

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/dL correlate 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.

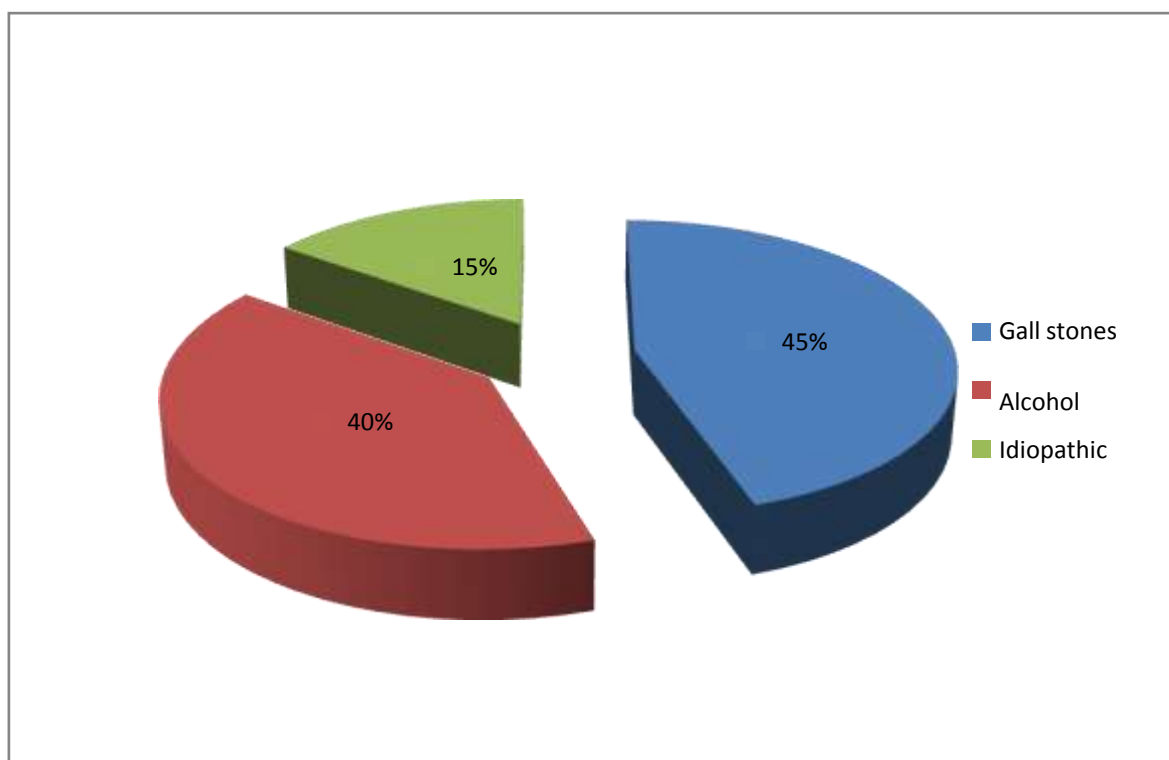
Results:

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

Age in years	No. of patients	%
20-40	18	60.0
41-60	8	26.6
61-80	4	13.4
SEX		
Female	12	40.0
Male	18	60.0

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.

Fig. 1 Etiology

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

CRP	Severity Score		Total (n=30)	P value
	Mild (n=18)	Severe (n=12)		
Day 0				
• <12	11(61.11%)	3(25.00%)	14(46.6%)	0.026*
• >12	7(38.88%)	9(75.00%)	16(53.4%)	
Day 2				
• <12	14(77.8%)	3(25.0%)	17(56.6%)	<0.001**
• >12	4(22.2%)	9(75.0%)	13(43.4%)	

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 Carnovale¹² 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. Uhl¹³ 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 B¹⁴, 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 Lempinen et al.¹⁵ 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 Neoptolemos et al.¹⁶ have also found that CRP concentration were significantaly 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.¹⁷ 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.¹⁸ 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.¹⁹ noteda 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

