ORIGINAL ARTICLE

Positive Predictive Value (PPV) of BISAP in Predicting Severe Acute Pancreatitis using Atlanta Classification as Gold Standard

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ABSTRACT

Aim: To determine the positive predictive value (PPV) of BISAP in predicting severe acute pancreatitis using Atlanta Classification as gold standard.
Study Design: Cross-sectional study
Place and Duration of Study: Department of Gastroenterology, Shaikh Zayed Hospital Lahore from 20th January 2017 to 19th July 2017.
Methods: Sixty two adults of both genders having agebetween 20-70 years diagnosed of sever acute pancreatitis on BISAP (≥3). Diagnosis of sever acute pancreatitis was confirmed on ATLANTA classification which was taken as gold standard and results of BISAP were judged accordingly as true positive or false positive. A written informed consent was obtained from each patient.
Results: The mean age was 43.92±12.08 years. Majority 32(51.6%) of the patients had an age between 35-50 years. There were 39(62.9%) and 23(37.1%) male and female patients respectively in the study group with a male to female ratio of 1.7:1. Serum amylase level ranged from 486 IU/L to 2906 IU/L with a mean of 1673.60±615.13 IU/L while that of serum lipase ranged from 667 IU/L to 2930 IU/L with a mean of 1958.98±615.85 IU/L. Diagnosis of sever acute pancreatitis was confirmed in 40(64.5%) patients on ATLANTA Classification. Thus there were 40 true positive and 22 false positive cases. It yielded a positive predictive value of 64.5% for BISAP in predicting sever acute pancreatitis taking ATLANTA Classification as gold standard. Similar positive predictive value was noted across various age, gender and serum amylase on admission groups.
Conclusion: The positive predictive value of BISAP was found to be 64.5% in expecting sever acute pancreatitis taking ATLANTA classification as gold standard irrespective of patient's age, gender and serum amylase level upon admission.
Keywords: Sever acute pancreatitis, ATLANTA classification, BISAP score

INTRODUCTION

Acute pancreatitis is a complex inflammatory progression that occurs in the pancreatic gland. It is a non-bacterial inflammation of the pancreatic gland caused by its own enzymes. Most common causes of acute pancreatitis are gall stones (accounting for 54% of cases), alcoholism and idiopathic.[1]

Acute pancreatitis is found to be one of the most recurrent gastrointestinal causes for hospital admission. The annual prevalence of AP ranges from 13 to 45/100,000 persons in USA[2], while in UK it is between 4.8 to 24.2 cases per 100,000 population.[3]

Different scoring systems are being used to estimate the severity and mortality associated with acute pancreatitis. These systems are Ranson Scoring System, Acute Physiology and Chronic Health Evaluation (APACHE)-II, and Computed Tomography Severity Index (CTSI) and Bedside Index for Severity in Acute Pancreatitis (BISAP) scores, each having their own limitations.[4,5]

Chen et al. in 2013 conducted a study in Chinese population and found that the positive predictive value of BISAP in predicting severe acute pancreatitis was 48.1% taking Atlanta classification as gold standard.[6]Khannaet al[7] conducted a similar study in 2013 in Indian population and found that the PPV of BISAP in predicting severe acute Pancreatitis was 63.4%. Shabbir et al[8]conducted the study in local population and found that the PPV of BISAP in predicting acute severe pancreatitis was 100%.

There is a conflict of PPV of BISAP scoring system in predicting severeacute pancreatitis. Currently Ranson Scoring system is widely practiced but it has limitation that the evaluation cannot be completed until 48 hours following admission, which may lead to missing an early therapeutic window and increased mortality. CTSI has limitation that calculation is based on CT findings of some local complications and do not reflect the systemic inflammatory response. APACHE II has the advantage of allowing determination of disease severity on the day of admission, but complexity is its major drawback.[6] The BISAP scoring system is simpler than the Ranson's score and APACHE II screening and predictive accuracy of BISAP score is comparable to that of the APACHE II score.[9] As the PPV varies with the prevalence of the disease, there is a need to conduct this study in local population. The results of this study will help us in resolving the conflict in the PPV of BISAP which will help in early diagnosis and timely intervention to reduce the mortality and morbidity of this condition.

MATERIALS AND METHODS

This cross-sectional study was conducted at Gastroenterology Department, Shaikh Zayed Hospital Lahore from 20/01/2017 to 19/07/2017. Sixty two adults of both genders aged between 20-70 years diagnosed of

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sever acute pancreatitis on BISAP (≥3). Patients who were pregnant (dating scan), or those undergoing hemodialysis, or those taking anti-coagulants like aspirin, clopidogril, warfarin or heparin (as per history and clinical record) or those with COPD (FEV1 ≤70% of the normal).Patients were assessed using ATLANTA classification after 48 hours and diagnosis of sever acute pancreatitis was confirmed. The results of BISAP were judged accordingly asfalse positiveor true positive. All the clinical examinations, vitals and blood samples were taken and all the labs were sent to the same lab (hospital lab) to abolish bias and perplexing variables were controlled by exclusion.All the collected data was entered and analyzed through SPSS-17.

