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PREDICTING THE COURSE OF ACUTE PANCREATITIS PATIENT BASED ON HARMLESS ACUTE PANCREATITIS SCORE (HAPS)

General Surgery

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ABSTRACT

INTRODUCTION: Acute pancreatitis is a common disease with a very unpredictable course , and hence requires a scoring system that is easy, quick and simple and that can predict the course at the earliest to avoid and prevent further complications. One such scoring system in recent times is the Harmless Acute Pancreatitis Score.
MATERIALS AND METHODS: 60 patients presenting with pain in abdomen with raised serum amylase and serum lipase level are admitted to Bharati Hospital and research centre, Pune.
DISCUSSION: Harmless Acute Pancreatitis score could predict the severe cases more efficiently and that helped in making necessary decisions and improving the line of management. As per our study, we found the Harmless Acute Pancreatitis score to be an effective scoring system in predicting the course of Acute Pancreatitis with least number of investigations and requiring not more than half an hour.
CONCLUSION: The Harmless Acute Pancreatitis Score is a good prognostic scoring system in predicting severe cases more efficiently than mild cases very early on admission, requiring least number of investigations

KEYWORDS

Acute pancreatitis, HAPS, peritonitis, haematocrit.

INTRODUCTION

The incidence of acute pancreatitis has increased exponentially in the past 20 years. Acute pancreatitis is a common condition with an incidence of 13-45/100,000 population[1]. It shows wide clinical variation, ranging from mild to severe discomfort . Moreover, the inflammatory process may remain localized in the pancreas, spread to regional tissues, or even involve remote organ systems[2].

Most of these patients undergo a mild course with the only requirement of hydration. However, approximately 10-20% of these patients undergo a severe course with a rapidly progressive systemic inflammatory response leading to multiorgan failure[3] i.e. development of pleural effusion, renal failure, need for dialysis, endotracheal intubation and ventilation and in some cases death.

Because of its unpredictable course, a lot many scoring systems have been introduced and a few of them have a good predictive value, however these scoring systems have a few setbacks. Most take a long time to predict , are too complicated and expenditure rate being high, inability of various investigation facilities to score, and need for specialized centers.

The scoring systems include the Atlanta criteria for clinical classification of acute pancreatitis, multiple factor based scoring system by Ranson et al[4], Acute Physiology And Chronic Health Evaluation II (APACHE II score)[5] , Computed Tomography And Severity Index (CTSI)[6] , Bedside Index And Severity Of Acute Pancreatitis (BISAP)[7] , Systemic Inflammatory And Response Syndrome score (SIRS)[8] , and the recent ones include Marshall score[9] and Sequential Organ Failure Assessment Score (SOFA Score)[10] and single parameter predictors like Blood Urea Nitrogen(BUN), Serum Creatinine, C-Reactive Protein[11], D- Dimer etc. Among these, only an active increase in the blood urea nitrogen within 12-24 hours has shown to predict infected pancreatic necrosis and resulting mortality[12].

In recent times, a simple scoring system was established called The Harmless Acute Pancreatitis Score(HAPS) based on the data collected from a large prospective cohort study done on 394 patients of acute pancreatitis by the department of Internal Medicine of Luneberg Municipal Clinic in Germany[13].

HAPS is one such scoring system that can predict the course of acute pancreatitis within the first 30 minutes of patients being admitted into hospital.
This scoring system has an upper hand over the rest as it only requires 3 parameters which include the absence of –
1. Signs of peritonitis i.e. any guarding or rigidity of the abdomen,
2. Hematocrit levels<43% in males and <39.6% in females and
3. Creatinine level <2mg/dl.

These 3 parameters are non-expensive, easily available and does not require much time for the results. HAPS is an easy, simple and quick scoring system and will be very useful in predicting the course of the disease.

AIMS:

To evaluate a simple method for rapid identification of patients presenting with acute pancreatitis who do not require intensive care

OBJECTIVES:-

1. To Study HAPS score in acute pancreatitis patient.
2. To correlate the score with USG or CT findings , surgery findings and histopathology report(IF ANY).