- 1.Banks PA, Bollen TL, Dervenis C, Gooszen HG, Johnson CD, Sarr MG, Tsiotos GG, Vege SS. Classification of acute pancreatitis— 2012: revision of the Atlanta classification and definitions by international consensus. *Gut*. 2013 Jan 1;62(1):102-11.
- 2.Baillie J. AGA Institute medical position statement on acute pancreatitis. *Gastroenterology*. 2007 May 31;132(5):2019-21.
- 3.Fagenholz PJ, Fernández-Del Castillo C, Harris NS, Pelletier AJ, Camargo CA. Increasing United States hospital admissions for acute pancreatitis, 1988–2003. *Annals of epidemiology*. 2007 Jul 31;17(7):491-e1.
- 4.Yadav D, Lowenfels AB. Trends in the epidemiology of the first attack of acute pancreatitis: a systematic review. *Pancreas*. 2006 Nov 1;33(4):323-30.
- 5.Roberts SE, Akbari A, Thorne K, Atkinson M, Evans PA. The incidence of acute pancreatitis: impact of social deprivation, alcohol consumption, seasonal and demographic factors. *Alimentary pharmacology & therapeutics*. 2013 Sep 1;38(5):539- 48.
- 6.Birgisson H, Möller PH, Birgisson S, Thoroddsen A, Asgeirsson KS, Sigurjonsson SV, Magnusson J. Acute pancreatitis: a prospective study of its incidence, aetiology, severity, and mortality in Iceland. *The European journal of surgery*. 2002 Aug 1;168(5):278-82.
- 7.Pitchumoni CS, Bordalo O. Evaluation of hypotheses on pathogenesis of alcoholic pancreatitis. *The American journal of gastroenterology*. 1996;91(4):637-47.
- 8.Banks PA, Freeman ML. Practice guidelines in acute pancreatitis. *The American journal of gastroenterology*. 2006 Oct 1;101(10):2379.
- 9.Rettally CA, Skarda S, Garza MA, Schenker S. The usefulness of laboratory tests in the early assessment of severity of acute pancreatitis. *Critical reviews in clinical laboratory sciences*. 2003 Jan 1;40(2):117-49.
10. Chen CC, Wang SS, Chao Y, Lu CW, Lee SD, Tsai YT, LO KJ. C- reactive protein and lactate dehydrogenase isoenzymes in the assessment of the prognosis of acute pancreatitis. *Journal of gastroenterology and hepatology*. 1992 Aug 1;7(4):363-6.
- 11.Chen CC, Wang SS, Lee FY, Chang FY, Lee SD. Proinflammatory cytokines in early assessment of the prognosis of acute pancreatitis. *The American journal of gastroenterology*. 1999 Jan 1;94(1):213-8.
- 12.Carnovale A, Rabitti PG, Manes G, Esposito P, Pacelli L, Uomo G. Mortality in acute pancreatitis: is it an early or a late event. *Jop*. 2005 Sep 10;6(5):438-44.
- 13.Uhl W, Büchler MW, Malfertheiner P, Beger HG, Adler G, Gaus W, German Pancreatitis Study Group. A randomised, double blind, multicentre trial of octreotide in moderate to severe acute pancreatitis. *Gut*. 1999 Jul 1;45(1):97-104.
14. Marshall JB. Acute pancreatitis: a review with an emphasis on new developments. *Archives of internal medicine*. 1993 May 24;153(10):1185-98.
15. Lempinen et al. Predicting the severity of acute pancreatitis by rapid measurement of trypsinogen-2 in urine. *Clinical chemistry*. 2001 Dec 1;47(12):2103-7.
16. Neoptolemos JP et al. Early prediction of severity in acute pancreatitis by urinary trypsinogen activation peptide: a multicentre study. *The Lancet*. 2000 Jun 3;355(9219):1955-60.

17. Gurda-Duda A, Kusnierz-Cabala B, Nowak W, Naskalski JW, Kulig J. Assessment of the prognostic value of certain acute-phase proteins and procalcitonin in the prognosis of acute pancreatitis. *Pancreas*. 2008 Nov 1;37(4):449-53.
18. Gurleyik G, Emir S, Kiliçoglu G, Arman A, Saglam A. Computed tomography severity index, APACHE II score, and serum CRP concentration for predicting the severity of acute pancreatitis. *Jop*. 2005 Nov 10;6(6):562-7.
19. Balthazar EJ, Robinson DL, Megibow AJ, Ranson JH. Acute pancreatitis: value of CT in establishing prognosis. *Radiology*. 1990 Feb;174(2):331-6.