

Research Article

A clinical study of acute pancreatitis

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ABSTRACT

Background: Acute pancreatitis is an acute inflammatory process of the pancreas with varying involvement of other regional tissues or remote organ systems. About 80% of the attacks are mild, 20% are severe and they are commonly accompanied by necrosis of the pancreas and or organ failure. The objective of the study was to determine the correlation between Ranson's score, CT severity index and pancreatic enzymes in acute pancreatitis.

Methods: In the present study 150 patients were included who had clinical features of acute pancreatitis and CECT abdomen suggestive of acute pancreatitis. Patients with chronic pancreatitis were excluded from the study. Patients were admitted to the hospital and CECT abdomen was performed 48 hours after the onset of symptoms. Liver function tests, complete blood picture, serum calcium and pancreatic enzymes were assessed at the time of admission, after 48 hrs and weekly thereafter till discharge. Patients were followed up with regular spontaneous visits, telephonic intimation and through postcard.

Results: Majority of the patients were in the age group of 20-40 (72%). It was more common in males (m:f)=(9:1). In general, ethanol abuse was more common cause while in females gall stone was the major cause. There was a good correlation between Ranson's score and CT severity index score. The magnitude of enzyme elevation had no correlation with the severity of the disease. On follow up common complications were Pseudo cyst of the pancreas, Splenic vein thrombosis, Left sided pleural effusion.

Conclusions: This study concludes that there is a good correlation between CT severity index and Ranson's score with respect to severity of the acute pancreatitis. Serum amylase and lipase levels have little role in terms of severity of acute pancreatitis.

Keywords: Acute pancreatitis, Clinical study, Surgery

INTRODUCTION

Acute pancreatitis is an acute inflammatory process of the pancreas with varying involvement of other regional tissues or remote organ systems.¹ About 80% of the attacks are mild, 20% are severe and they are commonly accompanied by necrosis of the pancreas and or organ failure.² Gall stones and chronic ethanol abuse account for 70% of cases of acute pancreatitis.³ Pathologically there are two types of pancreatitis, interstitial and necrotizing.⁴ Pathophysiologic mechanisms include

micro-circulatory injury, leucocyte chemo-attraction, release of pro and anti-inflammatory cytokines, oxidative stress, leakage of pancreatic fluid into the region of pancreas, bacterial translocation to the pancreas and systemic circulation.⁵ The initial step in the pathogenesis of acute pancreatitis is conversion of trypsinogen to trypsin within acinar cells in sufficient quantities to overwhelm normal mechanisms to remove active trypsin.⁶ However enzyme colocalisation may occur without inducing significant acinar injury.⁷ A popular mechanism of gall stone pancreatitis is that an impacted

gall stone in the distal common bile duct obstructs the pancreatic duct.⁸ Obese patients with pancreatitis have a higher incidence of local complications, severe acute pancreatitis.^{9,10} About one fourth to one third of the acute severe pancreatitis patients die from the disease, for a total mortality of 2-10%.¹¹ About one fourth of the deaths in Scotland occur within 24 hrs of admission.¹² After the second week of illness patients succumb to pancreatic infection associated with multi-organ failure.¹³

Many patients referred to as acute pancreatitis have precipitates commonly referred to as biliary sludge.¹⁴ Biliary sludge accounted for approximately 67% of acute idiopathic pancreatitis.¹⁵ Tissue specimens obtained during cholecystectomy from patients with acute pancreatitis contain precipitates of various descriptions in approximately 60% of the cases.¹⁶⁻¹⁸ Abnormalities hepatic bile secretion and changes in the contractile function and mucosal properties of gall bladder contribute to formation of gall bladder sludge.^{19,20}

CT, as used to aid the diagnosis and staging of acute pancreatitis, has greatly improved and has changed the clinical management of this condition.^{21,22} CT performed during the initial 12 hours may show only equivocal findings, with a slight heterogeneous decrease in attenuation of the pancreas (ischemia) but a normal parenchymal texture.²³ The CT severity index is an attempt to improve the early prognostic value of CT in cases of acute pancreatitis.²⁴ The utility of the Ranson criteria compared with that of the Balthazar CT criteria for detection of severe pancreatitis, CECT results were found to be better prognostic indicators, owing to greater sensitivity and specificity.²⁵ Extravasation of activated pancreatic enzymes induces the development of retroperitoneal fat necrosis.^{26,27}

There has been much interest in early surgical and endoscopic removal of gallstones retained in the common bile duct.²⁸ There is good evidence that early endoscopic intervention is the procedure of choice in patients with stone impaction and cholangitis.²⁹

METHODS

A prospective observational study was performed of the 150 patients admitted with acute pancreatitis after taking permission from the institutional ethical committee. Patients with chronic pancreatitis with acute exacerbations were excluded from the study. Age, sex, complete blood picture, liver function tests, serum calcium, serum amylase and lipase, contrast enhanced computed tomography of the abdomen were performed for the patients. Patients were treated with conservative management. Serum enzymes were repeated when and where required.

