Research Article

Correlation of C-Reactive Protein and Computed Tomography Severity Index in Acute Pancreatitis

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Abstract

Background: Acute pancreatitis is the inflammatory disorder which can be mild or severe. Early diagnosis and proper assessment of the disease severity have a critical role in its treatment.

Objective: Determine the correlation of C-reactive protein and computed tomography severity index in acute pancreatitis.

Methods: This cross-sectional study took place at department of General surgery, Pakistan Institute of Medical Sciences hospital Islamabad (PIMS), from September 2019 to February 2020. Patients of age between 15-70 years, presenting with acute severe epigastrium pain spreading to back, diagnosed as acute pancreatitis by serum amylase of 1000 units or more and either gender were included. CT scan was performed within 24 hours following presentation using axial slices of dome in diaphragm up-to pelvis by IV contrast. Slice had 3 mm of thickness in pancreas region. Various parameters of pancreatic inflammatory response, ratio of pancreatic parenchymal necrosis and additional pancreatic complications are included in the updated CT severity index measured on CT, with various points given for each parameter. A score over 5 is rated as severe pancreatitis. A blood sample was taken from each patient for CRP level. A CRP level of >10 mg/L was considered as positive. All the information was recorded via self-prepared proforma. Data analysis was done by SPSS version 20.

Results: Total 67 patients of acute pancreatitis were selected for this study. Out of them, 59.7% were males and remaining were females. Most common age group was 46-60 years 43.3%. According to the pancreatic grading most of the patients presented with grade C as 29.9% and grade B as 23.9%, followed by grade D 20.95, grade E14.9% and 10.45 were normal. According to the pancreatic necrosis majority of the cases 41.8% had < 30%. There was a strong positive correlation between CT severity index and CRP level, r-value 0.346.

Conclusion: C reactive protein is a reliable and non-invasive diagnostic tool for acute pancreatitis and its severity, which showed strong positive correlation with CT severity index of acute pancreatitis.

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Key Words: Acute pancreatitis, CT severity, C-reactive protein.

Introduction

Acute pancreatitis (AP) is a pancreatic inflammatory disorder, among the most frequent factors of gastrointestinal disorder associated hospitalize-

tion.[1]. With extensive clinical variation, it remains a prevalent condition and its prevalence is growing. The severity of acute pancreatitis can range between mild self-limiting pancreatic inflammatory response to pancreatic necrosis leading to life-threatening condition.[2] Necrotizing pancreatitis and/or the development of systemic organ failure is associated with the incidence of acute pancreatitis.[2] Acute pancreatitis can be categorized into severe, moderate and mild disease with severe form of disease characterized by permanent organ dysfunction and numerous systemic and local complications.[3,4] The prevalence of acute pancreatitis has been projected to escalate with the growing prevalence of biliary diseases and alcoholism, which are the main etiological factors.[5,6]

The extreme type prognosis is low, arises in 8.8 percent of AP, and can hit 28 percent of severe AP (SAP) mortality.1,7 Though, with systemic and local complications, roughly 15-20 percent of patients experience clinically serious AP.[8] For the early detection of patients at highest risk of acquiring clinically serious AP, a variety of laboratory and clinical prognostic scoring frameworks have been developed. Generally, these scoring frameworks have an accuracy that ranges from 70% to 80%.[9.10] In the evaluation of AP, imaging via CT or MRI is beneficial not just for diagnosis however also to diagnose local pancreas associated complications as well as to guide interventional practices. CRP, however, is a hepatocyte-synthesized acute stage reactant and is typically increased in inflammatory disorders.[11] Cytokines including IL-6 are strong activators of hepatic CRP synthesis. It takes about 72 hours following the occurrence of symptoms for the CRP serum concentration to peak.[12] Today, it is the most commonly used individual biomarker for AP severity evaluation. Because it is cheap, readily accessible, and simple to analyze.[12] It is critical to provide a convenient and worthwhile screening method, given the enormous acute biliary pancreatitis burden within our nation.[4] As they need just a blood specimen, CRP concentrations can be obtained easily.[4] This study was therefore carried out to determine the link between the severity index of CT and C-reactive protein in acute pancreatitis.

Methods

This was a cross-sectional study, conducted in the General surgery department of Pakistan Institute of Medical Sciences hospital Islamabad (PIMS), from September 2019 to February 2010, after taking ethical approval. Ethical approval was taken. Patients of age between 15-70 years presenting with acute severe epigastrium pain radiating to back and diagnosed as acute pancreatitis by serum amylase of 1000 units or more, and either gender were included. Those with history of any severe comorbid illness as renal failure, chronic liver disease and any chronic inflammatory disorder were excluded from the study. Non probability consecutive sampling was used to enroll the patients. Informed consent was taken in each case. Detailed clinical history was taken in each case to find out the cause of acute pancreatitis. CT scan was performed within 24 hours following presentation using axial slices of dome in diaphragm upto pelvis by IV contrast. Slice had 3 mm of thickness in pancreas region. Various parameters of pancreatic inflammatory response, ratio of pancreatic parenchymal necrosis and additional pancreatic complications are included in the updated CT severity index measured on CT, with various points given for each parameter. A score over 5 is rated as severe pancreatitis.

