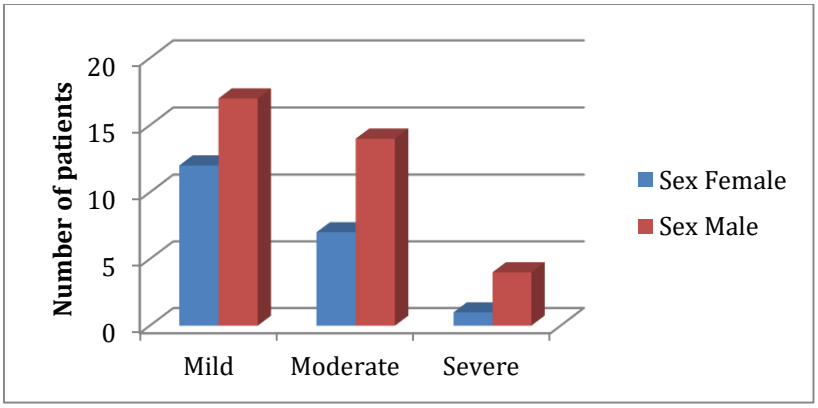

Figure 10: Association between Sex * Severity

In our study, among patients with mild disease, 8 patients (27.6%) had SIRS on admission. Among patients with moderate disease, 14 patients (66.7%) had SIRS on admission. Among patients with severe disease, 5 patients (100.0%) had SIRS on admission. The association between SIRS on Admission and severity was statistically significant (p = 0.001).

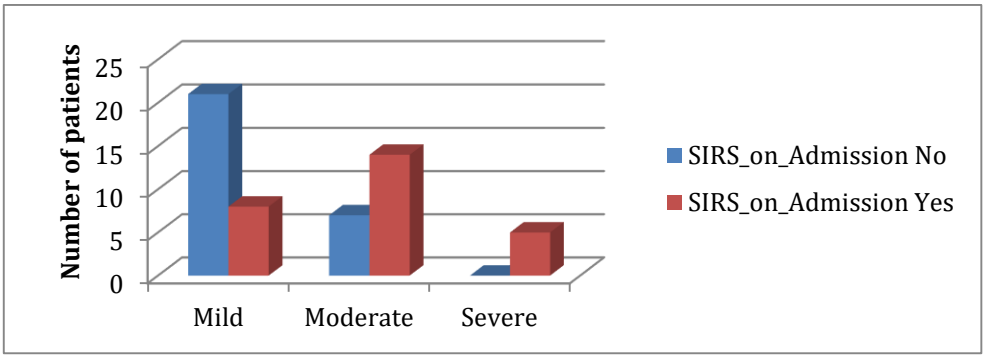

Figure 11: Association between SIRS on Admission * Severity

In our study, among patients with mild disease, 18 patients (62.1%) had edematous pancreas on USG findings, while 11 patients (37.9%) had normal USG findings. Among patients with moderate disease, 16 patients (76.2%) had edematous pancreas and 5 patients (23.8%) had peripancreatic collection on USG findings. Among patients with severe disease, all 5 patients (100.0%) had peripancreatic collection on USG findings. The association between USG Findings and severity was statistically significant (p <0.0001).

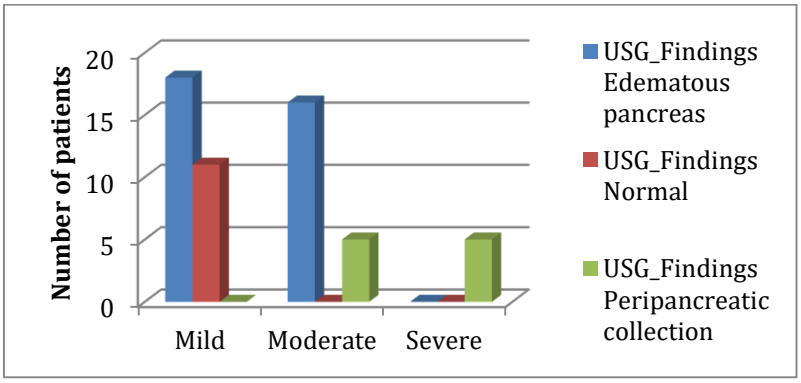

Figure 12: Association between Usg Findings * Severity

Among patients with moderate disease, 6 patients (28.6%) required ICU admission. Among patients with severe disease, 2 patients (40.0%) required ICU admission. The association between ICU Admission and severity was statistically significant (p =0.004).