INCLUSION CRITERIA

1. Patient of acute pancreatitis with pain in abdomen/ palpable mass/ paralytic ileus/ skin signs of acute pancreatitis [14].
2. Patients above 18 years of age

EXCLUSION CRITERIA

1. Immunocompromised patients e.g HIV, Patients on chemotherapy/ Steroids.

MATERIALS AND METHODS

:- STUDY AREA: Bharati hospital and research centre, Pune

- **STUDY POPULATION:** Patients presenting with complaints of upper abdominal pain and on clinical assessment and laboratory reports which include raised enzyme levels(amylase and lipase) diagnosed as acute pancreatitis admitted in Bharati Hospital and research centre , Pune from August 2018 to September 2020 have been included in the study after giving informed consent and ethical clearance.
- **STUDY DESIGN:** Prospective observational study
- **PERIOD OF STUDY:** 24 months

METHODOLOGY

60 patients of age above 18 years and fulfilling the inclusion criteria were taken up for the study. Patients were interviewed and demographic data such as age and sex were noted.

As soon as the patient of acute pancreatitis was brought to the hospital ,the patient was evaluated clinically and the HAPS scoring was done

based on 3 parameters

Absence of –
1. Signs of peritonitis i.e. any guarding or rigidity of the abdomen,
2. Hematocrit levels<43% in males and <39.6% in females and
3. Creatinine level <2mg/dl.

Presence of each of these were given a score of 1, making a minimum of 0 and maximum of 3.

Based on this, the course of the patient was decided, whether patient will require intensive care or will undergo a mild course.

If all the parameters are negative ,the patient was predicted to undergo a mild course (harmless course).

If patient has even one positive score, it will have a severe course of the disease and hence continuous vitals monitoring, strict input and output, regular blood investigation was done.

During the stay in the hospital, a harmless course was defined as absence of necrosis in contrast enhanced CT Imaging scan, absence of pleural effusion, no requirement of dialysis or artificial ventilation or a fatal outcome.

OBSERVATION AND RESULTS

The age distribution varied from less than 30 years to 60 years and above with peak incidence in the age group of 30-44 years accounting for 46.7% followed by the age group less than 30 years i.e 28.3% followed by age group 45-59 years and lastly 60 years and above.

The gender distribution showed 80% of patients with acute pancreatitis were males. And 20% were females [16].

The etiological factor ranged from alcohol accounting for a massive 66.7% cases followed by gall stones seen in 20% cases followed by hypertriglyceridemia i.e 11.7% , idiopathic in 3.4%,and blunt trauma to abdomen 1.7%[17] .

Table 1. Correlation of Guarding findings with CT findings (N=60)

Guarding	CT findings		P value	Kappa value(95% CI)
	Present	Absent		
Present	20 (45.5)	5 (31.2)	0.489	0.103 (-0.102-0.308)
Absent	24 (54.5)	11 (68.8)		
Total	**44 (100)**	**16 (100)**		

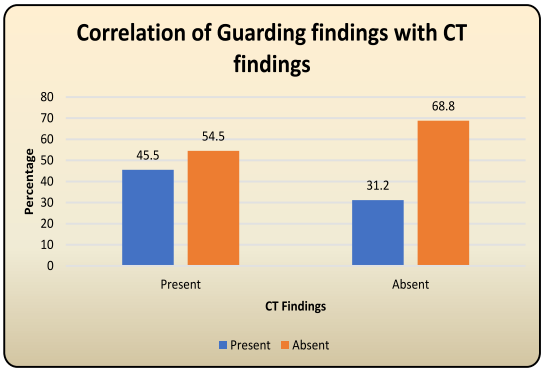


Table 2. Diagnostic accuracy of Guarding findings identifying acute pancreatitis compared to CT

Parameter	%	95% CI
Sensitivity	45.5	31.7-59.9
Specificity	68.7	44.4-85.8
Positive predictive value	80	60.9-91.1
Negative predictive value	31.4	18.6-48.0
Diagnostic accuracy	51.7	39.3-63.8

Table 3. Correlation of Haematocrit values with CT findings (N=60)

