International Clinical and Medical Case Reports Journal
Case Report Article (ISSN: 2832-5788)

Role of Harmless Acute Pancreatitis Score in Predicting Mild/Non - Severe Pancreatitis - A Prospective Observational Study.

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Citation: *Swmaya Bajpai, Gyaneswhor Shrestha, Aliza Hamal, Rupesh Verma, Bibhav Bashyal, Aakriti Shrestha, Bikal Ghimire. Role of Harmless Acute Pancreatitis Score in Predicting Mild/Non - Severe Pancreatitis - A Prospective Observational Study. Int Clinc Med Case Rep Jour. 2023;2(11):1-8.*

DOI: https://doi.org/10.5281/zenodo.7961073

Received Date: 09 May, 2023**; Accepted Date:** 15 May, 2023**; Published Date:** 18 May, 2023

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INTRODUCTION

Acute pancreatitis (AP), defined as the acute nonbacterial inflammatory condition of the pancreas. Acute Pancreatitis develops from the activation of digestive enzymes found within the acinar cells, which causes auto digestion of the gland parenchyma, surrounding tissues and other organs[1]. Clinically, AP diagnosis is made by revised Atlanta criteria, which includes parameters like clinical, biochemical and imaging[2]. AP has multiple identifiable causes, most common causes are Gall stone and Alcohol[3]. The spectrum of disease effect ranges from mild illness to mortality[4]. Series of disease starts with releases of preformed pancreatic enzymes within acinar cells. It then leaks into surrounding tissue and distant organs and causes systemic inflammation, MODS and mortality.

In the early stages of an illness, it is exceedingly challenging to forecast how it will progress. An important prerequisite is early detection of risk group for effective prevention of adverse outcomes of disease. Early identification of severe parameters will help in disease triage for adequate resuscitation and appropriate management. Ideal triage tool should be affordable, sensitive with high positive predictive value (PPV)[5].

Several scoring system and parameters had been studied like- APACHE score, Ranson score, Glassgow scale. All these parameters intended to predict severity of acute pancreatitis and triage the patient who needs ICU admission[6].

After 48 hours after admission, several parameters for the Ranson score are obtained. Some scoring systems include variables like CRP, D dimer, calcium, and others that are not readily available in all Nepali hospitals. Patients may get worse before their severity is assessed in these assessments.

Recently, Harmless Acute Pancreatitis Score (HAPS) has been introduced for acute pancreatitis with mild/non severe course. HAPS parameters are easily available and feasible in the Department of Emergency.

Aim of this study is to determine the use of HAPS score in comparison to revised Atlanta classification of AP in detecting acute mild/non severe pancreatitis.

METHODOLOGY

This was a prospective observational study conducted in the department of surgery, TUTH from March 2020 to February 2021. Study was conducted after Ethical approval from IRC.

In this study all patients older than 16 of primary diagnosis of acute pancreatitis were included. Patient with documented recurrent pancreatitis, idiopathic pancreatitis, co-morbidities like cardiovascular and cerebrovascular diseases, renal and liver failure, malignancy, history of infectious disease 1 month prior were excluded from the study. Patients were followed till they got discharged or in hospital mortality whichever came first.

In the emergency room and surgery department, the patients were evaluated by the treating surgeon and a third-year student. According to the Revised Atlanta classification, the diagnosis of acute pancreatitis was made based on the symptoms (epigastric pain radiating to the back, serum amylase or lipase value > 3 times normal value, imaging finding Ultrasonography of the abdomen and pelvis). Confirmed case of AP and those fulfilling the inclusion criteria were admitted and enrolled in the study. Vital signs like Blood Pressure, Pulse Rate, Respiratory Rate, Temperature and clinical finding like rebound tenderness was recorded. In ED hematological and biochemical investigations like complete blood count, hematocrit, serum amylase and lipase, creatinine, urea, sodium, potassium, Liver function test (TB, DB, ALT, AST, ALP, PT/INR), Blood gas analysis with PO2/FIO2 ratio were analyzed and recorded.