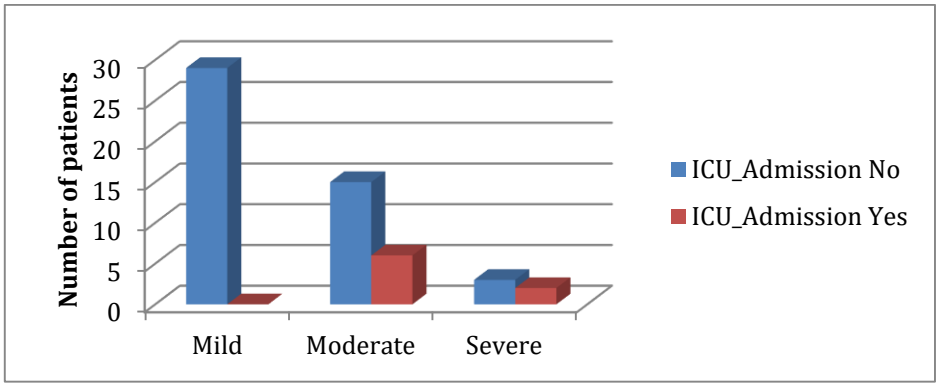

Figure 13: Association between ICU Admission * Severity

Table 4: Association between Local Complications * Severity

			Severity			Total
			Mild	Moderate	Severe	
Local Complications	No	Count	26	16	0	42
		% Within Local Complications	61.9%	38.1%	0.0%	100.0%
		% Within Severity	89.7%	76.2%	0.0%	76.4%
	Yes	Count	3	5	5	13
		% Within Local Complications	23.1%	38.5%	38.5%	100.0%
		% Within Severity	10.3%	23.8%	100.0%	23.6%
Total		Count	29	21	5	55

	% Within Local Complications	52.7%	38.2%	9.1%	100.0%
	% Within Severity	100.0%	100.0%	100.0%	100.0%
Chi-Square	18.993				
P-Value	<0.0001				

In our study, among patients with mild disease, 3 patients (10.3%) had local complications. Among patients with moderate disease, 5 patients (23.8%) had local complications. Among patients with severe disease, all 5 patients (100.0%) had local complications. The association between Local Complications and severity was statistically significant (p <0.0001).

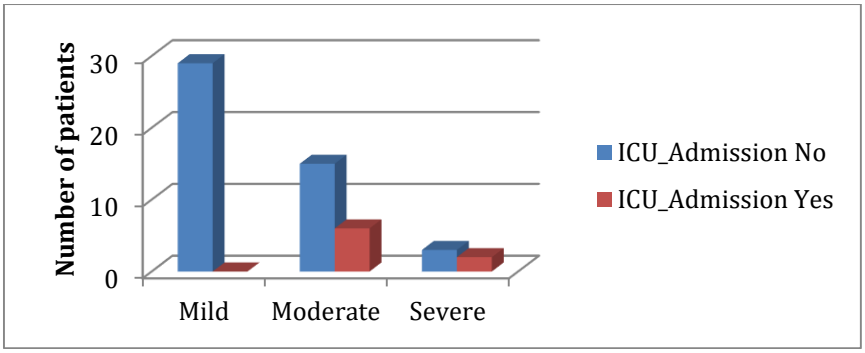

Figure 14: Association between Local Complications * Severity

In our study, among patients with mild disease, 3 patients (10.3%) had systemic complications. Among patients with moderate disease 7 patients (33.3%) had systemic complications. Among patients with severe disease 1 patient (20.0%) had systemic complications. The association between Systemic Complications and severity was not statistically significant (p = 0.134).