Haematocrit	CT findings		P value	Kappa value (95% CI)
	Present	Absent		
Present	25 (56.8)	4 (25.0)	0.059	0.25 (0.02-0.47)
Absent	19 (43.2)	12 (75.0)		
Total	**44 (100)**	**16 (100)**		

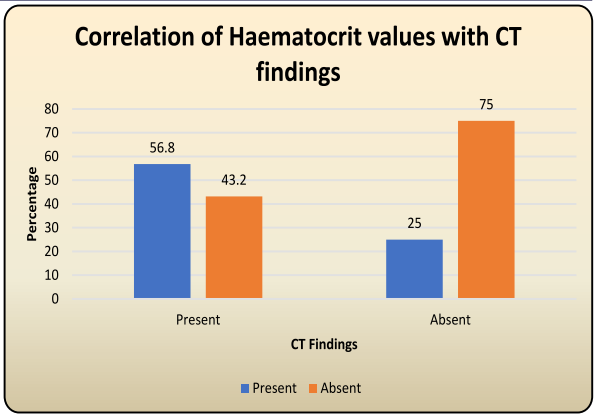


Table 4. Diagnostic accuracy of Haematocrit values identifying acute pancreatitis compared to CT

Parameter	%	95% CI
Sensitivity	56.8	42.2-70.3
Specificity	75	50.5-89.8
Positive predictive value	86.2	69.4-94.5
Negative predictive value	38.7	23.7-56.2
Diagnostic accuracy	61.7	49.0-72.9

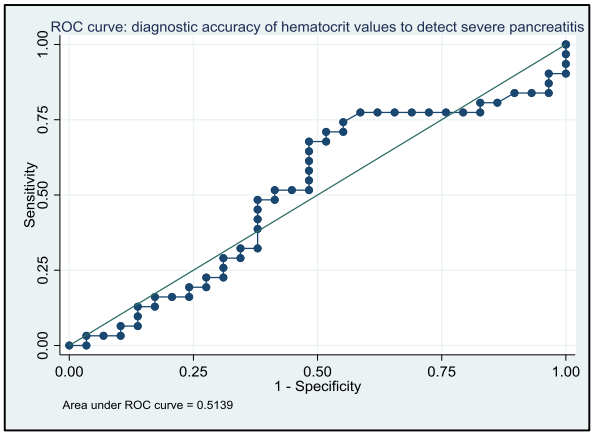


Table 5. Correlation of Creatinine values with CT findings (N=60)

Creatinine	CT findings		P value	Kappa value (95% CI)
	Present	Absent		
Present	3 (6.8)	0 (0)	0.687	0.04 (-0.03-0.106)
Absent	41 (93.2)	16 (100)		
Total	**44 (100)**	**16 (100)**		

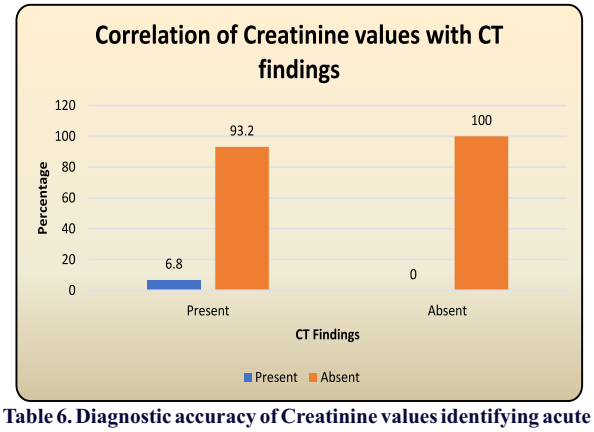
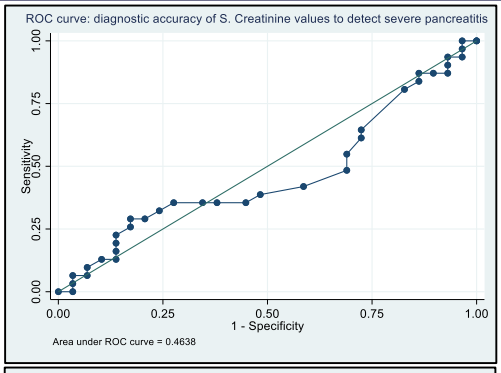