HAPS score of patients were calculated. Patient with absence of all three parameters were HAPS positive AP and were expected to have mild illness course and were admitted in general ward. Whereas HAPS negative AP were resuscitated and admitted to ICU. Modified Marshall Score was used organ failure and considered as organ failure if score is >2. According to Revised Atlanta Classification AP was classified into Mild, Moderately

severe and Severe. AP is labeled as mild, moderately severe and severe if no organ failure, organ failure that persist for less than 48 hours, and organ failure that persist for more than 48 hours respectively.

Mild AP were treated with nil per Os (NPO) for 24 hours, IV Ringers lactate solution, IV narcotics. Oral feeding was started after 24 hours of admission or once patient felt comfortable to eat. Severe cases were admitted to ICU. They were managed with NPO, IV RL, IV narcotics, strict BP, HR Spo2, Urine output monitoring. Supportive care like O2 supplementation, Inotropic drugs, dialysis if indicated.

The following outcomes were studied: Length of hospital stay, ICU stay, development of local complications including necrosis, development of organ failure (OF), development of hospital- acquired infections (urinary tract infection, pneumonia, primary infected necrosis (IN); sepsis), and in-hospital mortality.

Statistical analysis was performed using SPSS 25th version. For continuous variables t-test was used and for categorical variables chi-square test was used. The confidence interval of 95% was taken and a p-value <0.05 was considered statistically significant.

RESULTS

In this study we included 84 patients (38 male and 46 female). Mean age of study group was 45.95 ± 12.62 years. Causes of AP among study group were gall stone disease (n=63), alcohol intake (n=17) and other causes (unknown) (n=4). (Table 1) Biochemical analysis of study group revealed serum urea level of 5.25±3.74, serum creatinine level of0.98±0.47, serum amylase level of 933.98±801.89, serum lipase level of 1181.9±1346.87.

Table 1: Demographic and Characteristic

Characteristics	**Demographic**
Age, in years (mean ± SD)	45.95 ± 12.62
Sex, N (%) Male Female	 38(45.24%) 46(54.76%)

Causes (%)	
Alcohol	17 (20.24%)
Biliary	63 (75%)
Iatrogenic	2(2.38%)
Unknown	2(2.38%)
Comorbidity, N (%)	
COPD	3(3.357)
Hypothyroidism	1(1.19)
DM	7(4.76)
HTN	4(1.19)
Urea (mg/dl)	5.25±3.74
Creatinine (umol/l)	0.98±0.47
Amylase (U/L)	933.98±801.89
Lipase (U/L)	1181.9±1346.87

In this study, 59 (70.24%) were HAPS positive and 25 (29.76%) were HAPS negative. Among HAPS negative 6 patient required ICU transfer and managed accordingly. Total 11 patients had pleural effusion, 2 in HAPS positive group and 9 in HAPS negative group. Among HAPS negative group 1 case had Hospital acquired pneumonia. 1 patient in HAPS negative group AKI and was managed with Fluid resuscitation. Average length of symptoms in this study group was 4.22 ±3.72. (Table 2) Total duration of hospital of this study group was 3.85±2.18 (Duration of hospital stay in HAPS positive was 3.44±1.29 and in HAPS negative was 4.03±2.45). According to Revised Atlanta Classification, AP was classified to Mild AP and Severe AP among HAPS positive group, 48 cases had mild AP and 11 had Severe AP. Similarly, among HAPS negative group, 2 cases had mild AP and 23 had severe AP ($p<0.001$).

Table 2: Comparison of patients with HAPS positive and negative status based on duration of symptoms, need of ICU, complications, hospital acquired infections.