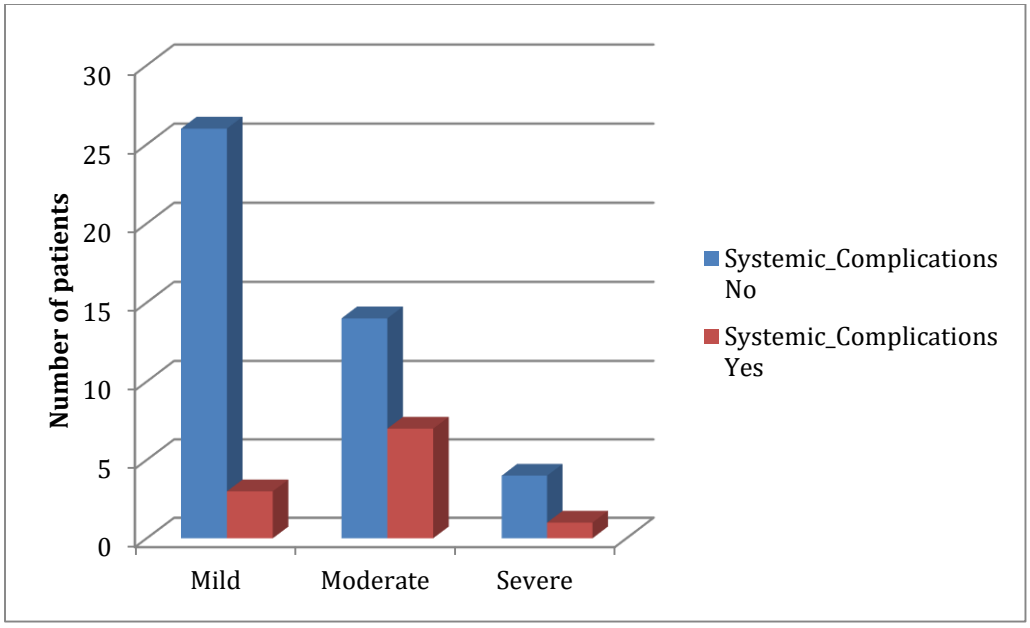

Figure 15: Association between Systemic Complications * Severity

Table 5: Association between Mortality * Severity

			Severity			Total
			Mild	Moderate	Severe	
Mortality	No	Count	29	21	3	53
		% Within Mortality	54.7%	39.6%	5.7%	100.0%

		% Within Severity	100.0%	100.0%	60.0%	96.4%
	Yes	Count	0	0	2	2
		% Within Mortality	0.0%	0.0%	100.0%	100.0%
		% Within Severity	0.0%	0.0%	40.0%	3.6%
Total		Count	29	21	5	55
		% Within Mortality	52.7%	38.2%	9.1%	100.0%
		% Within Severity	100.0%	100.0%	100.0%	100.0%
Chi-Square		20.755				
P-Value		<0.0001				

In our study, among patients with severe disease, 2 patients (40.0%) died. The association between Mortality and severity was statistically significant (p <0.0001).

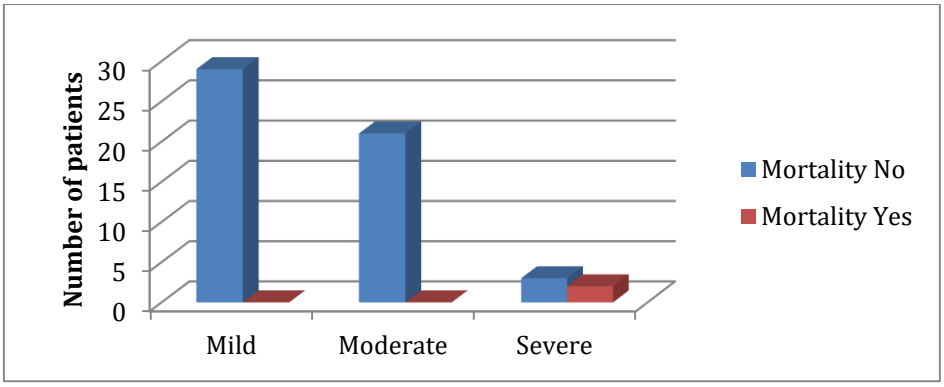

Figure 16: Association between Mortality * Severity

In our study, among patients with mild disease, 19 patients (65.5%) had interstitial edematous pancreatitis on CT findings. Among patients with moderate disease, 13 patients (61.9%) had interstitial edematous pancreatitis, 5 patients (23.8%) had necrotizing pancreatitis with peripancreatic collection, and 3 patients (14.3%) had acute pancreatitis with peripancreatic fluid collection. Among patients with severe disease, all 5 patients (100.0%) had necrotizing pancreatitis with peripancreatic collection. The association between CT Findings and severity was statistically significant (p <0.0001).