Table 6. Diagnostic accuracy of Creatinine values identifying acute pancreatitis compared to CT findings

Parameter	%	95% CI
Sensitivity	6.8	2.3-18.2
Specificity	100	80.6-100
Positive predictive value	100	43.9-100
Negative predictive value	28.1	18.1-40.8
Diagnostic accuracy	31.7	21.3-44.2



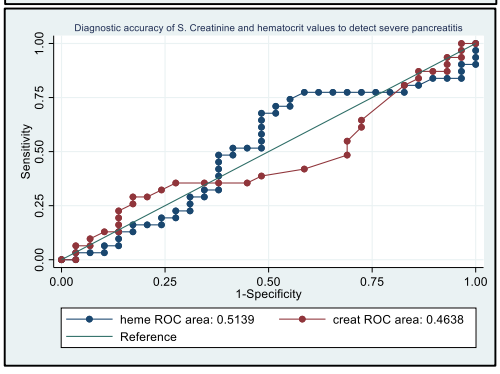


Table 7. Distribution of HAPS (N=60)

HAPS	N	%
Severe	40	66.66
Mild	20	33.33
Total	**60**	**100**

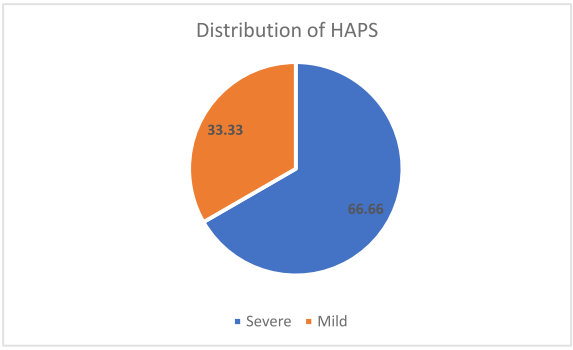


Table 8. Distribution of CT findings (N=60)

CT findings	N	%
Severe	44	73.33
Mild	16	26.66
Total	**60**	**100**

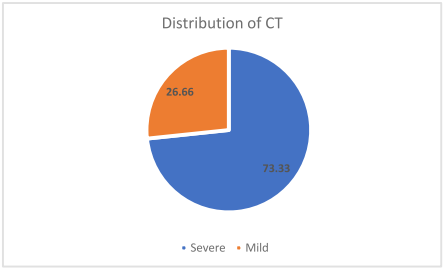


Table 9. Correlation of HAPS findings with CT findings (N=60)

HAPS Findings	CT findings		P value	Kappa value (95% CI)
	Severe	Mild		
Severe	33 (75.0)	7 (43.8)	0.023	0.28 (0.04-0.53.9)
Mild	11 (25.0)	9 (56.3)		
Total	**44 (100)**	**16 (100)**		

The correlation of HAPS findings with CT findings are depicted in table 10. There 75% of the cases severe in CT findings are correctly identified as severe by HAPS findings. Similarly, 56.3% of the mild cases in CT were correctly identified as mild by HAPS. There is a fair agreement between CT and HAPS for identifying acute pancreatitis (Kappa =0.28)

Table 10. Diagnostic accuracy of HAPS identifying acute pancreatitis compared to CT

Parameter	%	95% CI
Sensitivity	75	60.6-85.4
Specificity	56.3	33.2-76.9
Positive predictive value	82.5	68.1-91.3
Negative predictive value	45	24.8-65.8
Diagnostic accuracy	70	57.5-80.1

DISCUSSION

Acute Pancreatitis has an uncertain prognosis with most of the cases having unforeseeable course of the disease. Hence a detailed study about the etiological factor, the clinical presentation, the prognostic factors and the management is of utmost importance to be documented. In our study, we have taken into consideration the data of the patient, relevant to the study and the clinical presentation along with blood and radiological investigations to predict the outcome of the disease using the Harmless Acute Pancreatitis score within the initial 30 minutes of admission in patients with complaints of pain in abdomen and with raised amylase and lipase levels and have correlated our prediction with the CT findings. We have followed the patient's course of the disease in ward/ ICU and the radiological/ surgical procedure if required. Patient's condition at discharge were noted .

