RESEARCH ARTICLE

CLINICAL CORRELATION OF RANSON'S, HAPS AND ULTRASOUND ABDOMEN IN PREDICTING OUTCOME OF ACUTE PANCREATITIS

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Manuscript Info

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Abstract

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Background: Acute pancreatitis poses challenges due to its highly variable clinical course, making it difficult to predict and plan treatment protocols despite advancements in medicine. Consequently, treatment outcomes have seen little improvement. Given the unpredictable nature of pancreatitis, numerous scoring systems have emerged to aid in its early severity prediction. HAPS stands out as one such system, designed for early prognosis and to rule out severe pancreatitis, while Ranson's scoring system assesses severity based on admission investigations and those conducted after 48 hours.

Methods: This was a Prospective observational study that was conducted on patients with acute pancreatitis admitted to the Postgraduate Department of Surgery GMC Jammu from 1st November 2019 to 31st October 2020.

Results: The study population predominantly consisted of females (66.4%) with a mean age of 47.44 years and a range spanning from 19 to 85 years. The most prevalent symptom was abdominal pain, observed in all patients (100%), followed by nausea and vomiting in 81.8% and 77.3% respectively. Ranson's scoring system demonstrated a sensitivity of 87.5%, specificity of 83.3%, and an accuracy of 92%. Meanwhile, HAPS showed a sensitivity of 93%, specificity of 87.5%, and an accuracy of 97%. Within the initial 24 hours, among 8 patients diagnosed with severe pancreatitis, Ranson's scoring incorrectly classified 3 patients as mild and correctly identified 5 patients as severe, whereas HAPS accurately predicted severe pancreatitis in 7 out of 8 patients. Upon admission, abdominal ultrasound revealed a bulky pancreas in 6 out of 8 patients diagnosed with severe pancreatitis, while 2 cases showed a normal pancreas size.

Conclusion: Acute pancreatitis presents challenges in predicting its course and planning treatment due to its unpredictable nature. Despite medical advancements, outcomes remain unchanged. Various scoring systems, including HAPS, aim to predict severity early on admission. HAPS

effectively identifies patients with mild pancreatitis upon admission, based on readily available parameters for assessment. Comparing with Ranson's score, HAPS accurately identifies those with a mild course. Based on our study and literature reviews, HAPS emerges as a valuable tool for predicting pancreatitis severity upon admission, particularly in resource-limited settings.

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Introduction: -

Acute pancreatitis (AP) is an acute inflammatory condition of the pancreas leading to injury or destruction of acinar components, clinically characterized by abdominal pain and elevated blood levels of pancreatic enzymes. The incidence of the disease ranges from 13 to 45 per 100,000 persons/ year[1,2]. The causes of acute pancreatitis can be diverse, including biliary causes, alcohol, anatomic variations, genetic, metabolic, trauma, infections, drugs, toxins,etc[3].The diagnosis of AP is based on the clinical presentation of the patient with abdominal pain at the epigastrium and radiating to the back with nausea and vomiting, and laboratory investigations with elevated levels of pancreatic enzymes, i.e. serum amylase and lipase[4]. CECT, MRI abdomen, and Ultrasonography abdomen have a role in providing more information about anatomy and changes related to pancreatitis[5,6,7]. There are various scoring systems for assessing the severity of acute pancreatitis, one of them being Ransom's scoring system based on various laboratory parameters[8].

Methods: -

This was a Prospective observational study that was conducted on patients with acute pancreatitis admitted to the Postgraduate Department of Surgery GMC Jammu from 1st November 2019 to 31st October 2020 after ethical clearance from the institutional committee. Data was compiled and analysed in MS Xcel.

All patients were admitted to the surgical department with a history suggestive of acute pancreatitis due to surgical cause. They were evaluated to confirm or rule out acute pancreatitis. All baseline laboratory investigations including complete blood counts, liver function test, renal function test and serum amylase and lipase levels were done, an ultrasound abdomen on admission and at 48 hours, was done to see the radiological progression of the disease and findings. Pts with conditions, independently affecting serum amylase level, Chronic pancreatitis, Acute on chronic pancreatitis, Pancreatic trauma patients with pancreatitis, Alcoholic pancreatitis were excluded from the study.

The following factors were taken into consideration for assessing the severity of pancreatitis:
Harmless acute pancreatitis scoring system (HAPS) (rebound tenderness or guarding/hematocrit/creatinine), Ranson's scoring, and findings of Ultrasonography.

Results: -

Our study included a total of 110 patients, with 66.4% (n=73) being females and 33.6% (n=37) males. The mean age of patients was 47.44 years (ranging from 19 to 85) with a standard deviation of 16.29.

