

## Original Research Article

# Role of C-reactive protein in predicting the outcome of acute pancreatitis

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### ABSTRACT

**Background:** Acute pancreatitis is one of the most commonly encountered clinical entities in surgical practice and controversy still exists regarding the clinical features of acute pancreatitis. An early diagnosis, however, is regarded as mandatory for successful treatment. Over the years many Authors have proposed different scoring systems for the early assessment of the clinical evolution of acute pancreatitis. The most widely used scoring systems are often cumbersome and difficult to use in clinical practice because of their multi factorial nature. Thus, a number of unifactorial prognostic indices have been employed in routine hospital practice, such as C-reactive protein (CRP), serum amylase and serum lipase. These serum enzymes are easy to obtain in normal clinical practice and many authors consider them as reliable as multi factorial scoring systems.

**Methods:** A hospital based observational prospective study was done with 30 patients to measure C reactive protein levels in patients of acute pancreatitis and evaluate if CRP levels predict the severity of pancreatitis.

**Results:** In cases where CRP was raised >100 mg/dl on day 7 and beyond showed either a complication or increased duration of stay and delayed recovery. This correspondence of CRP with the clinical outcome correlated well with other parameters like blood counts, serum lipase and amylase levels too.

**Conclusions:** Hence, CRP can be a very useful uni factorial tool in assessing and thereby predicting the outcome in a case of pancreatitis.

**Keywords:** CRP, Pancreatitis, Serum enzymes

### INTRODUCTION

Pancreatitis is one of the most common entities encountered in a surgical as well as medical practice.<sup>1</sup> Alcohol and gall stones being the two most common etiological factors for its causation.<sup>2</sup> The presentation of this disease ranges over a very wide severity spectrum, from a mild edematous pancreatitis that usually recovers in a couple of days to the most severe and life threatening necrotizing pancreatitis that can lead to rapid deterioration and mortality of the patient. In order to evaluate and predict the outcome of a given case over such a wide variety of presentations, various severity scoring systems have been devised which are mostly

multi factorial and cumbersome.<sup>3</sup> APACHE II (acute physiology and chronic health evaluation), Ranson's, SOFA (sequential organ failure assessment), Glasgow's, BISAP (bedside index for severity in acute pancreatitis), HAPS (harmless acute pancreatitis), etc to name a few. C-reactive protein (CRP) is a single tool that is easily available that could help in the assessment and prediction of outcome of a case of acute pancreatitis.<sup>4</sup>

#### *Aims and objectives*

To predict the outcome in patients of acute pancreatitis with the aid of CRP in terms of complications developed,

duration of hospital stay, surgical intervention required results.

**METHODS**

Prospective study conducted in the department of general surgery at Rajarajeswari Medical College and Hospital Bangalore. We arrived at the sample size 30 after taking the average of total number of acute pancreatitis admitted in the past 1 year in our hospital.

All cases of acute pancreatitis admitted to surgical wards in the time period January 2020 to December 2020 underwent C- reactive protein examination on day 0, 2, and 7 of admission, along with other routine blood and imaging work up. The cases were followed up and co relation between the CRP levels and outcome of each case were noted in terms of symptomatic relief, duration of stay in hospital, development of complications, need for surgical intervention if so and the final outcome.

**Inclusion criteria**

All cases of acute pancreatitis which is proven by clinical, radiological and biochemically with raised amylase and lipase by three fold.

**Exclusion criteria**

Pediatric age group, traumatic pancreatitis.

**Statistical analysis**

Descriptive analysis was used in the study. It will be done using Statistical package for social sciences (SPSS) version 20.0. Data will be presented as mean±standard deviation and median with range whichever is appropriate. Institutional Ethical committee clearance was obtained.

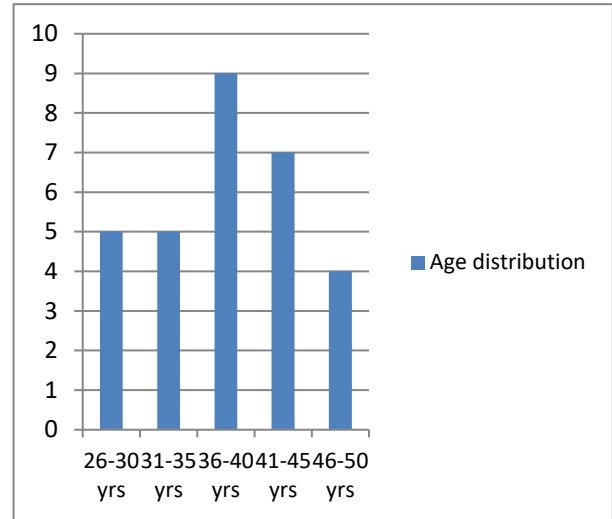
**RESULTS**

Total number of cases was 30. 29 males and 1 female. All of the patients were alcoholics. Pain abdomen was the chief complaint in all the patient. 28 were acute edematous pancreatitis and 2 were acute on chronic pancreatitis with pseudo cyst formation, one out of which was infected and treated with serial USG guided needle aspirations. No documented necrotizing pancreatitis was noted among the 30 cases. All of them recovered while at their hospital stay. Shortest duration of stay being 1 day and longest of 23 days. Co- relation between day 7 CRP levels and duration of stay in the hospital.

