

# FREQUENCY OF MORTALITY OF PATIENTS WITH ACUTE PANCREATITIS USING BEDSIDE INDEX FOR SEVERITY

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## ABSTRACT

**Objective:** To determine the frequency of mortality of patients with Acute Pancreatitis having bedside index for severity in acute pancreatitis (BISAP).

**Material and Methods:** This was a Cross sectional descriptive study, conducted at Department of Surgery of Khyber Teaching Hospital, Peshawar-Pakistan, from January 2014 to June 2016 on patients after diagnosing the disease severity of the acute pancreatitis and expected mortality of patients were calculated on bedside index for severity in acute pancreatitis (BISAP) >3 and analyzed using Statistical Package for Social Sciences 20.

**Results:** In this study, 65 patients presenting with acute pancreatitis were observed, in which male to female ratio was 1.24:1. The study included age ranged from 16 up to 75 years. Average age was 52.85 years + 12.99 SD. Mortality was observed in 51 (78.46%) patients having acute pancreatitis by using BISAP score.

**Conclusion:** The BISAP score represents a simple way to accurately identify patients at risk of developing severe acute pancreatitis within 24 hours of presentation in our setup. Its components are clinically relevant and easy to obtain. This risk stratification capability can be utilized to improve clinical care.

**Key Words:** Acute Pancreatitis, BISAP score, Mortality.

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## INTRODUCTION

Acute pancreatitis is an acute condition presenting with abdominal pain ( Epigastric ) radiating to back and is associated with raised pancreatic enzyme levels in blood as a result of acute inflammation. In most cases acute pancreatitis is mild self-limiting and requires no treatment. However the inflammatory process can lead to pancreatic edema, hemorrhage and eventually necrosis. The inflammatory mediators can also lead to systemic complications like hemodynamic instability, acute respiratory distress syndrome and pleural effusion, gastrointestinal hemorrhage, renal failure and disseminated intravascular coagulation and even death.

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The incidence worldwide is up to 50 per 100000. The overall mortality from acute pancreatitis has remained 10-15% over the past 20 years<sup>1</sup>. The associated mortality of severe acute pancreatitis approaches 40% and early aggressive supportive care improves outcome<sup>2</sup>. The bedside index for severity in acute pancreatitis (BISAP) score is a simple and accurate method for the early identification of patients at increased risk for in hospital mortality and morbidity<sup>3</sup> with rising BISAP score the severity and mortality increases in acute pancreatitis<sup>4</sup>. Rapid, reliable and validated means of predicting patient from rapid clinical assessment are of value to the emergency physician. BISAP score assist in decision making due to their simplicity of use and applicability within the first 24 hours after admission to hospital<sup>5</sup>. BISAP score has been comparatively evaluated with regard to their ability to predict the severity of acute pancreatitis on admission (within the first 24 hour of hospitalization) and proved be to very effective<sup>6</sup>. The best cutoff value for BISAP is 2 for predicting severity i.e pancreatitis necrosis and organ failure and 3 for

## Frequency of mortality of patients with acute pancreatitis using bedside index for severity

predicting mortality<sup>7</sup>. The bedside index for severity in acute pancreatitis (BISAP) is an accurate method for early identification of patients at risk for in hospital mortality<sup>8</sup>.

A study was carried out by Shabir S et al. in which a total of 80 patients with acute pancreatitis were taken, 35(44%) were males and 45(56%) were females. 47% of the patients were in the 4th and 5th decades of their life. 25 patients (31.25%) were classified as severe acute pancreatitis and 3(3.75%) had evidence of pancreatitis necrosis on CT scan and same number of patients died. The mortality of patients having BISAP score > 3 was 20%.<sup>8</sup> Identification of patients at risk for severe disease early in the course of acute pancreatitis (AP) is an important step to guide management and improving outcomes. There are several approaches in order to predict prognosis and severity of acute pancreatitis and it include clinical, biochemical, imaging and different assessment criteria's which help in guiding patients triage and management. Currently, a variety of scoring systems are available to evaluate the severity of AP, including Ranson's criteria, Glasgow, acute physiology and chronic health evaluation (APACHE) II and computed tomography severity index(CTSI).<sup>9,10</sup>

The rationale of the study with the proposed BISAP score was that it is quite simple to carry out on the bed side, non invasive, reasonably cost effective, feasible and reliable tool in finding out severity in patients with acute pancreatitis on admission. There is high index of predictive value of this score that one can have aggressive management of the patient with better outcome that ultimately reduces the morbidity and mortality of the patients.