Patients with mild pancreatitis had a mean hospital stay of 6.6 days (SD = 2.46), while those with severe pancreatitis stayed for an average of 17.12 days (SD = 16.23).

All patients presented with abdominal pain, with accompanying symptoms including nausea and vomiting (81.8% and 77.3% respectively), fever (15.5%), and breathlessness (10.9%). On examination, epigastric tenderness was universal, while guarding was observed in 10%, rebound tenderness in 7.3%, distension in 20.9%, and icterus in 15.5%.

Serum amylase levels were elevated in 87.3% of patients, and serum lipase levels were elevated in 93.6% of patients. In cases with normal enzyme levels, typical clinical presentation and abdominal ultrasound findings showed a bulky pancreas.

Out of 101 HAPS positive patients, 100 had a mild course of pancreatitis, while one had severe acute pancreatitis. Among the 9 HAPS negative patients, 7 developed severe pancreatitis, with 4 fatalities, and 2 had a mild course.

Regarding Ranson's score, among 24 patients with a score >3 after 48 hours, 7 had severe pancreatitis, resulting in 4 fatalities, and 17 had a mild course of the disease. Ranson's score exhibited a sensitivity of 87.5%, specificity of 83.3%, and an accuracy of 92%, serving as a reliable tool for predicting pancreatitis severity, albeit requiring 48 hours after admission for treatment protocol determination.

Abdominal ultrasound revealed a bulky pancreas in 50.9% of patients, while in 15.45% pancreas was not visualized initially due to gut gases, and in 33.63% pancreas appeared normal in bulk on admission scans. Thus, abdominal ultrasound may not be the preferred method for diagnosing pancreatic morphological changes at admission.

HAPS demonstrated a sensitivity of 93%, specificity of 87.5%, and an accuracy of 97%, providing prompt results post-admission. Ultrasound findings included edematous pancreas, peripancreatic fat stranding, fluid collection, ascites, and pleural effusion.

Regarding early prediction, within the first 24 hours, Ranson's score misclassified 3 patients with severe pancreatitis as mild, whereas HAPS accurately predicted 7 out of 8 patients with severe pancreatitis. Additionally, ultrasound scans on admission showed a bulky pancreas in 6 out of 8 patients with severe pancreatitis, with 2 cases reporting normal pancreatic bulk.

Table 1: - Showing various clinical parameters of patients.

Patient Data	Findings	Number	Percentage
Gender	Males	37	33.6
	Females	73	66.4
Symptoms	Pain abdomen	110	100
	Nausea	90	81.8
	Vomiting	85	77.3
	Fever	17	15.5
	Breathlessness	12	10.9
Signs	Epigastric tenderness	110	100
	Guarding	11	10
	Rebound tenderness	8	7.3
	Distension	93	84.5
	Jaundice	17	15.5
Comorbidities	HTN	13	11.8
	Hypothyroid	5	4.54
	DM	5	4.54
	IHD	3	2.73
	ATT	1	0.9

Table 2: - Showing various laboratory and radiological parameters of patients.

Lab/radiological findings	Characteristic	Number	Percentage
Blood sugar	>220mg/dl	34	30.9
AST	>250IU/L	18	16.4
LDH	>400IU/L	33	30
Calcium	<8mg/dl	38	34.5
Hematocrit fall	>10%	9	8.2
BUN	>2mg/dl	9	8.2
Base deficit	>5meq/L	27	24.5

