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Study to Assess C Reactive Protein as a Biochemical Severity Marker for Acute Pancreatitis

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Introduction

Majority of Acute pancreatitis are due to gall stone induced[(1)] and alcohol induced [(2)]. Various theories have been proposed for the mechanism involved in pancreatitis like Bile reflux [(3)] from CBD to main pancreatic duct, Duodenal reflux theory [(4)], Ductal hypertension theory [(5)] and so on. Acinar cells are affected first. But the mechanism of injury by alcohol and drugs is not known. Calcium activates and can increase the activation of other intra cellular enzymes [(6)]. Pancreatic enzyme activation within acinar cells is seen in all models of pancreatitis. It is being held that intra acinar activation of enzymes is the critical event in pancreatitis leading to injury of acinar cells [(7)]. These changes produce significant inflammatory reaction in and around the pancreas.

AIM

To assess the value of C reactive protein (CRP) levels as the biochemical severity marker as compared against computed tomography severity index (CTSI) as standard in acute pancreatitis to differentiate mild from severe acute pancreatitis. To find the correlation of significantly raised serum CRP with local changes in pancreas, especially pancreatic necrosis. To find the relationship between CRP and CTSI with number of days of admission in the hospital.

Methodology and Materials

A Prospective Observational study in 50 patients in the Department of General Surgery , Stanley Medical College for a period of 16 months from June 2016 to September 2017 , diagnosed as ethanol induced acute pancreatitis. History, Clinical examination and biochemical , imaging studies were done. Patients with more than 1 day abdomen pain , acute on chronic pancreatitis , children <14 yrs of age , pancreatitis due to other causes and other significant comorbidities were excluded. Serial CRP levels were measured at 24, 48, 72 hours were done after admission. Computed Tomography with Oral and IV contrast was done at 72 hours after admission and CT severity index (Balthazars and Ransons score) was ascertained. Number of Days of admission for each case was also documented.

Observations And Results

Cutoff value for CRP was taken as 100 mg/dl. Peak levels are reached after 48 hours of onset of pain hence the same was recorded in each case.

Age distribution :8 cases between 21- 30 yrs of age, 27 cases between 31- 40 yrs of age, 15 cases in 41- 50 yrs age group.

Only male patient with history suggestive of alcohol induced pancreatitis were included.

Table 1- CRP values distribution from time of admission

Time from admission (hours)	Average CRP values
24	61.52
48	71.43
72	80.24

CRP values rise as the age of the group increases and highest values are seen in older age group.

Table 2 – CRP values in different age groups

Age group (yrs)	Average CRP values (48hrs)
21-30	70.26
31-40	75.62
41-50	77.72

Significant CRP values Vs Duration of hospital stay:

Duration of hospital stay varied in different patients from 7days to 59 days (mean = 26 days). Patients with CRP value > 100 mg./dl and values <100 mg /dl are correlated with days of hospital stay in patients.

Table 3 – CRP values and Hospital Stay duration

CRP values (mg/dl)	Duration of Hospital Stay
<100	12
>100	25.2

Table 4 – comparison of number of patients with significant CRP values (>100 mg/ dl) at 48 hrs of onset vs CT severity index values (>3)

	CRP value >100 mg /dl at 48 hrs of onset of pain	CRP values < 100 mg/ dl at 48 hrs of onset of pain
CTSI > 3 (total score)	11	2
CTSI <3 (total score)	8	29

Table 5 – comparison of number of patients with significant CRP values (48 hrs) with presence of absence of necrosis.

	CRP values > 100 mg/ dl (48 hrs)	CRP values < 100 mg/ dl (48 hrs)
Presence of necrosis (necrosis score +)	5	1
Absence of necrosis (necrosis score 0)	8	36

SENSITIVITY – 83.33%

SPECIFICITY – 81.81%

Discussion

It is known that CRP [8] is a acute phase protein secreted by liver multiple inflammatory conditions and is a non specific marker. 13 patients with acute severe pancreatitis as defined by Atlanta classification [9], all patients had CT severity index more than or equal to 3 and so it is justified in using it as a standard to compare CRP values and it is the current standard in this regard as shown by number of studies [10].

Of the 13 patients with severe pancreatitis , 11 patients had CRP values >100 mg/ dl at 48 hrs of onset of pain [11]. Sensitivity and Specificity of 84.61% and 78.37% respectively, which correlates with earlier studies and establishes CRP level as severity marker in acute pancreatitis with sensitivity and specificity better than the scoring systems (40- 60%) as given by study by Gurleyik et al [12].

Out of 6 patients with necrotizing pancreatitis with positive necrosis score in CTSI, 5 patients had CRP values at 48 hours >100 mg/ dl giving CRP level sensitivity of 83.3% and specificity of 81.81 %

respectively and by this data, it is established that CRP level can be used as an indicator for necrosis and to decide on patients who need CT at 48- 72 hrs.

Conclusion

Increased CRP values above the significant range correlates positively with the occurrence of necrosis in pancreatitis and can be used to decide on patients who need a CECT as this investigation is expensive and may not be widely available. It correlates positively with duration of stay of patients in hospital, thereby reflecting the morbidity of pancreatitis.

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