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General Surgery

CRP UNVEILED: A TERTIARY TALE OF ACUTE PANCREATITIS IN DIAGNOSIS AND PROGNOSIS

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ABSTRACT **Background-** Acute pancreatitis stands as a leading cause of severe abdominal pain. Despite the less-than-optimal performance of conventional diagnostic markers such as pancreatic enzymes like amylase and lipase in predicting outcomes, C-reactive protein (CRP) evaluation emerges as a promising, cost-effective alternative. Our research aims to investigate the efficacy of an early, single assessment of CRP levels as a potential indicator for morbidity and mortality in cases of acute pancreatitis. **Methods-** This was a prospective observational study done at Rajarajeshwari Medical College & Hospital for a period of three years from April 2020 to April 2022. 100 patients diagnosed to have acute pancreatitis were included in this study. Their CRP levels were sent on second day of admission and computed tomography (CT) scan done after 72 hours of admission. Demographic variables were recorded along with local and systemic complications and compared with CRP levels. **Results- :** In this study of 100 patients, we found that most of the patients of pancreatitis were young to middle aged males, a majority of whom belonged to fourth decade of life. We found that levels of CRP rise as age and severity progresses. CRP levels also remains on higher side in various local complications like necrosis, acute fluid collection etc., however a statistical significance could not be ascertained. **Conclusions-** Acute Pancreatitis is a life-threatening disease with a wide spectrum of clinical symptoms. CRP levels can offer early insights into the ongoing inflammatory processes. There is a compelling need for further research to expand our understanding of CRP's role, with the ultimate goal of reducing the mortality and morbidity associated with acute pancreatitis.

KEYWORDS : Amylase, Lipase, Acute pancreatitis, CRP, CT

INTRODUCTION

Acute pancreatitis stands out as a prominent cause of severe abdominal pain. The clinical presentation of acute pancreatitis can vary greatly, with the majority of patients experiencing a successful recovery free from complications. However, a subset of patients presents with severe complications, such as pancreatic abscesses and pancreatic necrosis, leading to heightened morbidity and mortality rates.[1]

While the role of diagnostic markers, such as amylase and lipase, in predicting outcomes has proven less effective, the assessment of CRP (C-reactive protein) emerges as a cost-effective alternative. In this study, our objective was to investigate whether an early and singular evaluation of CRP levels can serve as a reliable predictor of morbidity and mortality in cases of acute pancreatitis.[2]

CRP (C-reactive protein) is the most commonly employed and economical marker, synthesized in the liver through the influence of IL-6 and IL-1.

Peak serum values typically occur between 48 to 72 hours following the onset, and a positive indication is seen when levels exceed 100-150 mg/dL.

The liver produces CRP as a response to proinflammatory cytokines, including IL-6 and IL-1. Elevated CRP levels beyond 100-150 mg/dL signify a more severe progression of acute pancreatitis.

1)Considering its peak at only 48-72 hours, so cannot be used to access severity in the therapeutic window of pancreatitis (first 72 hours).

2)CRP is also elevated in conditions like coronary heart disease, insulin resistance, diabetes, dental disorders, smoking, overweight, obesity, Alzheimer's disease, rheumatoid arthritis and cancer.[3]

MATERIALS AND METHODS:

This retrospective observational research was carried out at Rajarajeswari medical college and hospital, during the period from April 2020 to 2022. The study encompassed first 100 individuals diagnosed with acute pancreatitis.

CRP levels were measured on the second day of their hospital admission, and a CT scan was performed 72 hours after admission. Various parameters were documented, including age,gender as well as the identification of both local complications (such as peri-pancreatic fluid collection, sterile necrosis, infected necrosis, and pleural effusion) and systemic complications (encompassing cardiovascular, respiratory, renal, and hematological issues).

Case Selection And Inclusion Criteria

The study enrolled first 100 consecutive patients diagnosed with acute pancreatitis who sought treatment in our department, following the application of the exclusion criteria.

Patients meeting the criteria for acute pancreatitis as defined by the Atlanta classification were included in the study. Specifically, individuals aged over 20 but under 50 were considered for inclusion.

Exclusion Criteria

Patients with ongoing inflammatory conditions distinct from acute pancreatitis, individuals with liver failure or cirrhosis, and those afflicted with conditions such as rheumatoid arthritis, diabetes mellitus, coronary artery disease, obesity, and the like were not considered for the study.

Patient age less than 20years and greater than 50years were not considered.

Statistical Analysis

Data collected in the proforma was entered into a Microsoft Excel spreadsheet, and statistical analyses were carried out using SPSS software version 21. The p-value was calculated to examine the significant associations between CRP and various variables, employing the Chi-square test with the inclusion of Fisher's exact test when necessary.

Furthermore, serial CRP measurements were performed at the 72-hour mark. A CT scan, using both oral and intravenous contrast agents, was conducted 72 hours after the patients' admission. The CT severity index, encompassing CT grade and necrosis grade, was determined during this imaging procedure.

RESULTS

Age Distribution

Most of the patients included in the study are young to middle aged

males and most common age group was 30-40 years.