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Fluid sequestration	>4L	13	11.8
S. Amylase	>3 times normal	96	87.3
S. Lipase	>3 times normal	103	93.6
USG Abdomen findings	GB Calculus	110	100
(at the time of admission)	Bulky pancreas	56	50.9
	Normal bulk pancreas	37	33.6
	Not visualized	17	15.5
USG abdomen >48hrs	Diffuse oedematous	52	51.3
	DE + pleural effusion	19	17.3
	DE+PE+ Ascites	9	8.2
	Focal oedematous	26	23.6
	Normal bulk	4	3.6
Organ failure	Transient	13	11.8
	Permanent	4	3.6
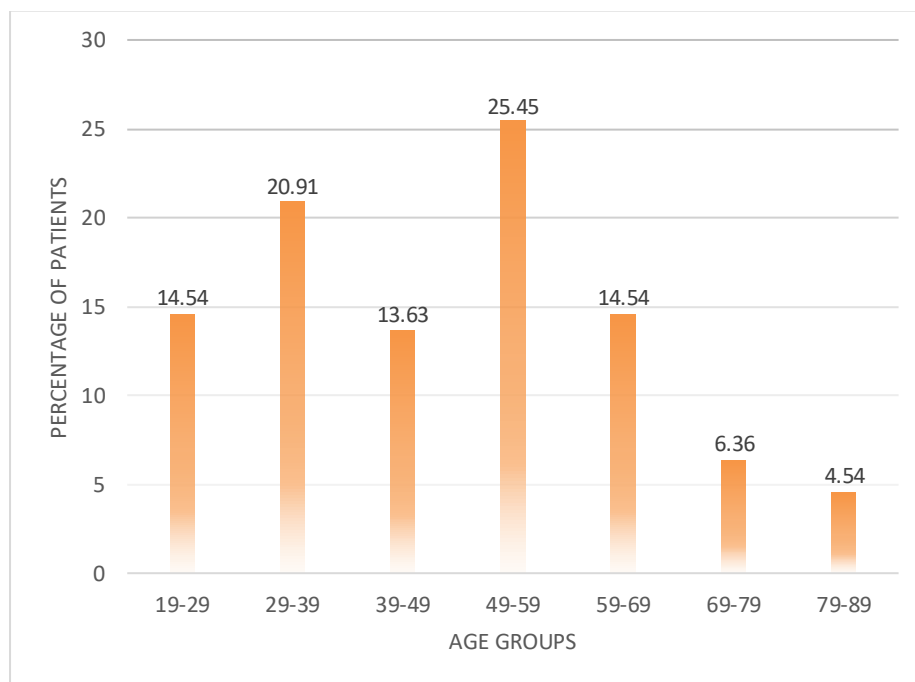
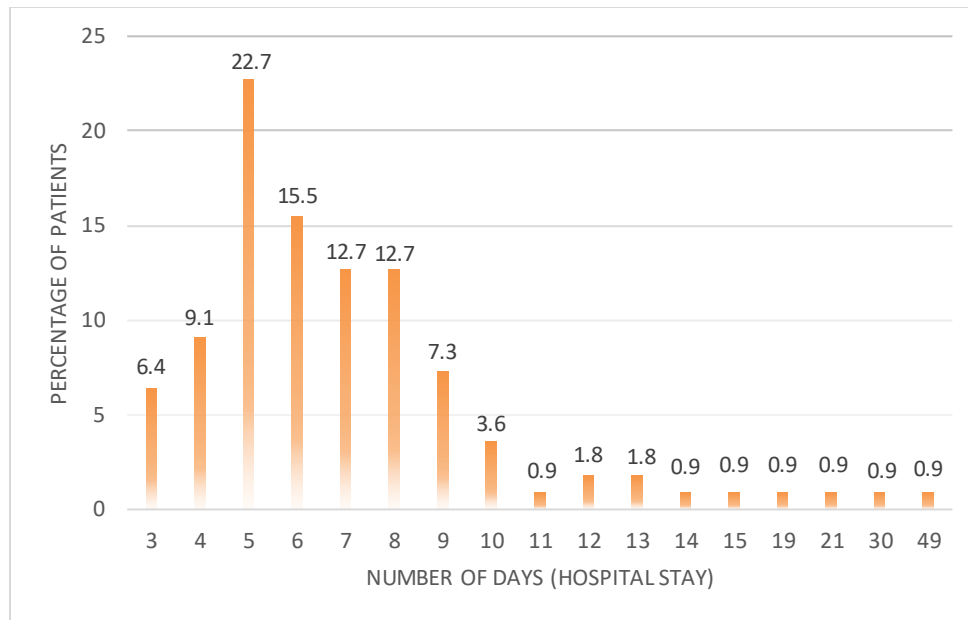**Figure 1: -** Showing percentage of patients in various age groups.

Figure 2: - Showing distribution of days in hospital stay.

Discussion: -

In our study of 110 patients, 73 were female and 37 were male, with a mean age of 47.44 years, predominantly in the 51 to 60 age brackets. Other studies showed varying gender distributions and ages: Oskarsson et al. had 55% males and 45% females with a median age of 57 years; Talukdar et al. had 76.3% females and 23.7% males with a median age of 40 years; Al-Qahtani et al. had 83.6% females and 16.4% males with a mean age of 42 years; Sayrac et al. had 52.1% females and 47.9% males with a mean age of 58.7 years[9,10,11,12].

In our study, every patient experienced abdominal pain and epigastric tenderness. This parallels findings from studies by Lankisch et al. and Kumar & Griwan, where all participants similarly displayed these symptoms[13,14].

