Agreement of BISAP and CRP in Assessment of Severe Acute Pancreatitis

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Authors’ contributions

This work was carried out in collaboration among all authors. Author HT designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors SB, HK, SAP, SR, RK and AA managed the analyses of the study and managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Background: Acute pancreatitis is one of the most common causes of acute abdominal pain in patients presenting to tertiary care hospital. The prevalence of acute pancreatitis in Pakistan is 0.03%. Assessment of prognosis is important in management of patients with acute pancreatitis. A simple and clinical oriented scoring system to predict the severity of acute pancreatitis at the time of presentation is required.

Objectives: To determine the agreement between BISAP score and CRP in assessing severe acute pancreatitis.

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INTRODUCTION

Acute pancreatitis is one of the most common causes of acute abdominal pain in patients presenting to tertiary care hospital. The prevalence of acute pancreatitis in U.S. is 0.04% [1] which is one of the highest in the world [2] and is rising [3]. The prevalence of acute pancreatitis in Pakistan is 0.03%. An important stage after diagnosis in management of acute pancreatitis is assessment of prognosis. Advantages of assessing prognosis early are improved patient management and outcome depending on timely intervention [4,5,6]. There are various scoring systems in practice for assessing prognosis for many years which include RANSON’s, APACHE-II, GLASSGOW etc. Because of various difficulties in applying these scoring systems due to multiple variables and as they require at least 48hrs of hospitalization and as they require at least 48hrs of hospitalization and as they require at least 48hrs of hospitalization [7,8] clinicians have practiced single factor to assess the prognosis like CRP, third space fluid loss and trypsinogen. Another simple method of assessing prognosis is a new scoring system called BISAP [9,10] which include five variables which are easy to apply like BUN>25mg/dl, Impaired mental status, SIRS (systemic inflammatory response syndrome), age>60yrs and pleural effusion on radiology. SIRS include 2 or more of the following; temperature <34 or >37C, pulse >90bpm, respiratory rate >30 and leucocyte count <4000 or >16000/cmm³. Each positive variable contributes to 1 point with a total score of 5 [11].

Assessment of prognosis is important in management of patients of acute pancreatitis. It is claimed that BISAP score is an easy and bedside technique for assessing prognosis of pancreatitis. It is applied immediately at the time of admission. This study was aimed to determine the agreement of BISAP score and CRP in assessing the prognosis of acute pancreatitis on admission. Early recognition of severe disease would enable the clinician to consider more aggressive treatment within a time frame and prevent adverse outcome and complications. As there is no gold standard for assessment of severity of acute pancreatitis so we apply CRP to the same patients if agreement between the BISAP and CRP in predicting the severity of acute pancreatitis is found to be high, then BISAP being simple, quick to perform, safe, reproducible and inexpensive would be recommended.

The aim of this study is to determine the agreement of BISAP score and CRP in assessing severe acute pancreatitis.

METHODOLOGY

The present prospective study was conducted over the period of six months. After institutional ethical committee approval, 15 patients with gallstone in pancreatitis diagnosed by serum amylase level >1000 IU, presenting within 24 hrs, coming in any general surgical unit of Abbasi Shaheed Hospital, Karachi were enrolled using non-probability consecutive sampling technique. An informed consent of the study population with the assurance to keep their information confidential their demographics were obtained to include in the study. BISAP score and CRP levels were done, presence of BISAP score >3 and CRP level >12-15mg/dl was labeled as positive agreement. The collected data was inputted and analyzed in SPSS version 20.0 and considered significant p value of ≤ 0.05.

Data was analyzed by SPSS version 20. Frequencies and percentages were calculated for categorical variables like gender, severity of acute pancreatitis on BISAP score and CRP and final outcome; agreement. Mean ± standard deviation (SD) were computed for numerical variables like age, TLC, temperature, respiratory rate and pulse rate. Stratification of data was done with respect to age and gender to see the
effect on outcome variable. The chi-square test was applied to see the effect of these on outcome variable. P<0.05 was considered as significant.

2.1 Inclusion Criteria

- All adult population both males and females, between 25 and 70 years of age, with gallstone pancreatitis diagnosed by serum amylase level >1000 IU, presenting within 24 hrs were included in the study.

2.2 Exclusion Criteria

Following group of patients were excluded from this study.

- Patients with non-gallstone pancreatitis.
- Patients who had co-morbid like diabetes, hypertension, chronic liver disease, chronic kidney disease.
- Patients with carcinoma gall bladder.

3. RESULTS

The age range of patients was between 25 to 70 years. Nine patients accounting for 60% were in age range group 25-50 years. Rest of the 40% of the group aged more than 50 years. Mean age was 46.73 ± 8.29 years (Table 1).

Nine (60%) patients in this study were males. six patients (40%) were females. The male to female ratio observed in this study was 1.5 to 1 (Fig. 1).

Mean BUN (blood urea nitrogen) was 25.4 ± 5.67, temperature 38.12 ± 0.71, respiratory rate 20.8 ± 4.32, pulse rate 96 ± 9.59 and total leucocyte count was 13260 ± 1752.06 (Table 2).

10 (66.6%) patients had impaired mental status (Table 3) and seven (46.7%) had pleural effusion (Table 4). 10 (66.7%) patients out of 15 had BISAP score >3 and 5 (33.3%) had BISAP score <3 (Table 5). 10 (66.7%) patients CRP value >15mg/dl and five (33.3%) had CRP value <12 mg/dl. Mean ± SD 14.90 ± 2.85(Table 6).