Relation Of CRP Levels With Age Distribution

In our study of 100 patients we found that levels of CRP rises as age progresses as shown in Table1.

Relation of Ct-score with CRP levels at 72 hours

In this study of 100 patients we found that as severity of pancreatitis increases on CT-scan correspondingly CRP levels also remains on higher side. With p>0.005 which is clinically insignificant.

Relation of local complications with CRP levels at 72hours

In our study of 100 patients we analyzed various local complications like necrosis,acute fluid collection and related that with CRP levels as shown in Table 2, p=1.07.

Table No-1

AGE GROUP IN YEARS	AVERAGE CRP LEVELS
21-30years	72.7
31-40years	77.3
41-50years	80.9

Table No: 2

VARIABLES	CRP LEVELS >100 AT 72YEARS HOURS	CRP LEVELS <100 AT 72HOURS
CT documented local complication	31	13
CT documented no local complication	15	41

DISCUSSION

C-reactive protein (CRP) is a sensitive marker for bodily injuries, infections, and inflammation. It plays a crucial role in the acute-phase response following inflammation, primarily driven by IL-6 in the liver.[4] Research has expanded its functions, especially in cardiovascular disease[5]. Elevated CRP levels predict cardiovascular disease even in asymptomatic individuals and are relevant in various conditions like atherosclerotic disease, congestive heart failure, atrial fibrillation, myocarditis, aortic valve disease, and heart transplantation. Higher CRP levels are also observed in acute appendicitis, acute cholecystitis, acute pancreatitis, and meningitis[67]. CRP levels below 25 mg/L can rule out acute appendicitis, and levels above 30 mg/L aid in diagnosing acute cholecystitis with greater sensitivity than erythrocyte sedimentation rate (ESR).[7]

In acute pancreatitis, distinguishing mild from severe cases is achieved when CRP levels exceed 210 mg/L, with 83% sensitivity and 85% specificity[8]. While the critical CRP value varies in studies, ours suggests a significant reference point of 100 mg/dL. The study didn't extensively explore the causes and gender distribution due to participant age.

Normal CRP levels increase with age, reaching about 77% in the third decade and 80% in the fifth decade. In our study, most severe cases had CRP values over 100 mg/dL at 72 hours, with over 80% sensitivity and 85% specificity. This emphasizes CRP as a robust marker in acute pancreatitis, surpassing scoring systems in sensitivity and specificity. In necrotizing pancreatitis, elevated CRP levels exceeding 100 mg/dL indicate the presence of necrosis, with 87.3% sensitivity and 82.81% specificity. This supports using CRP levels to identify patients for contrast-enhanced CT scans within 48-72 hours.

Limitations

Since this study was conducted at a single center, it is vulnerable to type I statistical bias. Additionally,the relatively small sample size may not be fully representative of the broader population. As a result, it is crucial that future research involves larger sample sizes to confirm the results obtained in this study.

CONCLUSIONS

Acute pancreatitis is a life-threatening illness that manifests a wide array of clinical symptoms. While diagnostic markers like amylase and lipase have proven unsatisfactory as prognostic indicators, previous studies have indicated that CRP shows promise in this regard. CRP levels can offer early insights into the ongoing inflammatory processes. There is a compelling need for further research to expand our understanding of CRP's role, with the ultimate goal of reducing the mortality and morbidity associated with acute pancreatitis.

REFERENCES:

1. Puolakkainen P, Valtonen V, Paananen A, Schröder T. C-reactive protein (CRP) and serum phospholipase A2 in the assessment of the severity of acute pancreatitis. Gut. 1987;28(6):764-71.
2. Mayer JM, Raraty M, Slavin J, Kemppainen E, Fitzpatrick J, Hietaranta A, et al. Serum amyloid A is a better early predictor of severity than C-reactive protein in acute pancreatitis. Br J Surg. 2002;89(2):163-71.
3. Pepys MB. C reactive protein fifty years on. Lancet. 1981;1:653-7.
4. Pradhan AD, Manson JE, Rifai N, Buring JE, Ridker PM. C-reactive protein, interleukin 6, and risk of developing type 2 diabetes mellitus. J Am Med Assoc. 2001; 286(3):327-34.
5. Juvonen T, Kiviniemi H, Niemelä O, Kairaluoma MI. Diagnositic accuracy of ultrasonography and C reactive protein concentration in acute cholecystitis: a prospective clinical study. Eur J Surg. 1991;158(6-7):365-9.
6. Clyne B, Olshaker JS. The C-reactive protein. J Emerg Med.1999;17(6):1019-25.
7. Albu E, Miller BM, Choi Y, Lakhanpal S, Murthy RN, Gerst PH. Diagnostic value of C-reactive protein in acute appendicitis. Dis Colon Rectum. 1994;37(1):49-51.
8. Wilson C, Heads A, Shenkin A, Imrie CW. Creactive protein, antiproteases and complement factors as objective markers of severity in acute pancreatitis. Br J Surg. 1989;76(2):177-81