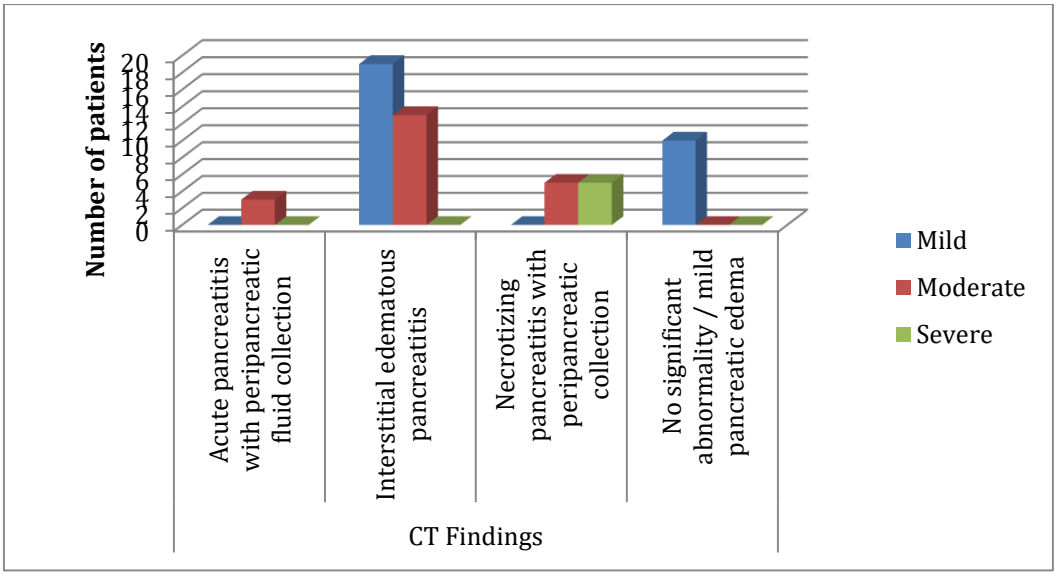

Figure 17: Association between CT Findings * Severity

The mean age of patients in the mild, moderate, and severe groups was 52.76 ± 19.652 years, 51.57 ± 18.832 years, and 54.60 ± 17.024 years respectively. There was no statistically significant (p = 0.944). The mean LDH levels in the mild, moderate, and severe groups were 296.17 ± 43.524 U/L, 493.05 ±

