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Original Research Article

A Study of Cardiac Dysfunction and its Association with Outcome in Acute Pancreatitis

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Conflict of interest: Nil

Abstract

Background: Pancreatitis by itself is a disease, which is unique, protean and extrudes into the diagnostic arena. Acute pancreatitis (AP) is an acute inflammatory process of the pancreas with variable involvement Cardiovascular and pulmonary system.

Methods: The study was conduct in the Department of medicine J.L.N. Medical College & Hospitals, Ajmer. After taking informed consent eligible acute pancreatitis patients were enrolled according to the inclusion and exclusion criteria.

Result: In our study, maximum patients (96.00%) were male and (80%) were from 31-50 years of age group. Patients with CTSI ≥7 (severe pancreatitis) had significantly higher CRP score of 125.29±6.84 mg/dl. positive S. CRP Value were present with sensitivity 100% and specificity 16.13%. The mean CKMB was found to be 33.52 ±19.51 IU/L. and in Patients with CTSI ≥7 (severe pancreatitis) was 52.57±26.97 IU/l. In case of severe pancreatitis positive CKMB value were present with sensitivity 85.71% and specificity 51.61%. Abnormal ECG changes were seen in 42% patients (42/100), all patients had Sinus tachycardia. Abnormal ECG finding were present with sensitivity 100% and specificity 62.37%. 20% of the studied patients, were found to be having abnormalities in 2D echo and mostly have diastolic dysfunction.

Conclusion: In our study association of high S. CRP and S. CKMB levels with severe Pancreatitis had high sensitivity. Association of 2D ECHO abnormalities with severe pancreatitis was highly specific. Association of ECG changes with Severe pancreatitis had 100% sensitivity. Most common ECG abnormalities was sinus tachycardia.

Keywords: Acute Pancreatitis (AP), CRP, CKMB CTSI, APACHEII, ECG, 2DECHO

Introduction

Acute pancreatitis is a common disorder of the pancreas. It is the most frequent gastrointestinal cause for hospitalization and one of the leading causes of in-hospital deaths. Acute pancreatitis (AP) is an inflammatory disease characterized by steady, acute abdominal pain of varying severity, often radiating from the epigastrium

to the back. Its presentation ranges from a self-limiting mild disorder to a more severe and fulminant disease.

Acute pancreatitis remains a common disorder with disorder with devastating consequences.[1] Acute pancreatitis is defined as an acute inflammatory process of the pancreas, with variable involvement of other regional tissues or remote organ systems [2].

Acute Pancreatitis is defined by the presence of 2 of the 3 criteria [3].

1. Abdominal pain characteristic of AP;

2. Serum amylase and/or lipase3 times the upper limit of normal; and

3. Characteristic findings of AP on computed tomography (CT) scan.

Among the cardiovascular abnormalities studied in AP, the commonest are electrocardiographic (ECG) changes and echocardiographic changes. ECG changes are known to occur in ~ 50% of AP patients and that include tachycardia, atrial flutter and fibrillation, bundle branch blocks and ST-T wave changes [4]. These changes are thought to be due to electrolyte disturbances, reflex mediated by the vagus nerve, coronary vasospasm or myonecrosis due to the release of pancreatic proteolytic enzymes [5].

There are several other cardiovascular manifestations in AP like cardiac rhythm disturbances, hyperdynamic state with increased cardiac index, decreased myocardial contractility and low peripheral vascular resistance. AP show microcirculation impairment with interstitial edema and cardiomyocyte hypoxia, intracellular edema of the cardiomyocytes and hypertrophy of the cardiomyocytes and collagenisation of myocardium stroma.

On echocardiography in patients with acute pancreatitis there results have been variable. While some studies have reported no difference in left ventricular (LV) function in patients with AP as compared to controls, others have noted diastolic dysfunction [6].

Material and Methods

Source of the study

The study was conduct in the Department of Medicine after approval from institutional ethical committee of J.L.N. Medical College & Hospitals, Ajmer. After taking informed consent, study was performing in 100 patient or for two year, whichever is earlier, admitted in different wards was include in our study.

Inclusion criteria:

1. Acute Pancreatitis as defined by clinical symptoms and elevated serum amylase or lipase (more than thrice the upper limit of normal range) or imaging evidence of acute pancreatitis.
2. Patients presenting within 7 days of onset of pain.
3. Age more than 18 year

Exclusion criteria:

1. Patients with severe pre-existing co-morbid illnesses like coronary artery disease (CAD), Congestive heart failure (CHF) of any etiology, chronic kidney disease (CKD), Cirrhosis.
2. Patients with any evidence of chronic pancreatitis or any precious attack of acute pancreatitis.