## MATERIAL AND METHODS

This Descriptive case series were conducted at Surgical Department of Khyber Teaching Hospital Peshawar-Pakistan, from January 2014 to June 2016 after informed consent and approval of Hospital ethical committee. The diagnosis were confirmed by history, examination and raised serum amylase levels by registrar and reconfirmed with consultant. After diagnosing the disease severity of the acute pancreatitis and expected mortality of patients were calculated on BISAP>3. Patients with chronic pancreatitis, Pancreatic cancer and patient presented with acute pancreatitis after 24 hours of symptoms were excluded as they act as confounder and make the study results biased. All demographic information and reports were collected on Performa and were analyzed through SPSS(version 20). The BISAP score sheet is shown in Annexure 1<sup>30</sup>.

## RESULTS

In this study, 65 patients presenting with acute pancreatitis were observed, in which 36(55.38%) were male and 29(44.62%) were female patients. Male to female ratio was 1.24:1. Patient's age was divided in four categories, out of which most common age group for acute pancreatitis was 46–60 years, of which majority of the 29(44.6%) patients. Four (6.2%) patients were in the age range of less than 30 years, 12 (18.5%) were of age range 31-45 years and 20(30.8%) lies in age group of more than 60 years of age. The study included age ranged from 16 up to 75 years. Average age was 52.85 years + 12.99SD. Mortality was observed in 51(78.46%) patients having acute pancreatitis by using BISAP score while 14(21.54%) patients not diagnosed through this score. Age wise distribution of mortality detected on BISAP scorer are shown in Table 1. Sex wise distribution of mortality detected on BISAP scorer are shown in Table 2.

**Table 1: Age wise distribution of mortality**

		Mortality		Total	p-value
		Yes	No		
Age (in years)	<= 30.00	2	2	4	0.504
		50.0%	50.0%	100.0%	
	31.00 - 45.00	9	3	12	
		75.0%	25.0%	100.0%	
	46.00 - 60.00	24	5	29	
		82.8%	17.2%	100.0%	
	61.00+	16	4	20	
		80.0%	20.0%	100.0%	
Total	51	14	65		
	78.5%	21.5%	100.0%		

## Frequency of mortality of patients with acute pancreatitis using bedside index for severity

**Table 2: Gender wise Distribution of Mortality**

		Mortality		Total	p-value
		Yes	No		
		29	7	36	0.437
		80.6%	19.4%	100.0%	
Gender	Male	22	7	29	
		75.9%	24.1%	100.0%	
Total	Female	51	14	65	
		78.5%	21.5%	100.0%	

### DISCUSSION

Acute Pancreatitis is one of the most common abdominal emergencies presenting to Gastroenterology and Surgical departments.<sup>11</sup> It is one of the leading cause of hospitalization for gastrointestinal disorders placing a substantial burden on the healthcare system.<sup>12,13</sup> Its outcome can be devastating and can lead to significant increase in morbidity and mortality if not managed aggressively and appropriately.<sup>14</sup>

Prediction of severity of AP early in the course of disease preferably within first 24 hours of presentation is of paramount importance and plays a critical role in the management of AP<sup>15,16</sup> It has been an area of active investigation for many years<sup>17,19</sup> The benefits of this effort is multi-fold. It would facilitate the triage of patients with predicted severe disease for intensive monitoring and treatment and will also hasten the transfer of such patients from periphery hospitals to tertiary care centers capable of more advanced care.<sup>20</sup> Unfortunately, despite of the presence of multiple scoring systems and various markers (discussed earlier), predicting severity is an on-going challenge and clinicians have been largely unable to predict which patients with AP will develop severe disease.<sup>21</sup>

The main aim of this study was to determine the accuracy of a recently developed simple scoring system, the BISAP score, in predicting the severity of AP within first 24 hours of presentation in our setup for possible utilization of this scoring system on a broader scale.

In our study the male to female ratio was 1:1.54 (figure 13). Reports from western countries show a slightly greater incidence of acute pancreatitis in males compared with females.<sup>22,23</sup> However studies related to AP from Pakistan have shown female predominance. The male to female ratio reported by 2 local studies, Raza M et al<sup>21</sup> and Saeed et al<sup>22</sup> is 1:2.7 and 1:1.52 respectively. Many reports mainly from western and Scandinavian countries show that alcohol abuse is more commonly associated with male cases and gallstone