60.844 U/L, and 442.20 ± 65.393 U/L respectively. LDH levels showed a statistically significant ($p < 0.0001$).

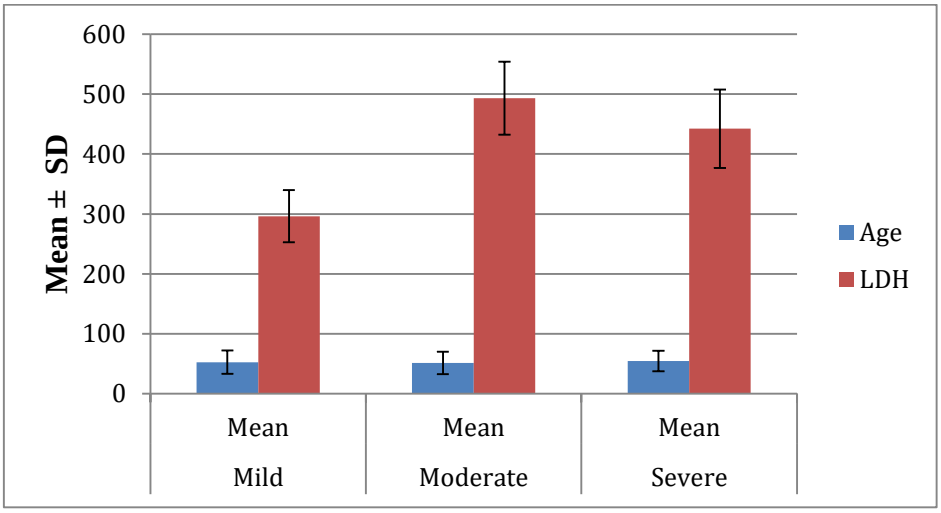

Figure 18: Distribution of Mean Age, LDH

The mean Ranson score on admission in the mild, moderate, and severe groups was 2.38 ± 0.820, 4.33 ± 1.983, and 6.60 ± 0.548 respectively. It was statistically significant ($p < 0.0001$). The mean Ranson score at 48 hours in the mild, moderate, and severe groups was 3.21 ± 1.146, 5.52 ± 2.064, and 8.20 ± 0.837 respectively. It was statistically significant ($p < 0.0001$). The mean CT severity scoring system scores in the mild, moderate, and severe groups were 3.69 ± 1.442, 4.62 ± 1.627, and 7.00 ± 0.707 respectively. It was statistically significant ($p < 0.0001$).

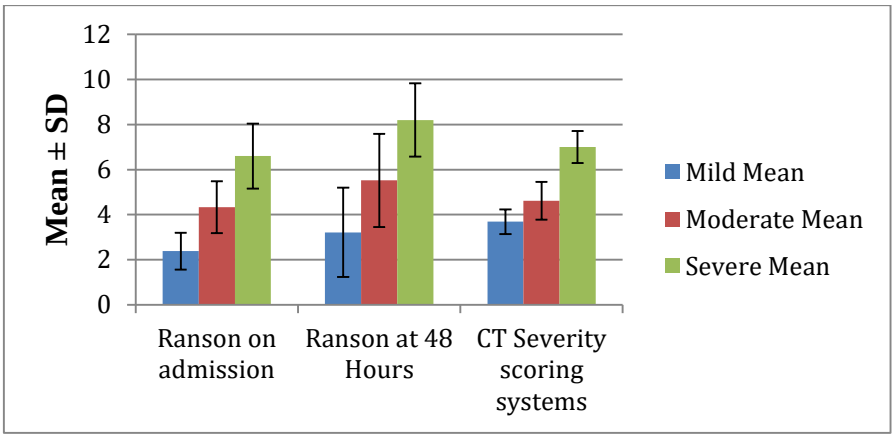

Figure 19: Distribution of Mean Ranson on Admission, Ranson at 48 Hours, CT Severity Scoring Systems

Table 6: Distribution of Mean Serum Amylase, Serum Lipase, Serum IL-6 Level (Pg/Ml), Serum Ferritin Level Ng/Ml

Severity		Serum Amylase	Serum Lipase	Serum IL-6 Level (Pg/Ml)	Serum Ferritin Level Ng/Ml
Mild	N	29	29	29	29
	Mean	504.59	680.17	37.10	215.72
	Std. Deviation	144.085	179.748	8.077	53.141
	Minimum	261	373	16	134
	Maximum	882	996	46	320
	Median	486.00	694.00	39.00	201.00
Moderate	N	21	21	21	21
	Mean	866.00	1176.29	154.33	418.76
	Std. Deviation	139.444	187.393	41.653	79.174
	Minimum	612	854	85	328

	Maximum	1121	1457	220	620
	Median	878.00	1243.00	137.00	390.00
Severe	N	5	5	5	5
	Mean	911.40	1269.80	264.80	882.40
	Std. Deviation	113.383	242.404	22.698	73.612
	Minimum	754	858	235	782
	Maximum	1026	1501	298	980
	Median	906.00	1339.00	267.00	870.00
P-Value		<0.0001	<0.0001	<0.0001	<0.0001

The mean serum amylase level in the mild, moderate, and severe groups was 504.59 ± 144.085 U/L, 866.00 ± 139.444 U/L, and 911.40 ± 113.383 U/L respectively. It was statistically significant ($p < 0.0001$). The mean serum lipase level in the mild, moderate, and severe groups was 680.17 ± 179.748 U/L, 1176.29 ± 187.393 U/L, and 1269.80 ± 242.404 U/L respectively. It was statistically significant ($p < 0.0001$). The mean serum IL-6 level was 37.10 ± 8.077 pg/mL in the mild group, 154.33 ± 41.653 pg/mL in the moderate group, and 264.80 ± 22.698 pg/mL in the severe group. It was statistically significant ($p < 0.0001$). The mean serum ferritin level was 215.72 ± 53.141 ng/mL, 418.76 ± 79.174 ng/mL, and 882.40 ± 73.612 ng/mL in the mild, moderate, and severe groups respectively. It was statistically significant ($p < 0.0001$).