Lankisch et al in 2009 had established the criteria of the Harmless Acute pancreatitis score after studying 394 patients who had presented to the department of internal medicine in the Luneberg municipal clinic, Germany, with a first attack of acute pancreatitis. The HAPS could predict a harmless course with a specificity of 97%(89% to 99%) and positive predictive value of 98%(92% to 100%)[4].

This study was carried out in another validation set of 452 patients in a Germany with a predictive value similar to the original study.

Later, more recently, similar study was performed between 2004 and 2009 in Sweden with a cohort of 531 patients, this study showed a specificity of 96.3(81-99.99) and PPV of 98.7(93.1-100).[18]

A pilot study was performed in the north eastern state of India from July 2010 to December 2011 by Rupjyoti Talukdar et al with a total of 103 patients out of which 23 were excluded. The sensitivity was 76.3(66.9-86.4), specificity of 85.7(78.0-96.8), positive predictive value of 93.8(88.5-98.6) and negative predictive value of 84.8(76.9-92.7).

The findings as per the statistics shows that in previous studies, HAPS had a higher diagnostic accuracy for predicting the mild cases. In our study, we have found that the Harmless Acute Pancreatitis score could predict the severe cases more efficiently and that helped in making necessary decisions and improving the line of management. Patients who had a severe score according to HAPS were regularly monitored and hydrated well and were managed in intensive care unit/ high dependency unit. The hematocrit and the creatinine levels along with serum amylase and serum lipase were monitored serially and necessary actions were taken to normalize it .

Patients were given aggressive hydration therapy along with antibiotics in selected cases with infected necrosis of peri-pancreatic collection, Spirometry was started to improve the respiratory function, in 3 cases out of 60 with raised creatinine levels despite aggressive hydration, dialysis was required in view of kidney failure.

Out of 60 patients, 3 patients who were predicted to have a severe course showed an aggressive course of the disease and despite our best efforts to salvage, could not be salvaged and eventually expired. However, these patients presented to our hospital late after getting transferred from other hospitals/ primary health centre and that delay in getting adequate initial treatment could be a potential reason for the severity of the course and eventual death.

The milder cases were treated with hydration and symptomatic treatment and were discharged on 4-5th day. In patients with gall stone pancreatitis, ERCP followed by laparoscopic cholecystectomy was

done. Patients with hypertriglyceridemia were started on statins and patients with splenic vein and portal vein thrombosis were started on low molecular weight heparin injections followed by Tab Warfarin on discharge with regular coagulation profile monitoring. Regular follow ups on OPD basis were done for all patients for a minimum of 2 months.

The HAPS shows a fair diagnostic accuracy and sensitivity in predicting a mild case. Although, HAPS has a good predictive value in predicting severe cases which can improve the management and will prove a better prognostic scoring system over previous ones within the initial 30 mins of admission.

The shortcomings and drawbacks in our study could be due to the delay in admission and delay in early start of treatment measures considering patients were initially managed at primary centers and also alcoholic patients who were brought on the 2nd or 3rd day since the onset of symptoms. However, one major handicap in our study is a relatively small sample size. This subject needs to be studied on a larger scale with a larger sample size for a fair validation of the Harmless Acute Pancreatitis Score. Even so, our study has shown a promising diagnostic value in predicting a severe course and that led to early management and treatment of the patients.

CONCLUSION

In conclusion, the Harmless Acute Pancreatitis Score is a good prognostic scoring system in predicting severe cases more efficiently than mild cases very early on admission, requiring least number of investigations and this would be of utmost value in initiation of aggressive treatment immediately after admission without any delay and thereby reducing the morbidity and mortality of patients with Acute Pancreatitis and in reducing the expenditures of patient and the hospital in treating milder cases on OPD basis with symptomatic treatment or admission in ward for a mere 4-5 days.

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