Variables	HAPS+ (n=59)	HAPS- (n=25)	P-value[1]
Duration of symptoms (days) Mean ± SD	3.84 ± 3.66	5.12±3.77	0.923

Complications (Number) AKI Pleural effusion	 0 2	 1 9	 0.643
Need for ICU care (Number)	0	6	0.111
Hospital acquired infection (Number)	0	1	0.702
Duration of hospital stay (days)Mean± SD	3.44 ± 1.29	4.03±2.45	0.128

In this study among 84 patients, 51 were in HAPS positive group and 25 were in HAPS negative group. According to Revised Atlanta Classification among HAPS positive group 48 patients had mild AP, 7 had moderately severe AP and 4 had severe AP similarly among HAPS negative group, 2 patients had mild AP, 8 had moderately severe AP and 15 had severe AP (Figure 1).

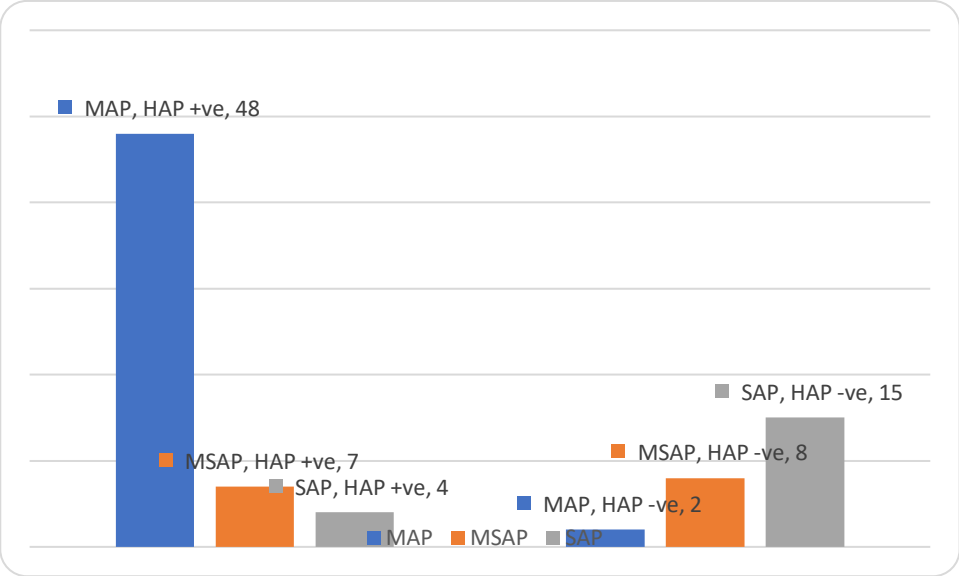

Figure 1: HAP status compared with Revised Atlanta classification

In this study, among HAPS positive group 11 patient had SAP (moderately severe AP and severe AP) (n=9+2) and 48 patient had mild AP(MAP), similarly among HAPS negative group 23 patient had SAP (moderately severe AP and severe AP) (n=8+15) and 2 had MAP. In this study showed statistical significance on comparison of HPAS with revised Atlanta score (p<0.01). (Table 3) Similarly, HAPS score in predicting mild AP had sensitivity of 96%, PPV 80.56% and NPV of 92.36% with p value of <0.001 (95% C.I.)

Table 3**:** Comparison of patients with HAPS positive and negative status based on severity

Variables	MAP (n=50)	SAP(n=34)	P-value[1]
	Number	Number	
HAP +ve (n=59)	48	11	<0.0001
HAP -ve (n=25)	2	23	

DISCUSSION

Acute pancreatitis is acute inflammation of pancreas due to release of premature pancreatic enzymes from islet cells. Majority of AP has mild course. Severe AP has high morbidity and mortality (4-6%), mainly due to multi organ dysfunction (MODS) in first few weeks whereas in later days infection is most common cause of mortality[7]. HAPS was first proposed by Lankisch et al. in 2009 in Germany which included patients with the first attack of AP[8]. Their study disclosed HAPS could predict a non- severe course of AP with a specificity of 97 (89 % to 99 %) and PPV of 98 % (92 % to 100 %), and that result was validated with another study with 452 patients in a Germany, which showed similar predictive accuracy[9].