DISCUSSION

Distribution of Age in Group

The present study demonstrated that acute pancreatitis was more common among older individuals, with a statistically significant variation in age distribution (p=0.031). Increasing age is associated with a higher prevalence of gallstone disease, metabolic disorders, and comorbidities that predispose individuals to pancreatic inflammation and its complications. Similar findings were reported by Rossetti et al.[5] and Çalim A et al.[6], who observed increased disease occurrence, severity, and poorer outcomes among elderly patients.

Distribution of Sex

Male predominance was observed in the study population, consistent with previous literature. This may be attributed to greater exposure to alcohol consumption, smoking, and lifestyle-related risk factors among males, whereas gallstone-related pancreatitis is relatively more common in females.

Distribution of Severity

Mild acute pancreatitis constituted the majority of cases, reflecting the natural course of the disease as a predominantly self-limiting condition. Severe pancreatitis occurred less frequently but was associated with increased risk of organ failure, complications, prolonged hospitalization, and mortality. Similar observations were reported in the revised Atlanta Classification by Banks et al.[7] and by Wu et al.[8].

Distribution of SIRS on Admission

Nearly half of the patients had SIRS at admission. Although statistical significance was not observed, SIRS remains an important early predictor of disease severity, as persistent inflammatory response is associated with organ dysfunction and adverse outcomes.

Distribution of USG Findings

Ultrasonography revealed predominantly edematous pancreas, corresponding to the high proportion of mild interstitial pancreatitis. Peripancreatic collections identified in some patients suggested more severe disease. Arvanitakis et al.[9] emphasized the usefulness of ultrasonography as an initial diagnostic tool, particularly for detecting inflammatory changes and biliary etiology.

Distribution of ICU Admission, Local Complications, Systemic Complications and Mortality

The relatively low ICU admission rate reflected the predominance of mild disease. However, ICU admission was associated with greater morbidity and prolonged hospitalization. Local complications, including peripancreatic fluid collections, necrosis, pseudocysts, and walled-off necrosis, occurred in nearly one-fourth of patients and were associated with severe disease. Similar findings were described by Banks et al.[7] and Mederos et al.[10]. Systemic complications such as respiratory, renal, and cardiovascular dysfunction were less frequent due to the predominance of mild pancreatitis but remain major determinants of morbidity and mortality. The low mortality rate observed likely reflects early diagnosis, prompt treatment, and fewer severe cases.

Distribution of CT Findings

Contrast-enhanced CT demonstrated a predominance of interstitial edematous pancreatitis, consistent with the clinical severity profile. Necrotizing pancreatitis and peripancreatic collections were observed in a smaller subset and were associated with severe disease. These findings agree with reports by Balthazar et al.[11] and Banks et al.[7], who highlighted the prognostic significance of CT-detected necrosis and fluid collections.

Distribution of Mean Age, LDH, and Length of Stay

The mean age was 52.47 ± 18.81 years, indicating that acute pancreatitis predominantly affected middle-aged and elderly individuals. Similar age

distributions were reported by Peery et al.[12]. The mean hospital stay was 6.31 ± 2.28 days, with longer admissions among patients with severe disease, complications, or ICU requirement, consistent with findings by Fagenholz et al.[13].

Distribution of Ranson Scores and CT Severity Score

Ranson's criteria remain valuable prognostic tools for assessing severity and mortality risk in acute pancreatitis. Higher scores were associated with increased complications and adverse outcomes, as also reported by Khanna AK et al.[14] and Papachristou GI et al.[15]. The mean CT severity score was 4.35 ± 1.73, reflecting predominantly mild-to-moderate disease. Higher CT scores generally indicate increased pancreatic inflammation, necrosis, and morbidity.

Distribution of Serum Amylase, Lipase, IL-6 and Ferritin

Serum lipase demonstrated superior diagnostic utility compared with amylase, consistent with observations by Smith RC et al.[16] and Treacy J et al.[17]. The mean IL-6 level was 102.56 ± 80.59 pg/mL, supporting its role as an early inflammatory marker associated with disease severity and systemic complications. Heath DI et al.[18] similarly reported a strong association between elevated IL-6 levels and severe pancreatitis. The mean ferritin level was 353.85 ± 204.79 ng/mL. As an acute-phase reactant, ferritin reflects systemic inflammation and may serve as a useful prognostic biomarker.

