



COMPARISON OF DIFFERENT SCORING SYSTEMS IN PREDICTING THE SEVERITY OF ACUTE PANCREATITIS

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ABSTRACT

AIM: to compare the different scoring systems in predicting the severity of acute pancreatitis (AP).

METHODS: We Prospectively analysed the database from consecutive patients with AP in VS Hospital between December 2017 and July 2018. Ranson, Acute Physiology and Chronic Health Evaluation (APACHE)-II, and bedside index for severity in acute pancreatitis (BISAP) scores of all patients were calculated. Predictive accuracy of scores were measured by different statistical analysis.

RESULTS: Of 60 patients, 7 (12%) were classified as severe AP, and 1 (1.9%) died. Statistically significant cutoff values for prediction of severe AP were Ranson ≥ 3 , BISAP ≥ 2 , APACHE-II ≥ 8 . Negative predictive value is almost same in all where sensitivity are 86 %, 61.9 % and 81 % in RANSON, BISAP and APACHE scores. No statistically significant pairwise differences were observed between APACHE-II and the other scoring systems.

CONCLUSION: Various scoring systems showed similar predictive accuracy for severity of AP. Unique models are needed in order to achieve further improvement of prognostic accuracy.

KEYWORDS : Severity, Scoring systems, acute pancreatitis

INTRODUCTION

Acute pancreatitis (AP) is an inflammatory process with a highly variable clinical course.

Most patients with AP have a mild disease that resolves spontaneously without sequel.

However, 10%-20% of patients experience a severe attack with high mortality up to 30%[1,2].

MANAGEMENT

This high risk group of patients may benefit from

- 1) aggressive fluid resuscitation
- 2) close monitoring for development of organ failure
- 3) proper administration of antibiotics
- 4) specific therapeutic procedures, such as endoscopic sphincterotomy and radiologic intervention^[3].

early assessment of the severity and identification of patients at risk is important for early intensive therapy and timely intervention, and has been shown to improve prognosis and survival.

30 patients of alcohol (50%),
02 patients of idiopathic (4%),
and others (13%).

- 06 patients (10%) developed persistent organ failure for more than 48 h and were classified as severe AP according to the Atlanta Classification.
- Disease severity is determined by different scoring systems and compare with Atlanta classifications.

Ranson (alcoholic or other)	Ranson (biliary)
At admission	At admission
Age >55 y	Age >70 y
GB > 16 000/mm ³	GB > 18 000/mm ³
LDH > 350 U/l	LDH > 250 U/l
AST > 250 U/l	AST > 250 U/l
Glycemia >200 mg/dl	Glycemia >220 mg/dl
In 48 h	In 48 h
Drop in hematocrit > 10%	Drop in hematocrit > 10%
BUN increase > 5 mg/dl	BUN increase > 2 mg/dl
Calcium <8 mg/dl	Calcium <8 mg/dl
PO ₂ <60 mmHg	PO ₂ <60 mmHg
Bases deficit >4 mEq/l	Bases deficit >5 mEq/l
Fluid loss >6L	Fluid loss >4L
Each item worth 1 point (0 a 11 points)	

APACHE (Acute Physiologic And Chronic Health Evaluation) II score

1. Physiologic points : Temperature MAP (Mean Arterial Pressure) Heart rate Respiratory rate Oxygenation (PaO ₂) Arterial pH Serum sodium Serum potassium Hematocrit White cell count Glasgow coma score	2. Age points 3. Chronic health points : Liver Cardiovascular Respiratory Renal Immunocompromised
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1+2+3 = Total Score

Score ≥ 8 indicate severe pancreatitis

The main advantage of the APACHE II system is that a score can be derived at any time during the patient's hospital course, while the Ranson's criteria are only prognostic during the initial 48 hours.

Scoring systems for prediction of AP

- Multi-factorial scoring systems, including Ranson^[6] and Acute Physiology and Chronic Health Evaluation (APACHE) II scores^[7] and BISAP have been used for assessment of the severity of AP.
- However, these are complex and difficult to use in clinical bases, have been shown to perform with high negative predictive value but only moderate overall sensitivity^[3,9,10].
- This study was conducted for assessment and comparison of the early predictability of various parameters most widely used in AP, such as multi-factorial scoring systems (Ranson, APACHE-II, and BISAP)

MATERIAL AND METHODS

Study type: prospective

Sample size =60 patients

Time duration = July 2017 to July 2018

Institution: V.S.G.H, Ahmedabad

- The mean age : 40.5 \pm years
- Male: 46/60 (76%) male.
- A history of previous pancreatitis attack: 6/60 patients (10%).
- Causes of AP:
20 patients of gallstones (33%)

Bedside index of severity in acute pancreatitis (BISAP) score

This calculator evaluates the following Clinical Criteria:

- BUN ≥ 25 mg/dL (8.9 mmol/L)
- Impairment of mental status with a Glasgow coma score ≤ 15
- SIRS (systemic inflammatory response syndrome)
- Age > 60 years old
- Pleural effusion

Each determinant is given one point

The MedCalc score module Bedside index of severity in acute pancreatitis (BISAP) score is available in MedCalc software Complete Edition.