A blood sample was taken from each patient for CRP level. A CRP level of >10 mg/L was considered as positive. All the information was recorded via self-made proforma. Data was analyzed by using SPSS version 20.

Results:

Total 67 patients of acute pancreatitis were selected for this study. Out of them, 59.7% were males and remaining were females. Most common age group was 46-60 years 43.3%, followed by 31-45 years of 25.4%, 13.4% were between age of 15 to 30 years and 17.9% were more than 60 years of age. Table1.

According to the pancreatic grading most of the patients presented with grade C as 29.9% and grade B as 23.9%, followed by grade D as 20.95%, grade E as 14.9%, and 10.45% were normal. According to the pancreatic necrosis majority of the cases (41.8%) had < 30% pancreatic necrosis, 23.9% had >30-50% and

4.5% had >50% pancreatic necrosis, while 29.9% were normal. Table 2.

There was a strong positive correlation between CT severity index and CRP level, r-value 0.346. Fig.1

Table 1: *Age and gender of patients n=67*

Variable	Categories	Frequency (%)
Age Groups	15-30 years	09(13.4%)
	31-45 years	17(25.4%)
	46-60 years	29(43.3%)
	>60 years	12(17.9%)
	Total	67(100.0%)
Sex	Male	40 (59.7%)
	Female	27 (40.3%)

Table 2: *Pancreatic grading and necrosis n=67*

Variable	Categories	Frequency (%)
Pancreatic grading	A	07(10.4%)
	B	16(23.9%)
	C	20(29.9%)
	D	14(20.9%)
	E	10(14.9%)
	Total	67(100.0%)
Pancreatic Necrosis	None: 0	20 (29.9%)
	< 30%:2	28(41.8%)
	>30-50%;4	16(23.9%)
	>50%:6	03(4.5%)
	Total	67(40.3%)

A=Normal, B=Enlarge of pancreas, C=Inflammatory changes in pancreas and peri-pancreatic fat, D=Ill-defined peri-pancreatic fluid collection, C= Two or more poorly defined peri-pancreatic fluid collection.
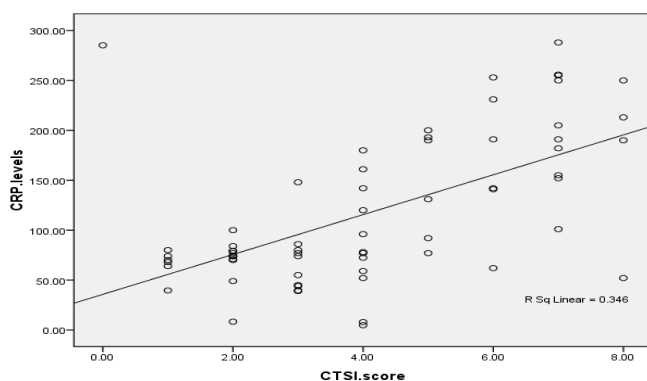

Figure: *Correlation of CT severity index and CRP level n=67, r-value 0.346*

Discussion:

Acute pancreatitis is a prevalent emergency surgical condition that can progress to sepsis and even death if not managed promptly. Several scoring systems are available that allow to accurately predict the severity of disease. In this study 59.7% were males and remaining were females. Similarly Wang Y et al13 found 51.64% males and 48.36% females. While inconsistently Kayar Y et al14 reported that out of all study participants 111 were females and 69 were males.

In this study according to the pancreatic grading most of the patients presented with grade C as 29.9% and grade B as 23.9%, followed by grade-D as 20.95%, grade-E as 14.9% and 10.45 were normal. Similarly, Raghuwanshi S et al15 stated that grade-C Balthazar was commonest (40%) after that 25% was grade D and 25% was grade E. In 72% of cases, acute peri-pancreatic fluid collection was the commonest finding.

In this study there was a strong positive correlation between CT severity index and CRP level, r-value 0.346. Vengadakrishnan K et al2 found comparable results. Balthazar et al., reported necrosis as grade B pancreatitis in 7% cases, grade C pancreatitis in 1% cases, grade D pancreatitis in 17% and grade E pancreatitis in 52% of cases.[16]

According to several studies and approaches and efficacy in the application, it is apparent that the C-reactive protein can be a significant diagnostic bio-chemical marker for acute pancreatitis. This study was limited by its small sample size and carried out at single Centre. As in some approaches it is stated that serum C-reactive protein may not be the most accurate indicative marker.[17] However until the most accurate non-invasive marker comes along, the C-reactive protein is readily accessible. However further studies should be done on to prove as single predictive.

Conclusion

C-reactive protein showed strong positive correlation with CT severity index of acute pancreatitis. Though it is a reliable and non-invasive diagnostic tool for acute pancreatitis and its severity, by using these

diagnostic tool patients can be saved from extra financial Burdon. More studies are required on this correlation at local level.

Ethical Approval: Given
Conflict of Interest: The authors declare no conflict of interest
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