Computed Tomography (CT) grading system of Balthazar and CT Severity index scoring system (CTSI)

Balthazar Grade:

Grade A: Normal pancreas consistent with mild Pancreatitis.

Grade B: Focal or diffuse enlargement of the gland, including contour irregularities and inhomogeneous attenuation

Grade C: Abnormalities seen in grade B plus peripancreatic Inflammation.

Grade D: Grade C plus single fluid collection.

Grade E: Grade C plus two or more peripancreatic fluid collections or gas in the Pancreas.

CTSI = Balthazar grade score plus necrosis score.

Balthazar grade score

A = 0

B = 1

C = 2

D = 3

E = 4

Necrosis score:

Absence of necrosis = 0

Necrosis of up to 1/3% of pancreas = 2

Necrosis of 1/3 to 50% = 4

Necrosis of >50% = 6.

Table 1: Ranson's 11 Prognostic Criteria for Pancreatitis: at admission

Parameter	1974 criteria for Non-gallstone pancreatitis	1982 criteria for gallstone Pancreatitis
Age	> 55 years	Age > 70 years
W.B.C count	>16,000 cells/cu.mm	>18,000 cells/cu.mm
RBS	> 200 mg/dl	> 220 mg/dl
LDH	> 350 IU/L	> 400 IU/L
AST	> 250 IU/L	> 250 IU/L

Table 2: Ranson's 11 prognostic criteria for pancreatitis: at initial 48 hours of admission.

Parameter	1974 criteria for Non-gallstone pancreatitis	1982 criteria for gallstone Pancreatitis
Fall in HCT (%)	>10	>10
Rise in BUN > 5	> 200 mg/dl	> 220 mg/dl
Calcium	< 8 mg/L	< 8 mg/l
Base deficit	> 4 mEq/L	> 5mEq/L
Fluid sequestration	> 4 liters	> 6 liters
pO ₂	< 60 mmHg	NA

RESULTS

Age and sex distribution

With the study conducted on 150 patients, 15 patients were female and 135 were male. Majority of the patients were in the age group of (21-40) constituting 62% with a mean of 36.24 yrs and median of 43 yrs. There was a clear sex predilection towards males with M:F of 9:1.

Table 3: Distribution of study subjects as per their age and sex.

Age distribution	Male	Female	Total
10-20	9	6	15
21-30	48	3	51
31-40	39	3	42
41-50	27	3	30
51-60	9	0	9
61-70	3	0	3

Table 4: Distribution of study subjects as per their age and sex.

Etiology	No. of patients	Percentage
Alcoholism	114	76
Biliary sludge	18	12
Idiopathic	18	12

Pancreatic enzyme levels

Both serum amylase and lipase were analysed in all the 150 patients and all of them showed more than threefold higher than the upper limit of normal.

Table 5: Enzyme levels in different conditions.

Enzyme	Alcoholism	Gall stone	Idiopathic
Amylase	527.2+/- 256.7	515.38+/- 256.7	524.4+/- 251.3
Lipase	781.12+/- 362	765.6+/- 345	773+/- 345.6

Ranson's score

Of the 150 patients included in the study, 144 were mild and 6 were severe as per Ranson's score.

Table 6: Distribution of study subjects as per Ranson's score.

Score	No. of cases	Percentage	Grading
</= 2	144	96	Mild
>/= 3	6	4	Severe

CT severity index

CECT abdomen was done in all the 150 patients. The most common finding was diffuse swelling of the pancreas and peri-pancreatic fat stranding.

Table 7: Distribution of cases as per CT severity index.

CTSI score	0-3	4-6	7-10
No. of cases	138	9	3
Percentage	92	6	2
Grading	Mild	Moderate	Severe

Table 8: Distribution of cases according to complications.