- BUN is defined as a serum level of the following variables:
- Error of more than 0.5% (1.04 g/dL) or less than 0.5% (0.52 g/dL)
- Heart rate of more than 100 beats per minute
- Respiratory rate of more than 20 breaths per minute or arterial carbon dioxide tension (PaCO₂) of less than 35 mmHg
- Abnormal white blood cell count ($< 4,000/\text{mm}^3$ or $> 12,000/\text{mm}^3$)

BOX 81.4**Revised Atlanta Classification of Acute Pancreatitis****MILD**

No organ failure
No local or systemic complications

MODERATE

Transient organ failure (<48 h)^a
Local or systemic complications

SEVERE

Persistent organ failure (>48 h)^a

^aOrgan failure defined as a modified Marshall score of 2 or more for the respiratory, cardiovascular, or renal system.

Adapted from Banks PA, Bollen TL, Dervenis C, et al: Classification of acute pancreatitis—2012: revision of the Atlanta classification and definitions by international consensus. Gut 62:102–111, 2013.

Incidence of Severe acute pancreatitis stratified according bed side index for severity in acute pancreatitis, Ranson, Acute physiology and chronic health evaluation -II

	Patients	Severe AP
Ranson		
<2	54	01
≥3	06	05
BISAP		
≤1	54	02
≥2	06	04
APACHE-II		
<7	53	01
≥8	07	05

Defination:

The diagnosis of AP was based on the presence of two or more of the following three features:

- (1) abdominal pain consistent with AP (acute onset of a persistent and severe epigastric pain often radiating to the back);
- (2) elevation of serum amylase and/or lipase levels three or more times of the upper limit of normal; and
- (3) characteristic findings of AP on CECT[5].

Alcoholic AP was defined when patients had a history of alcohol consumption within 48 h before symptom onset with no signs of other possible causes.

Biliary pancreatitis was defined when there was a gallstone or biliary sludge on ultrasonogram or CT.

The **idiopathic aetiology**: when causative factors could not be identified from a detailed clinical and drug history or after initial investigations.

Statistical analysis

- Data were collected prospectively in a Microsoft Excel database and SPSS 2015.
- After completion of data collection Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated for individual scoring systems.
- Receiver-operating characteristic (ROC) curves for severe AP were calculated for Ranson, BISAP, APACHE-II scores, using cut-off values and the predictive accuracy of each scoring system was measured by the area under the receiver operating curve (AUC) with standard error and 95% confidence interval (Cis). A p value of <0.05 was considered statistically significant.

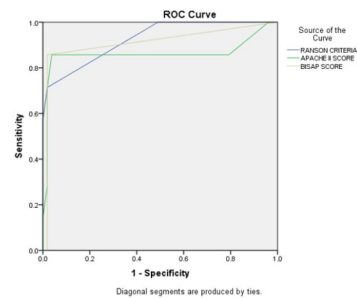
Sensitivity, specificity, positive predictive value, and negative predictive value of different scoring systems in prediction of severe acute pancreatitis (95 % CI)

	SENSITIVITY	SPECIFICITY	PPV	NPV	ACCURACY
Ranson	83.33	98.15	83.33	98.15	96.67
BISAP	66.67%	96.30	66.67	96.30	93.33
APACHE-II	83.33%	96.30	71.43	98.11	98.15

Area Under the Curve

Test Result Variable(s)	Area
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RANSON CRITERIA	.926
APACHE II SCORE	.861
BISAP SCORE	.911

**CONCLUSION:**

- In conclusion, results of this study demonstrate that the **APACHE- II** scoring system seems to have the **highest accuracy** in assessment of the severity and outcome of AP and **RANSON SCORE** highest **AUC (.926)**, although the predictive accuracy of APACHE II and AUC of ranson score were not significantly different compared to that of the other scoring systems. **No si scoring system capable of reaching maximal utility is available, and unique models are needed in order to achieve further improvement of predictive accuracy.**

Limitation of study

- Although the data used in this study were collected prospectively, some clinical data, including, **LDH** were **missing due to lack of availability.**
- In this study, the **number of cases** of severe AP and mortalities was **lower** compared to other large scale clinical studies; therefore, comparison of prognostic value of various scoring systems was somewhat difficult.

Following Data are collected with informed consent of patients:

- Age , sex, length of hospital stay, in-hospital mortality, duration of nil per os (NPO), presence of organ failure and local complications such as peripancreatic fluid collections, pseudocyst and necrosis.
- APACHE- II and BISAP scores were calculated using data from the first 24 h after admission and the Ranson score using data from the first 48 h after admission.
- CT scan is useful to assess the severity of acute pancreatitis and stage of disease process, but in my study, patient were from lower socioeconomic class, CT scan was not done routinely due to cost limitations

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