RESULTS

The age of the patients ranged from 20 years to 70 years with a mean of 43.92±12.08 years. Majority 32(51.6%) of the patients ha an age 35-50 years. There were 39 (62.9%) and 23 (37.1%) maleand female patients respectively in the study group with a male to female ratio of 1.7:1. Serum amylase level ranged from 486 IU/L to 2906 IU/L with a mean of 1673.60±615.13 IU/L while that of serum lipase ranged from 667 IU/L to 2930 IU/L with a mean of 1958.98±615.85 IU/L (Table 1).

Diagnosis of sever acute pancreatitis was confirmed in 40(64.5%) patients on ATLANTA Classification. Thus there were 40 true positive and 22 false positive cases. It yielded a positive predictive value of 64.5% for BISAP in predicting sever acute pancreatitis taking ATLANTA Classification as gold standard (Table 2). Similar positive predictive value was noted across various age, gender and serum amylase on admission groups as shown in Tables 3-5.

Table 1: Demographic characteristics of included patients

Variable	**No.**	**%**
Age (years)		
≤ 35	16	25.8
35-50	32	51.6
>50	14	22.6
Gender		
Male	39	62.9
Female	23	37.1
Serum Amylase (IU/L)	1673.60±615.13	
Serum Lipase (IU/L)	1958.98±615.85	

Table 2: Frequency of severe acute pancreatitis on ATLANTA Classification (n=62)

Severe Acute Pancreatitis	**No.**	**%**
Yes (True Positive)	40	64.5
No (False Positive)	22	35.5

Positive Predictive Value = 64.5%

Table 3: Positive predictive value of BISAP across age groups

Age (years)	**Diagnosis on ATLANTA classification**		**PPV**
	True +ve	**False +ve**	
<35	10 (62.5%)	6 (37.5%)	62.5%
35-50	21 (65.6%)	11 (34.4%)	65.6%
>50	9 (64.3%	5 (35.7%)	64.3%

P-value >0.05

Table 1: Positive predictive value of BISAP across gender

Gender	Diagnosis on ATLANTA classification		PPV
	True +ve	False +ve	
Male (n=39)	25 (64.1%)	14 (35.9%)	64.1%
Female (n=23)	15 (65.2%)	8 (34.8%)	65.2%

P>0.05

DISCUSSION

Acute pancreatitis is a complex inflammatory progression that occurs in the pancreatic gland. It is a non-bacterial inflammation of the pancreatic gland caused by its own enzymes. Acute pancreatitis is one of the most frequent gastrointestinal causes for hospital admission[1]. Different scoring systems are being used to predict the severity and mortality associated with acute pancreatitis but each has its own limitations[4,5]. BISAP predictive scoring is simpler and easier to follow among these scoring systems but the existing evidence on its positive predictive value in predicting sever acute pancreatitis contained controversy (Table 1) while there no locally published material was found which necessitated the conduct of present study.

In our study, the mean age of the patients was 43.92±12.08 years Yadav and Lowenfels[10] (43±11 years) and Raza et al[1] (44.68+17.47 years) observed similar mean age among patients of acute pancreatitis. However, Nitsche et al[11] reported comparatively higher mean age of 51.6±14.6 years. Sadrazodi et al[12] reported much lower mean age of 38.4±13.8 years patients while Urushihara et al[13] reported much higher mean age of 55.6±15.6 years.

Majority (n=32, 51.6%) of the patients were aged between 35-50 years. A similar higher proportion (50%) of patients in this age group was previously observed by Lai et al.[14]Serum amylase level ranged from 486 IU/L to 2906 IU/L with a mean of 1673.60±615.13 IU/L while that of serum lipase ranged from 667 IU/L to 2930 IU/L with a mean of 1958.98±615.85 IU/L. Our results are comparable to those of Cho et al[4] who also reported similar mean serum amylase (1687.9±1415.4 IU/L) and lipase (1949.7±1951.3 IU/L) levels in Chinese patients with severe acute pancreatitis.

We observed a positive predictive value of 64.5% for BISAP in predicting sever acute pancreatitis taking ATLANTA Classification as gold standard. Our observation is in line with that of Noelet al[15] who reported similar positive predictive value of 64.3% for BISAP in predicting sever acute pancreatitis in Indian population. Sadrazodi et al[12] and Khanna et al[7] also observed similar positive predictive value of 63.4% for BISAP in India. Butleret al[16] reported it to be 65.6% in the same population.

The present study is first of its kind in local population and has found the positive predictive value of BISAP to be 64.5% in predicting sever acute pancreatitis taking ATLANTA classification as gold standard irrespective of age, gender and serum of the patientamylase level upon admission. The results of the present study are similar to the studies in Indian population. It can be advocated on the basis of results of the present study that BISAP scoring should be used in future practice to identify patients with severe acute pancreatitis on admission so that timely and

optimum management can improve the patient outcome. As mentioned earlier, BISAP is simpler and easier to follow in the existing list of predictive scoring systems which also favor its use in clinical practice.A very strong constraint to the present study was that we didn't consider the 30-days mortality of patients with respect of BISAP score on admission. This information could further establish the role of BISAP in identification of high risk patients. In future research, such a study is highly recommended.

CONCLUSION

The positive predictive value of BISAP was found to be 64.5% in predicting sever acute pancreatitis taking ATLANTA classification as gold standard irrespective of patient's age, gender and serum amylase level upon admission.

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