INTRODUCTION

Acute pancreatitis (AP) is an inflammatory condition of the pancreas with a clinical course that varies from mild to severe and is characterised by activation of pancreatic enzymes to cause self-digestion of pancreas.[1] Generally, AP is mild self-limiting and requires no special treatment, but 20-30% of patients would develop a severe disease that can progress to systemic inflammation and cause pancreatic necrosis, multi-organ failure and potentially death.[2] Therefore, it is important to choose early quick and accurate risk stratification for AP patients which would permit evidence based early initiation of intensive care therapy for patients with severe AP to prevent adverse outcomes and possible complications.[3]

There are a variety of scoring systems for the early detection of severe acute pancreatitis such as APACHE-II, Bedside index of severity in acute pancreatitis (BISAP) which can predict the clinical severity of pancreatitis within 24 hours of admission.[4] An attempt was made to compare and evaluate both scores to conclude the severity of acute pancreatitis.

MATERIALS AND METHODS

45 adult patients having acute pancreatitis admitted at surgery and medicine departments, SVS Medical College Hospital, Mahabubnagar–509002, Telangana were studied.

Inclusive Criteria

Patients with symptoms of acute pancreatitis, laboratory and/or radiological evidence of acute pancreatitis were selected for study.

Exclusion Criteria

Patients less than 15 years of age, cases of chronic pancreatitis, hereditary pancreatitis, traumatic pancreatitis and immune-compromised patients were excluded from study.

Method

Patients with acute pancreatitis were admitted, resuscitated with Nasogastric decompression, IV fluids, analgesics and electrolyte imbalance correction. Laboratory and radiological investigations were carried out according to the proforma. APACHE-II score ranging from 0 to 71, and BISAP score ranging from 0 to 5 were calculated from the worst parameters in the first 24 hours. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) were calculated for each score.
The duration of study was January-2018 to March-2021.

**Statistical Analysis**

Clinical and Laboratory Parameters in acute pancreatitis patients were collected and scores of both APACHE-II and BISAP were compared with z test. Various clinical parameters of pancreatitis were classified with percentage. The Statistical analysis was carried out in SPSS software. The ratio of male and females was 2:1.

### RESULTS

**Table 1** The aetiology of acute pancreatitis – 25 (55.5%) Alcoholic, 2 (4.44%) Drug induced, 8 (17.7%) had Gall stones, 1 (2.22%) had Hypercalcaemia, 1 (2.22%) had Hypertriglyceridemia and 1 (2.22%) Obstructed pancreatic duct, 2 (4.44%) had Pancreas divisum, 5 (11.1%) had Idiopathic.

**Table 2** Comparative study of laboratory stay and laboratory parameters:

- **Duration of hospital stay**: 10.15 (±2.30) in mild and moderate acute pancreatitis (MAP) and 15.38 (±3.40) in severe acute pancreatitis (SAP). t test value was 4.60 and p<0.00 (significant).
- **Serum amylase level**: 899.15 (±190.2) in MAP, 925.58 (±198.8) in SAP and z test 6.47 and p<0.000 (significant).
- **Serum lipase level**: 1530.32 (±120.3) in SAP and z test 9.81 and p<0.000 (significant).
- **Hematocrit level**: 35.98 (±6.20) in SAP, t test 3.32 and p<0.001 (significant).
- **Blood Urea Nitrogen level**: 17.11 (±3.32) in MAP, 35.29 (±4.08) in SAP, t test 23.1 and p<0.00 (significant).
- **Serum creatinine level**: 1.19 (±0.80) in MAP, 2.49 (±1.02) in SAP, t test 6.7 and p<0.00 (significant).
- **WBC count**: 11465 (±520.1) in MAP, 15380 (±530.8) in SAP, t test 35.3 and p<0.000 (significant).
- **Fasting blood sugar level**: 105.90 (±60.3) in MAP, 138.36 (±52.33) in SAP t test 2.5 and p<0.001 (significant).
- **Serum Total Calcium level**: 8.3 (±1.04) in SAP, 8.57 (±1.40) in SAP t test 1.03 and p>0.30 (insignificant).
- **APACHE-II score**: 4.33 (±3.30) in SAP, 11.30 (±7.07) in SAP t test 5.98 and p<0.00 (significant).
- **BISAP score**: 1.04 (±3.30) in SAP, t test 2.6 and p<0.00 (significant).

**Table 3** Severity of acute pancreatitis as per the score – In APACHE-II > 8 score out of 15, 6 (13.3%) had severe pancreatitis. In APACHE-II<8 out of 30, 4 (8.8%) had severe acute pancreatitis. In BISAP >2 – out of 19 patients 2 (17.7%) had SAP. In BISAP<2 score out of 26 patients 2 (4.4%) had SAP.