In our study, 70.24% cases were HAPS positive and 29.76% were HAPS negative, among this according to revised Atlanta classification for AP, mild, moderately severe and severe AP cases were classified as having 48, 7, 4 and 15, 8, 2 respectively. Comparison of difference between HAPS positive and HAPS negative group is statistically significant ($p<0.001$). Similar result were seen in study conducted by R Talukdar et.al where 58.8% were HAPS positive(among which 93.6% had mild AP) and 41.2% were HAPS negative[10]. The comparison of MAP, MSAP, and SAP between HAPS-positive and HAPS- negative patients was statistically significant ($p < 0.001$)[10].

In our study, HAPS had AP had sensitivity of 96%, specificity of 67.65%, PPV 80.58% and NPV 92.36% on predicting non severe AP [$p <0.0001$,C.I. 95%]. In the meta analysis done by Patric Maisonneuve et. al had PPV 97% in HAP Score[11]. Similarly, study conducted in Germany by Lankisch et al. in 2009 with 394 patients, had a specificity of 97 (89 % to 99 %) and PPV of 98 % (92 % to 100 %) in HAP score[12]. In our study treating surgeon and third year resident calculated HAPS and it is simple to calculate and easy to recall the parameters. In our study six patients were transferred to ICU among HAPS negative and managed appropriately. Plerual effusion was developed in 11 patients, 2 of them were HAPS positive and 9 were HAPS negative. All of them improved in HDU after chest physiotherapy and conservative treatment. In study done in India, 103 AP pancreatitis were enrolled, all of them were admitted in ICU, total hospital stay was comparable in both the group, number of days spent in the ICU was significantly lower in the HAPS positive category[10]. The average length of hospital stay in our study was 3.85±2.18. According to the American Gastroenterology association

(AGA) gall stone is most common cause for the AP (40-70%), similarly in this study, gall stones were also the most frequent cause of AP (75%)[13].

Acute pancreatitis is an inflammatory process of the pancreas with a wide spectrum of severity, complications and outcome[14,15]. The progression of the disease in AP is unpredictable; some cases can be treated effectively while others may result in consequences that might be fatal, with a mortality rate of 2 to 22%[4]. Severe AP likely develop the life threating local or systemic complication[16]. Early prediction of complications may help to reduce patients morbidity and mortality[17]. This cases needs early identification along with adequate management in ICU. The HAPS score was proposed to help clinician recognize mild form of AP and to guide them in admitting those patients in general ward. HPAS score will help to triage and admit the mild form of AP in general ward in the country like Nepal where getting ICU bed is challenging. It will decrease unnecessary bed occupancy in ICU.

In a comparison of BISAP score with Ranson's Score in determining the severity of Acute Pancreatitis in 80 patients who presented in with Acute Pancreatitis, 31% of cases had severe AP, 3.75% had CT evidence of pancreatic necrosis, similarly in this study 40% had severe AP[18]. Common determinant of outcome comes of AP are peripancreatic fluid collection, pseudocyst, pancreatic necrosis, pancreatic abscess and MODS[18]. In our study 11 cases had pleural effusion. Pleural effusion in AP is due to trans-diaphragmatic lymphatic blockage and pancreaticopleural fistula and 1 case had AKI due to hypovolemic status which was improved after fluid resuscitation[19].

CONCLUSION

HAPS score is reliable in predicting mild AP with high sensitivity and positive predictive value.

As it is a simple and easily available tool, it can be helpful to triage patents requiring intensive care. However, further studies are required to validate its use in clinical practice.

FUNDING

No fund was provided from any resources.

CONFLICTS OF INTEREST

This study does not have any conflict of interest.

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