CRP AS PREDICTOR OF ACUTE PANCREATITIS

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ABSTRACT

Introduction: Acute pancreatitis is defined as an inflammatory condition of the pancreas. Aim: to study CRP level in acute pancreatitis as predictor. Methods: The prospective study was conducted on 30 cases of acute pancreatitis at the department of surgery, GMC Bundi. After taking informed consent and fulfilling inclusion and exclusion criteria, diagnosis of acute pancreatitis was based on typical clinical history. Assessment of severity was performed at admission and at 48 hours on the basis of Atlanta classification. The analysis of the data and Microsoft word and Excel have been used to generate graphs, tables, using Epi info software of CDC. Results: The patients in the 20 – 40 yr constituted a majority of the population (60.0%) included in the study. 60% cases were male. As per classification, 18 (60.0%) patients had mild pancreatitis and 12 (40.0%) patients had severe pancreatitis. The evaluation of serum CRP levels at admission for the detection of severity of AP showed a sensitivity and specificity of 73.08% and 55.56% respectively. Conclusion: CRP can be used as a prognostic indicator of severity of AP at admission, bases on which proper triage and management can be initiated.

Keywords: CRP, acute pancreatitis, severity score.

Introduction: Acute pancreatitis is defined as an inflammatory condition of the pancreas with variable involvement of adjacent or remote organs.1 Depending on its severity it can have a mild self-limiting course or severe complications and high mortality despite treatment. While mild cases are successfully treated with simple conservative measures, severe cases often present with organ failure requiring ICU admission or even surgery to deal with complications of the disease. Acute pancreatitis is a disease that produces significant morbidity and mortality and consumes enormous healthcare resources. While many patients recover with only general supportive care, about 1 in 5 will develop severe acute pancreatitis and 20% of these may succumb to it.2

The incidence varies between 4.9 and 73.4 cases per lac of population worldwide.3,4 An increase in incidence of acute pancreatitis has been observed in most recent studies over last few decades.5 Gall stones and alcohol are the most common causes worldwide.6 Other less common causes include medications, trauma, iatrogenic as after endoscopic retrograde cholangiopancreatography, metabolic and anatomic causes. The overall mortality in acute pancreatitis is approximately 5%: 3% in interstitial pancreatitis, 17% in necrotizing pancreatitis (30% in infected necrosis, 12% in sterile necrosis).7

Early diagnosis of pancreatitis and assessment of its severity is crucial for its effective management, because acute pancreatitis provides a small therapeutic window, mostly limited to first 72 hours from onset of disease. Patients with severe pancreatitis need to be identified at the earliest for initiation of intensive care while mild pancreatitis cases can be managed in general wards.8

A variety of single serum parameters, among them biochemical markers, the simplest and most widely available test is CRP. Serum CRP levels above 12~15 mg/dLcorrelate with severe disease.9-11 However, CRP measurements involve a delay of 48 hours or longer before prediction. The sensitivity of CRP on
day 1 after admission is not as good as it is on day 2 (56% vs. 83%). Thus we had conducted this study to assess CRP as a predictor of acute pancreatitis.

**Aim:** to study CRP level in acute pancreatitis as predictor.

**Methods:** The prospective study was conducted on 30 cases of acute pancreatitis at the department of surgery, GMC Bundi. After taking informed consent and fulfilling inclusion and exclusion criteria, diagnosis of acute pancreatitis was based on typical clinical history. All patients with diagnosis of chronic pancreatitis documented by CECT abdomen, more than 48 hrs were excluded. Severe acute onset upper abdominal pain radiating to back associated with raised serum amylase and lipase level more than 3 times to the upper limit of normal. CRP estimation was carried at the time of admission and after 48 hours. Cut off value of 12 mg/dl was taken as indicator of severe acute pancreatitis. Assessment of severity was performed at admission and at 48 hours on the basis of Atlanta classification i.e. local complication or development of organ failure or both. Severe acute pancreatitis is defined as an acute pancreatitis associated with local and /or systemic complications. Patients received standard treatment which included bowel rest, nasogastric tube insertion, intravenous fluids, analgesics and other supportive treatment as supplemental oxygen and mechanical ventilation as per clinical indications. The analysis of the data and Microsoft word and Excel have been used to generate graphs, tables, using Epi info software of CDC.

**Results:**

The mean age of the patient in the study group was 45 year. The patients in the 20 – 40 yr constituted a majority of the population (60.0%) included in the study. 60% cases were male. 

Table 1. Sociodemography

<table>
<thead>
<tr>
<th>Age in years</th>
<th>No. of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-40</td>
<td>18</td>
<td>60.0</td>
</tr>
<tr>
<td>41-60</td>
<td>8</td>
<td>26.6</td>
</tr>
<tr>
<td>61-80</td>
<td>4</td>
<td>13.4</td>
</tr>
</tbody>
</table>

**SEX**

<table>
<thead>
<tr>
<th></th>
<th>No. of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>12</td>
<td>40.0</td>
</tr>
<tr>
<td>Male</td>
<td>18</td>
<td>60.0</td>
</tr>
</tbody>
</table>

The study consisted of 14 patients of acute pancreatitis secondary to cholelithiasis, 12(40%) patients had alcohol as etiology and rest 5 cases were idiopathic.
The patients were classified into mild group and the severe group as per the Atlanta classification. This classification has been considered as the gold standard for the study. As per classification, 18 (60.0%) patients had mild pancreatitis and 12 (40.0%) patients had severe pancreatitis.