The final outcome of this study, that is agreement of BISAP and CRP level in severe acute pancreatitis was observed in 10 (66.7%) of the patients (Table 7).

4. DISCUSSION

The results of this study demonstrate that the agreement of BISAP score and CRP level in assessing the severity of acute pancreatitis was 66.7%.

Acute pancreatitis (AP) is highly variable in terms of its clinical presentation and severity [12]. Many scoring systems have been developed for the early detection of severe disease and improved patient management and outcome, but they are not convenient for predicting the severity of AP since they involve many parameters [13].

Given that the disease burden worldwide [2], high morbidity and mortality associated with severe acute pancreatitis, prognostic scoring systems are in a continuous experimental phase. To date many scoring systems promised to be helpful yet not very accurate in determining the severity of disease. Many researchers have studied different means of prognostic indices and much of work is currently going on to develop accurate, simple and early attainable prognostic index.

Table 1. Age wise distribution of the patients (n=15)

| Age of patients (years) | Frequency | Percentage(%) |
|-------------------------|-----------|---------------|
| 25-50                   | 09        | 60            |
| 51-70                   | 06        | 40            |

Mean age ± S.D = 46.73 ± 8.29

Table 2. Mean values of SIRS (Systemic inflammatory response syndrome) (n=15)

| Variable       | Mean    | ±SD   |
|----------------|---------|-------|
| Bun            | 25.4    | 5.67  |
| Temperature    | 38.12   | 0.71  |
| Respiratory rate| 20.80  | 4.32  |
| Pulse rate     | 96      | 9.59  |
| TLC            | 13260   | 1752.06 |
Fig. 1. Gender wise distribution of the participants (n=15)

Table 3. Impaired mental status (n=15)

| Impaired mental status | Frequency | Percentage (%) |
|------------------------|-----------|----------------|
| Yes                    | 10        | 66.7           |
| No                     | 05        | 33.3           |

Table 4. Pleural effusion (n=15)

| Pleural effusion | Frequency | Percentage (%) |
|------------------|-----------|----------------|
| Yes              | 07        | 46.7           |
| No               | 08        | 53.3           |

Table 5. BISAP score (n=15).

| BISA PScore | Frequency | Percentage (%) |
|-------------|-----------|----------------|
| <3          | 05        | 33.3           |
| >3          | 10        | 66.7           |

Mean ± SD = 3.33 ± 1.17

Table 6. C-reactive protein (CRP) (n=15).

| CRP Level   | Frequency | Percentage (%) |
|-------------|-----------|----------------|
| <12-15mg/dl | 05        | 33.3           |
| >15 mg/dl   | 10        | 66.7           |

Table 7. Agreement of BISAP and CRP (n=15)

| Agreement | Frequency | Percentage (%) |
|-----------|-----------|----------------|
| Yes       | 10        | 66.7           |
| No        | 05        | 33.3           |

Ranson's score is relatively accurate at classifying the severity of AP, but it is difficult to calculate the score as it requires a 48-hour, missing the potential for early treatment [14]. The acute physiology and chronic health examination (APACHE)-II is more accurate than Ranson's score, and is more commonly used to predict the severity of AP.[15] although it was designed originally to predict intensive care unit survival and required the collection of many parameters, some of which might not be relevant to disease prognosis. The Glasgow score also requires...
many clinical parameters and needs 48 hours to complete.

Balthazar et al. [16] described the utility of contrast-enhanced computed tomography (CT) for evaluating the severity of AP and developed the Balthazar computed tomography severity index (BCTSI) based on contrast-enhanced CT, but this system was based on local complications and did not reflect the systemic inflammatory response. Several biochemical markers including serum procalcitonin and C-reactive protein are relatively accurate and convenient to get in patients with severe acute pancreatitis [17].

Currently another simple and easily attainable method of assessing prognosis is being used worldwide called BISAP score. The main advantage of this scoring is the commencement of this scoring at admission and requires less than 24 hours to complete the assessment [9,10]. In this study BISAP score and CRP levels were combined and agreement of both were used for assessing the severity of the disease.

Bezmareric et al [13] in a study prospective study of 51 patients compared procalcitonin and BISAP score versus CPR and APACHE-II to assess the severity of acute pancreatitis and observed sensitivity of BISAP score to be 74% and of CRP to be 75%. Furthermore, the values they observed for procalcitonin and APACHE were better than the two formerly mentioned and concluded APACHE and procalcitonin to be better predictor of disease severity.

Kim and associates [17] in a comparative study of 50 patients compared BISAP score and procalcitonin and found BISAP score as more accurate predictor of the severity of acute pancreatitis in comparison to procalcitonin, 84% vs 76%. Paaganen and colleagues [18] assess the severity of acute pancreatitis by comparing tumor necrosis factor and C-reactive protein and found CRP to be better in assessing the severity of acute pancreatitis.

Singh et al [11] evaluated BISAP score on 397 consecutive patients to assess the mortality associated with severe acute pancreatitis. They concluded BISAP score represents a simple way to identify patients at increased mortality.

5. CONCLUSION

In summary, there is substantial agreement of both CRP criteria and BISAP scoring in diagnosing acute severe pancreatitis. Therefore, these should be used in future to diagnose acute severe pancreatitis early in order to avoid potential complications. BISAP score is a valuable tool in predicting severity of severe acute pancreatitis being simple, easy and cost effective. The assessment is completed in 24 hours that allows early decision making and prompt management. Accuracy of BISAP and CRP is comparable.

CONSENT

As per international standard or university standard, patients’ written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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