In our study, vomiting occurred in 77.3% of patients, while abdominal distension was observed in 20.9% of patients. Contrarily, Ahmed et al. found vomiting in 88% and abdominal distension in 40% of their patients. Similarly, Kumar & Griwan reported vomiting in 78% and abdominal distension in 56% of their patient cohort[14,15].

In our study, rebound tenderness was observed in 7.3% of patients. In contrast, Lankisch et al. reported rebound tenderness in 32% of patients, while Kurrey et al. found it in 50% of their patient cohort[13,16].

In our study, jaundice was present in 15.5% of patients upon presentation. Similarly, Kurrey et al. and Das et al. reported jaundice in 14% of their patients at presentation. Conversely, Al-Qahtani et al. found jaundice in 6.7% of their patient population[11,16,17].

In our study, 15.5% of patients presented with fever. Conversely, Kurrey et al. found fever in 24% of their patients, while Das et al. reported it in only 3% of their patient cohort[16,17].

In our study, 4.5% of patients had hypertension, while 11.8% had diabetes as comorbidities. In contrast, Wani et al. (2017) reported higher rates with hypertension in 20.7% and diabetes in 32% of their patients. Similarly, Sathik et al. (2020) found hypertension in 30% and diabetes in 6% of their patient cohort[18,19].

In our study, elevated serum amylase levels were found in 87.3% of patients, while elevated serum lipase levels were found in 93.6% of patients. In comparison, Gomez et al. reported elevated serum amylase levels in 84% of patients and elevated serum lipase levels in 96% of patients. Conversely, Reddy et al. observed raised levels of both serum amylase and lipase in all patients[20,21].

In our study, pancreas visualization during abdominal ultrasonography was achieved in 66.37% of patients. Bhatt et al. reported a visualization rate of 80%, while Lalith &Ilangovan found a rate of 88% in their respective studies [22,23].

In our study, 50.9% of patients presented with a bulky pancreas during abdominal ultrasonography, while 33.6% had a pancreas of normal bulk. Conversely, Bhatt et al. reported that 68% of patients had a bulky pancreas, with 12% exhibiting a pancreas of normal bulk [22].

In our study, pleural effusion was detected in 26.4% of patients, while ascites was present in 8.2% of patients. Akhter et al. reported pleural effusion in 20% and ascites in 18% of their patients. Conversely, Chand et al. found pleural effusion in 19.4% of patients in their study using chest radiography and ultrasonography [24,25].

In our study, 3.64% of patients experienced permanent organ failure and died within 6 days. Similarly, Sayrac et al. reported that 4.17% of patients had permanent organ failure and died within 5 days of admission in their study [12].

In our study, patients with mild pancreatitis had a mean hospital stay of 6.6 days, while those with severe pancreatitis stayed for an average of 17.12 days. Conversely, Jalal reported a mean hospital stay of 6.2 days for patients with mild pancreatitis and 10.8 days for patients with severe pancreatitis in their study [26].

In our study, 7.3% of patients developed severe pancreatitis. In contrast, Lankisch et al. reported a higher rate with 20% of patients developing severe pancreatitis, while Oskarsson et al. found a lower rate with 6.6% of patients developing severe pancreatitis in their respective studies [9,13].

In this study, out of 101 patients who tested positive for HAPS, one had severe pancreatitis, while out of 9 patients who tested negative for HAPS, 7 had severe pancreatitis. HAPS demonstrated a sensitivity of 93% and a specificity of 87.5%.

Contrarily, in the study by Al-Qahtani et al. 104 out of 116 patients (89.6%) tested positive for HAPS, among which 101 had mild pancreatitis and 3 had severe pancreatitis. Among the 12 patients who tested negative for HAPS, 10 developed severe pancreatitis, while 2 developed mild pancreatitis. HAPS showed a sensitivity of 98% and a specificity of 77% in their study [11].

In our study, Ranson's scoring system demonstrated a sensitivity of 87.5% and a specificity of 83.3%. Contrarily, Kumar et al. reported a sensitivity of 80.00% and a specificity of 96.55% for Ranson's scoring. Similarly, Aggarwal et al. found Ranson's score to have a sensitivity of 91.6% and a specificity of 89.4% [14,27].

Conclusion: -

Acute pancreatitis presents challenges in early predicting its course and planning treatment due to its unpredictable nature. Despite medical advancements, outcomes remain unchanged. Various scoring systems, including HAPS, aim to predict severity of acute pancreatitis early on presentation or at time of admission. HAPS effectively identifies patients with mild pancreatitis upon admission, based on readily available parameters for assessment as compared to Ranson's score. Based on our study and literature reviews, HAPS is a valuable tool for predicting pancreatitis severity upon admission, particularly in resource-limited settings.

The limitation of the study was the sample size.

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