**Table 2. CRP as Predictor**

<table>
<thead>
<tr>
<th>CRP</th>
<th>Severity Score</th>
<th>Total (n=30)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild (n=18)</td>
<td>Severe (n=12)</td>
<td></td>
</tr>
<tr>
<td>Day 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;12</td>
<td>7(38.88%)</td>
<td>9(75.00%)</td>
<td>16(53.4%)</td>
</tr>
<tr>
<td>&lt;12</td>
<td>11(61.11%)</td>
<td>3(25.00%)</td>
<td>14(46.6%)</td>
</tr>
<tr>
<td></td>
<td>P value 0.026*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;12</td>
<td>4(22.2%)</td>
<td>9(75.00%)</td>
<td>13(43.4%)</td>
</tr>
<tr>
<td>&lt;12</td>
<td>14(77.8%)</td>
<td>3(25.0%)</td>
<td>17(56.6%)</td>
</tr>
<tr>
<td></td>
<td>P value &lt;0.001**</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Serum CRP at admission predicted severe pancreatitis in 9 cases out of 12 cases which turned out to be severe on Atlanta classification. So there were 3 false negative cases in severe group. CRP at admission predicted 11 cases as mild pancreatitis thus giving false positive result in 3 cases. Pearson Chi-Square test of significance was applied for analysis of data and a p value of 0.026 was obtained which was statistically significant. Serum CRP at 48 hours after admission predicted severe pancreatitis in which turned out to be statistically strongly significant and it is more significant than CRP at admission. The evaluation of serum CRP levels at admission for the detection of severity of AP showed a sensitivity and specificity of 73.08 % and 55.56 % respectively.

The hospital stay in our patients was a mean of 8.70 days in patients with mild pancreatitis and in the severe group the mean duration of hospital stay was 16.08 days. Student t test was applied for analysis of the data and p value was < 0.001 which was significant.
A total of 6 death recorded during the study. Rest of patients were discharged when their clinical and biochemical parameters returned to the normal level. All mortality were recorded in the severe group as per Atlanta classification.

**Discussion:**

Acute pancreatitis is a common ailment encountered by the physician, in any part of world, and forms a good proportion of emergency admissions in emergency department unit. It is most important to make an early diagnosis and assess the severity of acute pancreatitis in the beginning, to identify those patients with severe or necrotising disease who will benefit from an early intensive care therapy. Additionally, in view of new therapeutical concepts (e.g. antibiotics therapy in severe forms) and for the evaluation of new drugs, patients should be staged into mild and severe disease as early as possible. In most cases it is difficult to assess the severity clinically on hospital admission. This study was conducted to compare between APACHE II scoring and serum CRP at admission and at 48 hours after admission in assessing the severity of acute pancreatitis.

In our study, majority of patients in our study were in the age group of 31 - 40 years (38.8 %) followed by patients in the age group of 51 – 60 years (18.8 %), the age range was 20 – 70 years. A study by Antonio Carnovale included patients with an age range of 18 – 93 years with median sge of 61.5 years. In our study, males outnumbered females and the male to female ratio was 1.5 : 1. W. Uhl in his study had 302 patients, with male to female ratio of 1.85 : 1. The study consisted of 14 patients of acute pancreatitis secondary to cholelithiasis, 12(40%) patients had alcohol as etiology and rest 5 cases were idiopathic, Also Marshall J B, in a study found that biliary pathology and alcohol account for 60 – 80 % cases of AP. As per Atlanta classification, 18 (60.0%) patients had mild pancreatitis and 12 (40.0%) patients had severe pancreatitis. Similarly Mark Leminen et al. noted development of severe pancreatitis in 28% of their cases.

Serum CRP at admission predicted severe pancreatitis in 9 cases out of 12 cases which turned out to be severe on Atlanta classification. So there were 3 false negative cases in severe group. CRP at admission predicted 11 cases as mild pancreatitis thus giving false positive result in 3 cases. Pearson Chi-Square test of significance was applied for analysis of data and a p value of 0.026 was obtained which was statistically significant. Serum CRP at 48 hours after admission predicted severe pancreatitis in which turned out to be statistically strongly significant and it is more significant than CRP at admission. Also Neoptolomos et al. have also found that CRP concentration were significantly different between mild and severe pancreatitis cases at 48 hours, but not at 24 hours.

The evaluation of serum CRP levels at admission for the detection of severity of AP showed a sensitivity and specificity of 73.08 % and 55.56 % respectively. Similarly Anna Gurda- Duda et al. in a study recorded that the sensitivity and specificity of serum CRP at admission in detecting the severity of AP to be 63.6% and 65.5 % respectively.

The hospital stay in our patients was a mean of 8.70 days in patients with mild pancreatitis and in the severe group the mean duration of hospital stay was 16.08 days. Student t test was applied for analysis of the data and p value was < 0.001 which was significant. similarly Gurleyik et al. noted a mean hospital stay of 10.3 days (range 6 – 19 days) in mild cases and a mean hospital stay of 21.4 days (range 12 – 42 days) in severe cases.

A total of 6 death recorded during the study. Rest of patients were discharged when their clinical and biochemical parameters returned to the normal level. All mortality were recorded in the severe group as per Atlanta classification. Also Steinberg et al. noted a mortality of 2 – 9 % in his study.
Conclusion: CRP can be used as a prognostic indicator of severity of AP at admission, bases on which proper triage and management can be initiated. CRP should be repeated at 48 hours to predict the severity of AP so that further management can done to avoid the further complications.

References