Complication	No. of cases	Percentage
Pseudocyst	24	16%
Pleural effusion	18	12%
Splenic vein thrombosis	15	10%

DISCUSSION

150 patients were included in the study which constituted 1.43% of the total hospital admissions (150 out of 10,568). Majority of the patients were in the age group of 21-40 constituting 62% of the total. Minimum age of the study group was 13 and eldest was 70 yrs. There was no significant difference between the mean age of patients between the alcoholism and biliary stone disease groups 37.23 and 35.61 respectively. This was not consistent with the previous study (Korean study KIM YS et al., St. John's Bangalore), which said patients of alcoholism group were relatively younger to the gall stone disease. In the present study ethanol abuse was commonest cause in males and gall stone disease was common cause in females. It was consistent with the Indian textbook Tandon and opposing western textbook (Sleissenger) which quoted that ethanol abuse is common cause in both males and females. Patients were designated to have idiopathic cause after performing serum triglycerides, se. calcium, se. electrolytes and anti-nuclear anti bodies. Present study did not show any difference between the elevations in the three etiologies. This was not consistent with the previous studies which showed that the enzymes were relatively more elevated in gall stone disease as compared to ethanol abuse. In an Indian study done at Bangalore St. John's medical college mean amylase and mean lipase levels were significantly lower in ethanol abuse than the biliary group. Magnitude of enzyme elevation did not bear any relation with the severity of the acute pancreatitis.

The natural history of the disease varied from mild to severe necrotizing pancreatitis. All the patients were treated conservatively. Of the 18 biliary cases sent for ERCP 10 patients came for follow up, of them 6 patients had undergone laparoscopic cholecystectomy. In the

remaining 4 patients ERCP was normal. There was no gold standard treatment for acute pancreatitis; all the cases were managed conservatively. Henceforth, prediction of severity has not yet been important for the treatment of acute pancreatitis. However, this will be an important task for assessment of prognostication and treatment complications.

Amongst the various clinical scoring systems, the most feasible one Ranson's score was calculated and was compared with Balthazar's CT severity index. In our study, Ranson's score ranged from a minimum of 1 to a maximum of 3. Majority of the cases were mild with a score of less than or equal to 2. CECT was done in all the cases and as per them only 3 cases were severe with CT severity index score of 8. These cases were also severe as per Ranson's score. According to KIM YS et al. (Korean study published in the world journal of gastroenterology in April 21, 2008, "the estimation of severity through the Ranson's criteria is not precise and is not an appropriate method because it needs 48 hours to complete and has a low specificity (77%) and sensitivity (75%)".³³ They did not find any correlation between Ranson's score and radiological grade in their study. In the present study there was a fair correlation between Ranson's and Balthazar's score. According to another study "The utility of the Ranson analytic criteria compared with that of the Balthazar CT criteria for detection of severe pancreatitis, CECT results were found to be better prognostic indicators, owing to greater sensitivity and specificity."³²

All the cases were subjected to ultrasonography. The most common finding was diffusely swollen pancreas with increase in size. Out of the 150 patients, ultrasound examination was negative in 42 patients (28%). In the remaining 108 cases the disease was detected by ultrasonography. The probable reasons for the limitation are as follows:

1. Poor window for the probe.
2. Early oedema and fat stranding are not picked up by the ultrasound.^{30,31}
3. Observer dependent modality of imaging.

Sensitivity of the ultrasonography is only 68% while specificity stills less. Thus a negative ultrasound does not rule out acute pancreatitis.

The average hospital stay was 6 days. However, higher score on CT severity score was associated with a more prolonged stay. No systemic complications were encountered in the patients. Local complications were encountered, of which Pseudo cyst of the pancreas the most common (in 16% of the patients) was followed by splenic vein thrombosis, pleural effusion, and necrosis. On follow up with ultrasound abdomen, patients having fluid collections in the retroperitoneum for more than 4 weeks were diagnosed as Pseudo cysts and followed further regularly. Of these 24 cases, 10 cases had spontaneous resolution, while 7 cases were less than 6cm;

the remaining 7 cases with size more than 6cm. 5 had undergone elective open cyst gastrostomy. In the remaining 2 cases, external drainage was done as the pseudo cyst got infected (one patient was male and the other was female).

CONCLUSION

Majority of the patients suffering from acute pancreatitis were falling in the age group of 21-40. There is a significant male preponderance (9:1). Most common cause was ethanol abuse in males and gall stone disease in females. There was a good correlation between Balthazar CT severity index and Ranson's score. Magnitude of enzyme elevation had no correlation to the severity of the disease. Irrespective of the cause enzyme elevations were similar quantitatively, but the average lipase value was higher than the average amylase value in all the etiologies. Sensitivity of the ultrasound is only 68% while the specificity was still low. Most common complication was pseudo cyst of the pancreas. In the pseudo cyst cases which did not resolve spontaneously open cysto-gastrostomy was performed.

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