disease with female cases.<sup>23,24</sup> In our study the male to female ratio was reverse due to local prevalence of risk factors, since alcohol intake is not that common in our society and gall stones are a major factor in the etiology of acute pancreatitis which is predominantly a disease of females.<sup>24</sup> Mean age of patients in our study was 43.3 years + 15.5 years. This is coinciding with many local and international epidemiological studies. In a study conducted by Raza M et al<sup>21</sup> in Islamabad the reported mean age is 44.68+17.47 years. The numbers of patients progressing to develop SAP in our study were 31/137 (22.6%). According to international studies published from different centers with varying degree of expertise, SAP occurs in 15–25% of cases.<sup>3,6,9,14,16</sup> CT scan has been used as the gold standard modality for detecting complications defining SAP worldwide since decades.<sup>1,9,16</sup> We also have used CE-CT scan for detection of local complications in determining severity. The incidence of SAP in our study was in accordance with international data and national studies. Two local studies by Saeed et al<sup>22</sup> and Shah SSH et al<sup>23</sup> found the occurrence of SAP in the order of 26.6% and 18.6% respectively. A recent Chinese study by Chen L et al<sup>24</sup> reported SAP in 20.3% of patients.

There are no studies available regarding the usefulness of BISAP score in Pakistan, however it has been an area of interest for many pancreatologists and gastrointestinal centers over the past few years. There is reasonable concordance between the results of our study and international data regarding accuracy of BISAP score. Singh et al,<sup>25</sup> Papachristou et al,<sup>26</sup> Kim et al,<sup>27</sup> and Jin Y et al<sup>28</sup> have reported accuracy of BISAP score as 82%, 92.4%, 84%, 90.6% respectively. A more recent French study by Gompertz et al<sup>29</sup> conducted on 128 consecutive patients have shown accuracy of 97.66% which is very much concordant to our results. The cutoff value of BISAP score predictive of SAP taken in our study was > 3. In majority of studies determining predictive value of BISAP score, the optimal score considered for assessing severity has been > 3. 24-27,29

In our study the among the 31 patients who devel-

oped SAP, a BISAP score of 3 or more was documented in 28 patients. There were two females and one male patient who did not develop SAP but their BISAP score calculated within first 24 hours was < 3. Moreover one female patient had a BISAP score of > 3 but she didn't develop SAP.

The accuracy of BISAP score was marginally more in males as compared to females (98.1% vs 96.4%). This might be pointing towards a possibility that BISAP score is more helpful in assessing non-gallstone pancreatitis as in majority of females the cause is gallstones as opposed to idiopathic in males in our setup.<sup>21,23</sup> The other possibility can be a basic predilection of BISAP score for male gender. However it needs further research over large samples to sort out the accuracy of BISAP score in either gender and different etiologies of AP.

We found out in our study that SAP was more common in older age groups. The frequency of SAP was directly proportional to the age of patient. Out of the 31/137 patients who developed SAP half (51.6%) of the patients were older than 60 years. This is in concordance with national and international data. Many studies like Kapoor et al<sup>16</sup> have declared older age of > 55 years an independent risk factor for SAP. The reason for increased mortality in older patients, as reported by a study<sup>17</sup> can also be explained by the above finding i.e. old age patients are more likely to develop pancreatic necrosis (SAP) and mortality in necrotizing pancreatitis is in the range of 15-30%.<sup>9,11</sup> Therefore in view of above finding patients older than 50 years in our setup shall be offered a low threshold for referral to multi-disciplinary care centers.

In our study BISAP score has proved its value in predicting severity of disease in AP. It carries several important advantages in our setup. First is that it is easy and simple to calculate, and secondly it requires only those vital signs, laboratory tests, and imaging modalities that are widely available and commonly obtained at the time of presentation or within 24 hours of presentation. Contrary to this, other severity scoring systems like APACHE II and Ranson are cumbersome, typically require 48 hours to become accurate, and when the score demonstrates severe disease, the patient's condition is obvious regardless of the score.<sup>3,11,25,26</sup>

The limitation of our study was that our study sample was comprised of patients attending a tertiary care hospital, while BISAP score was initially developed using hospital admissions from tertiary as well as community centers.<sup>11</sup> Therefore a future prospective study of the BISAP score in community hospitals along with other teaching hospitals would be useful to validate the generalizability of the score in our setup.

## CONCLUSION

Bedside index for severity in acute pancreatitis (BISAP) was accurately able to identify patients at risk of developing SAP and its ability to risk-stratify patients early in their course is a major step to improve future management strategies in acute pancreatitis.

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## Frequency of mortality of patients with acute pancreatitis using bedside index for severity

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### **AUTHOR'S CONTRIBUTION**

Following authors have made substantial contributions to the manuscript as under:

**Naeem M:** Concept and design

**Saeed T:** Manuscript writing and data collection

**Samad A:** Data collection and referencing

**Waheed MR:** Data analysis, references collection, helps in writing and typing.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.