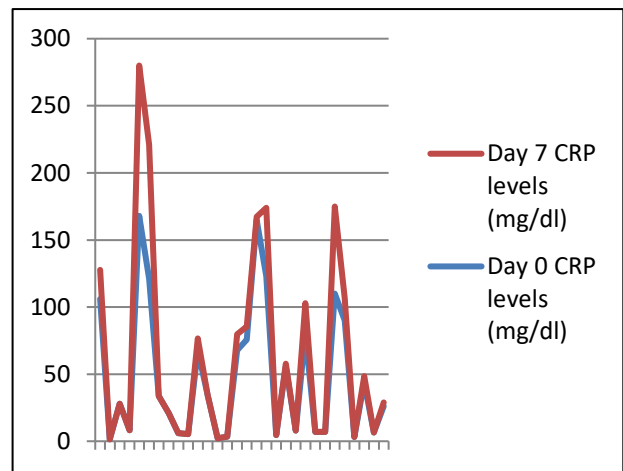
**DISCUSSION**

Pancreatitis is an inflammatory process of the pancreas that destroys the gland. There are various etiological factors contributing to the causation of it, alcohol and gall stones being the most common and important of them.<sup>5</sup>

The disease has a wide spectrum of severity and clinical presentation ranging from simple mild edematous pancreatitis to life threatening necrotizing type. Hence requirement of a good, quick, cheap, easily available assessment tool becomes necessary to evaluate and predict the outcome in each case that would aid in the efficient management of the same. Although alcoholic cause is much more common than biliary, the mortality associated with the latter is higher (30%).<sup>6,7</sup>



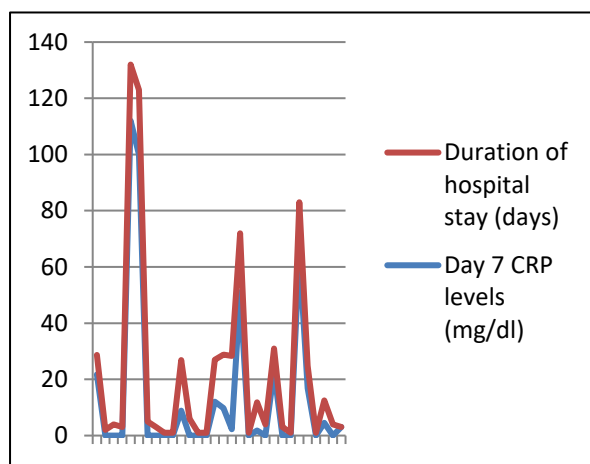
**Figure 1: Age distribution.**



**Figure 2: Co-relation between day 0 and day 7 CRP levels.**

Various severity scoring systems have been designed, viz; APACHE II (acute physiology and chronic health evaluation), Ranson’s. SOFA (sequential organ failure assessment), Glasgow’s, BISAP (bedside index for severity in acute pancreatitis), HAPS (harmless acute pancreatitis). All of them are multi factorial and cumbersome in daily use in terms of universal accessibility and repeatability. Use of C - reactive protein which is an acute phase reactant as a tool to assess the severity of pancreatitis is a novel idea. CRP is a pentameric ring structured plasma protein synthesized

from the liver in response to acute inflammation (interleukin-6) which binds on to the lysophosphatidylcholine expressed over dead cells and in turn activate complement pathway.<sup>8</sup> The normal values range from 5-10 mg/dl, and increases with age.<sup>9</sup>



**Figure 3: Day 7 CRP levels and duration of hospital stay.**

Various studies have been conducted with regards to this. In the study of Gurleyiket al for a cut-off value of 150 mg/L, CRP had 84.6% Se, 73.8% Sp, 50% PPV, 93.9% NPV and 76.4% accuracy to predict a severe outcome of AP.<sup>10</sup> In the study of de la Pena et al for a cut-off value of 100 mg/L, CRP had 100% Se and 86% sp to predict a severe outcome of acute pancreatitis.<sup>11</sup> In the study of Simona et al the best cut-off value of CRP to predict a severe AP was 120 mg/L, with an accuracy of 85%.<sup>12,13</sup>

Although not specific to pancreatitis, CRP seems to correlate well with the severity and outcome of pancreatitis and hence is a potential assessment tool in this clinical scenario. 100mg/dl at the end of 1st week indicates propensity toward necrotizing pancreatitis and end organ damage.<sup>14,15</sup> Hence CRP could be of good value in a case of acute pancreatitis.

#### Limitations of the study

Our study was limited because it was conducted in a single center with a relatively small sample size which limits the generalizability of our findings.

#### CONCLUSION

This study was carried out in Rajarajeswari medical college and hospital from January 2020 to December 2020. All cases of acute pancreatitis that presented to the surgical OPD were admitted and evaluated, the CRP levels of these cases were observed on days 0, 2 and 7 of admission and correlated with patients' symptomatic relief, duration of hospital stay, complications and intervention required for the same. The study concluded that CRP was a good uni factorial, easily available and

reproducible investigative tool to assess the severity and predict the outcome of acute pancreatitis, as was evident with reduced hospital stay with those presenting with low CRP levels while complication and long duration of stay (>20 days, in our study) for CRP levels of >100 on day 7.

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*Ethical approval: The study was approved by the Institutional Ethics Committee*

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