Association between Age and Severity

Although older age is often considered a risk factor for severe pancreatitis, no significant association was observed in the present study. This may be related to the relatively small sample size and limited number of severe cases.

Association between Sex and Severity

Males predominated across all severity categories, including severe disease (80%). However, sex was not significantly associated with severity (p=0.613), suggesting that gender alone does not independently determine disease severity despite differences in exposure to risk factors.

Association between SIRS and Severity

A strong association was observed between SIRS at admission and disease severity. Persistent systemic inflammatory response contributes to cytokine-mediated organ dysfunction and poor outcomes. Similar findings were reported by Mofidi R et al.[19] and Singh VK et al.[20], who identified SIRS as an early predictor of severe pancreatitis.

Association between USG Findings and Severity

Peripancreatic collections were associated with severe disease, whereas edematous pancreas predominated in mild and moderate cases. Similar observations were reported by Lankisch PG et al.[21] and Stimac D et al.[22], highlighting the prognostic value of imaging findings.

Association between ICU Admission and Severity

Requirement for ICU care increased significantly with disease severity. Severe pancreatitis frequently necessitated intensive monitoring due to organ dysfunction and hemodynamic instability. Similar findings were reported by Johnson CD et al.[23] and Petrov MS et al.[24].

Association between Local and Systemic Complications and Severity

Local complications such as pancreatic necrosis, pseudocysts, and fluid collections were strongly associated with severe pancreatitis. Although systemic complications were more frequent among moderate and severe cases, statistical significance was not achieved, possibly because of the limited number of severe cases. Banks PA et al.7 and Petrov MS et al.[22] similarly identified organ failure and systemic inflammatory response as major determinants of severity and outcome.

Association between Mortality and Severity

Mortality was closely associated with severe pancreatitis, particularly in the presence of persistent organ failure, pancreatic necrosis, and systemic inflammatory response. These findings are consistent with previous literature emphasizing the importance of early identification and aggressive management of severe disease.

Association between CT Findings and Severity

CT findings correlated strongly with disease severity. Interstitial edematous pancreatitis was generally associated with favorable outcomes, whereas necrotizing pancreatitis predicted increased morbidity, prolonged hospitalization, and mortality. Similar observations were reported by Balthazar EJ et al.[11], Mortele KJ et al., and Stimac D et al.[22].

Mean Age and LDH According to Severity

Age was not significantly associated with severity. In contrast, LDH demonstrated a highly significant association ($p<0.0001$), with levels increasing substantially in moderate and severe disease. Elevated LDH reflects greater tissue injury, pancreatic necrosis, and inflammatory activity, supporting previous reports linking LDH with adverse outcomes.

Ranson Score, CT Severity Score and Severity

Both Ranson scores and CT severity scores increased significantly with disease severity. Mean CT severity scores rose from 3.69 ± 1.44 in mild disease to 7.00 ± 0.71 in severe disease ($p<0.0001$). These findings confirm the prognostic value of both scoring systems and are consistent with observations by Balthazar EJ et al.[11] and Mortele KJ et al.

Serum Amylase, Lipase, IL-6 and Ferritin According to Severity

Serum lipase increased significantly with disease severity ($p<0.0001$), supporting its role as a marker of pancreatic injury. IL-6 levels showed a marked rise from mild to severe disease (37.10 ± 8.08 pg/mL to 264.80 ± 22.70 pg/mL; $p<0.0001$), confirming its

importance as an early predictor of severe pancreatitis and cytokine-mediated complications, consistent with Heath DI et al.[18]. Ferritin levels also increased significantly with severity, reaching 882.40 ± 73.61 ng/mL in severe cases ($p<0.0001$). As an acute-phase reactant, ferritin reflects systemic inflammation and may serve as a useful prognostic biomarker for identifying patients at risk of severe disease and adverse outcomes.

CONCLUSION

The Ranson score on admission, Ranson score at 48 hours, and CT severity scoring system were found to be reliable prognostic tools for predicting severity and clinical outcome in acute pancreatitis. The study highlights the importance of early clinical assessment, radiological evaluation, and inflammatory biomarkers in identifying high-risk patients and guiding timely management. Early recognition of severe acute pancreatitis and prompt intervention may help reduce complications, ICU requirement, and mortality.

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