Methodology

The study was conduct in the Department of Medicine after approval from institutional ethical committee of J.L.N. Medical College & Associated Hospitals, Ajmer. 100 patients were taken for this study.

All qualifying patients was undergoing detailed history, clinical examination biochemical and radiological investigations. All routine investigations was performed on all patients e.g. Complete Blood Count

(CBC), Blood Sugar (Fasting and Postprandial), Renal function test, Serum Electrolytes, Liver Function Test (LFT), Lipid Profile, Serum amylase, Serum lipase, Urine Complete, ECG,USG abdomen.

Special investigations:

1. CK-MB was on admission and on or after 3 days.
2. 2D Echocardiography
3. TMT (If required)
4. CECT ABDOMEN scan of the abdomen was done on or after 3 days to assess the severity of pancreatitis.
5. Coronary angiography (If required)

Percentage necrosis (50%) on CT scan and CT severity index (CTSI) were calculated. Acute physiology and chronic health evaluation II (APACHE II) score was derived at admission.

Severity of AP was defined as per revised Atlanta classification.

Results

Table 1: Correlation of CKMB with CTSI Score

CT SI Score	CKMB Value		Mean	Std. Deviation	P value
	Minimum Value	Maximum Value			
≤6	10	88	32.08	18.23	<0.04 (S)
≥7	24	96	52.57	26.97	

Table 2: Correlation of ECG finding with CTSI.

			ECG Finding		Total
			Normal	Abnormal	
CTSI	≤6	N	58	35	93
		%	62.4%	37.6%	100.0%
	≥7	N	0	7	7
		%	0.0%	100.0%	100.0%
Total		N	58	42	100
		%	58.0%	42.0%	100.0%

Table 3: Correlation of 2D echo finding with CTSI.

			2D Echo Finding		Total
			Normal	Abnormal	
CTSI	≤6	N	77	16	93
		%	82.8%	17.2%	100%
	≥7	N	3	4	7
		%	42.85%	57.15%	100%
Total		N	80	20	100
		%	80%	20%	100%

Discussion

Table No.1 is showing that we have 7 patients with severe pancreatitis (CTSI score ≥7) in which minimum and maximum values of S. CKMB were 24 and 96(IU/L) respectively and mean ± SD was 52.57±26.97(IU/L). it show that patients with severe pancreatitis have higher S. CKMB value and their association was found to be statistically significant (p value<0.04).

This shows that patients with severe pancreatitis had higher S. CKMB value and their association was found to be statistically significant (p value<0.04). Zhao bing *et al* [7]. study showed CKMB value and their association was found to be statistically significant (p value<0.001). On the contrary, Pezzili R *et al* [8]. revealed no significant relation.

Table No.2 is showing that we have 7 patients with severe pancreatitis (CTSI score ≥7) and all 7 patient have Abnormal ECG finding. Those 7 patient have sinus tachycardia, QT prolongation. While 3 patient have ST depression, 2 patient T inversion, one patient ST-T changes and 1 patient ST elevation. QT prolongation also found in 7patient with were CTSI score <6 and their association was found to be statistically significant (p value<0.001).

Ankit Mahajan *et al* [9] study show ECG and severe pancreatitis their association was found to be statistically significant (p value<0.05). Nadkarni *et al* [10]. study show ECG and severe pancreatitis their association was found to be statistically significant (p value<0.02).

Table No.3 is showing that we have 7 patients with severe pancreatitis (CTSI score ≥7) In which 4 patient have Abnormal 2DEcho finding,2 patient have RWMA +,EF 56%,dystolic dysfunction grade1, 1patient have RWMA+,EF49%, dystolic dysfunction Grade 2, and one patient have RWMA+, Ef 46% dystolic dysfunction grade 2.

16 patient with Abnormal 2D Echo finding With CTSI is ≤6 (mild to moderate pancreatitis) . In which 10 patient RWMA+, Ef53%, dystolic dysfunction grade 1 and 6 patient have RWMA+, Ef 46% ,dystolic dysfunction grade 2. and there association was found to be statically significant (p<0.001).

Nadkarni *et al* [10] and S. Rickes *et al* studies reported that association between severe pancreatitis and 2D ECHO changes was found to be statically significant (p<0.001, p<0.001 and p<0.05 respectively). On the other hand, Variyamshah (1987) did not find any myocardial dysfunction, so, 2D echo cardiography were observed to be normal.

Conclusion

In our study association of high Serum CKMB levels with severe Pancreatitis had high sensitivity. Association of 2D ECHO abnormalities with severe pancreatitis was highly specific. Association of ECG changes with Severe pancreatitis had 100% sensitivity. Most common ECG abnormalities was sinus tachycardia.

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