**Table 4** Study of sensitivity, specificity, positive predictive value and negative predictive value in both scores –

- APACHE-II score had sensitivity - 62, specificity - 74.60, PPV - 41.36 and NPV -86.19.
- BISAP score had sensitivity - 82, specificity – 68.64, PPV - 43.22 and NPV - 92.02.
### Table 3: Severity of acute pancreatitis as per the scores

<table>
<thead>
<tr>
<th>Score</th>
<th>Patients</th>
<th>Severe pancreatitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>APACHE-II ≥8</td>
<td>15 (33.3%)</td>
<td>6 (13.3%)</td>
</tr>
<tr>
<td>≤ 8</td>
<td>30 (66.6%)</td>
<td>4 (8.8%)</td>
</tr>
<tr>
<td>BISAP ≥2</td>
<td>19 (42.2%)</td>
<td>8 (17.6%)</td>
</tr>
<tr>
<td>≤ 2</td>
<td>26 (57.7%)</td>
<td>2 (4.4%)</td>
</tr>
</tbody>
</table>

### Table 4: Sensitivity, Specificity of APACHE-II and BISAP scores

<table>
<thead>
<tr>
<th>Scores</th>
<th>Sensitivity 95% CI</th>
<th>Specificity 95% CI</th>
<th>Positive predictive value (95% CI)</th>
<th>Negative predictive value (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>APACHE-II</td>
<td>62.00</td>
<td>74.60</td>
<td>41.36 (35.03-53.65)</td>
<td>86.19 (79.19-92.55)</td>
</tr>
<tr>
<td>BISAP</td>
<td>82</td>
<td>68.64</td>
<td>43.22 (57.30-95.17)</td>
<td>92.02 (83.21-97.16)</td>
</tr>
</tbody>
</table>

### DISCUSSION

Present comparative study of BISAP and APACHE-II scores in acute pancreatitis was studied in Telangana Population.

The etiological factors – 25 (55.5%) were Alcoholic, 2 (4.44) Drug induced, 8 (17.7%) had Gall stones, 1 (2.22%) had Hypercalcemia, 1 (2.22%) had Hyper-triglyceridemia, 1 (2.22%) Obstructed pancreatic duct, 2 (4.44%) Pancreas divisum, 5 (11.1%) Idiopathic and total number of patients was 45 (Table 1). Laboratory parameters in both SAP and MAP were compared and found to be highly significant. APACHE-II score was 4.33 (±3.30) in MAP, 11.30 (±7.07) in SAP t test 5.98 and p>0.000 (significant). BISAP score 1.04 (±1.06) in MAP, 2.6 (±1.22) in SAP, t test 6.47 and
p<0.00(significant)(Table-2). In assessment of SAP APACHE-II score > 8 had 15 patients and 6 had SAP and < 8 score had 30 patients and 4 had SAP. In BISAP > 2 score had 19 patients and 8 found to have SAP, < 2 score had 26 patients and 2 had SAP (Table-3). APACHE-II scores had 62sensitivity, 74.6 specificity, 41.36 PPV and 86.19 NPV. In BISAP score 82 sensitivity 68.6 specificity, 43.2 PPV, 92.02 NPV [Table 4] These findings are more or less in agreement with previous studies. [5,7]

The pathophysiology of acute pancreatitis is generally considered in three phases. In first phase there is activation of trypsin, once trypsin is activated it activates variety of injurious pancreatic digestive enzymes. In second phase there is intra pancreatic inflammation through variety of mechanisms and pathways. In third phase there is extra pancreatic inflammation including acute respiratory distress syndrome (ARDS).

APACHE-II score was calculated from 12 admission physiologic variables comprising the Acute Physiology Score (APS), the patient’s age, and chronic health status. The APS is determined from the most deranged (worst) physiologic value, e.g. the lowest BP or highest respiratory rate during initial 24 hours of admission. The 24 hours period ensures that all pertinent physiologic values are available and clinical judgement ensures that each value is legitimate. Because severity of disease significantly reduces the probability of survival during acute illness, APACHE-II is a reliable and useful means of classifying ICU patients. Increased Acute physiological scores (APS) are associated with increased risk of subsequent hospital death. [8]

APACHE-II has also proved useful in evaluating outcome from intensive care and in comparing the success of different treatment protocols. [9]

Severe Acute pancreatitis (SAP) implies the presence of organ failure, local complications or pancreatic necrosis The sensitivity and specificity of these scores predict the SAP range between 55% to 90% depending on the cut off number and timing of scanning. [9] [10]

The factors that determine the severity are not clearly understood but appear to involve a balance between pro-inflammatory and anti-inflammatory factors.

CONCLUSION

Present comparative study of BISAP and APACHE-II scores, APACHE-II score yielded better in predicting the severity, organ failure and outcome. BISAP score also hold significant value in predicting them. Hence it is concluded that the simple scoring systems may have reached their maximal utility and novel models are needed to further improve predictive accuracy because exact pathological mechanism of acute pancreatitis is still unclear.

REFERENCES