

Correlation of the Clinical, Biochemical, USG Abdomen and CT Finding to Predict the Prognosis of Acute Severe Pancreatitis: A Hospital Based Study

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ABSTRACT

Background: The adoption of multiparametric criteria proposed together with morphological evaluation consent the formulation of a discreetly reliable prognosis on the evolution of the disease a few days from onset, even though this still appears insufficient to plan a varied and timely therapeutic plan. Hence this study is planned to correlate the clinical, biochemical, USG abdomen and CT finding to predict the prognosis of acute severe pancreatitis.

Materials & Methods: The present study was conducted in Government Hospital Barmer, Rajasthan, India. The subjects for study were taken from patients attending medical outdoor and admitted in various medical and surgical wards. Subjects (n=50): Patient of various age and both sex divided in two group a. Mild acute pancreatitis b. Severe acute pancreatitis. Detailed history, physical examination and various investigations shall be done in each subject. Patients of various ages and both sex with acute pancreatitis diagnosed by Atlanta symposium (1992)¹ were taken for detailed history and physical examination, clinical evaluation by multiple organ failure criteria's, USG abdomen and CT scan abdomen.

Results: Overall, mostly patients were recovered (92%) with or without complications only 8% mortality occurred in our study. Serum lipase level >3 times of normal, found to be significant ($P < 0.05$) to predict the severity of acute pancreatitis. The statistical association between CT severity index, established with severity of acute pancreatitis ($P < 0.05$).

Conclusion: We concluded that acute pancreatitis still represents a condition of variable severity and differentiation cannot be made between necrotic and non-necrotic pancreatitis by USG but is evident on CT scan.

KEYWORDS: Ultrasonography, CT Scan, Acute pancreatitis, Clinical findings.

INTRODUCTION

The present scenario the early detection of an attack of acute pancreatitis is based on the detection of raised serum level of serum amylase, lipase level, serial USG examination for monitoring the inflammatory process and CT scan if indicated. In 1973 the raised levels of amylase and lipase were the most reliable and diagnostic criteria, but now it has proved that in the present situation it is not a very reliable investigation.¹

The serum amylase concentration rises during the first 2-3 hours (<24 hrs) after the onset of acute attack and may persist so for 1-3 days and return to the normal within 3-5 days unless there is extensive pancreatic necrosis,

incomplete ductal obstruction or pseudocyst formation. The increase in serum amylase level does not correlates with the severity of the disease as small increase in serum amylase level may be seen in acute necrotizing pancreatitis, so also in many other disease like perforation, acute MI, ectopic pregnancy etc. The serum level of lipase concentration tends to rises above the normal during acute episode of pancreatitis and may remain elevated upto 7-14 days. Serum lipase is more reliable as pancreas is the only source of lipase.¹

Ultrasound is often the initial investigation for most patients with suspected pancreatic disease but obesity,

excessive small/large bowel gas can interfere with ultrasound. Main role of USG lies in detection of gall stones or CBD calculi as a cause of acute pancreatitis, and serial USG examinations play an important role in monitoring the inflammatory process of pancreas after an initial attack.¹ In 1982 it was found that, it was difficult to differentiate between necrotic and non-necrotic pancreatitis by USG but it can be recognized on CT scan easily. The presence of bowel gas does not interfere with the CT scan examination and it defines pancreatic anatomy. CT scan is especially useful in detection of pancreatic tumor, fluid containing lesions such as pseudocysts, abscess formation and calcium deposits. Oral water soluble contrast may be used to opacify the stomach and duodenum during CT scan. Dynamic CT (rapid IV administration of contrast) is useful in estimating the degree of pancreatic necrosis and in predicting morbidity and mortality. Spiral CT provides clear images much more rapidly and essentially negates artifact caused by patient movement.²

In spite of these test, diagnosis of acute pancreatitis is done on basis of clinical examination, biochemical test, USG, CECT scan, endoscopic ultrasonography, MRCP (magnetic resonance cholangiopancreatography), ERCP and pancreatic biopsy with radiological guidance.

The prediction of the severity of pancreatitis in early course of disease is critical to maximize therapy and minimize organ dysfunction and complications. Good clinical judgment on admission, concerning the prognosis of attack, is high (high specificity) but misses a lot of severe cases (Low sensitivity). In near future a combined clinical and laboratory approach will be most suitable for early severity prediction. Clinical judgment predict 1/3 of severe cases on admission and early marker for either inflammation or trypsinogen activation should accurately identify 50-60% of mild cases among the rest, thus missing only 2-4% of remaining severe case.¹

Ultrasound alone fail to detect gall stone especially microlithiasis and/or sludge in 4-7% of patient.¹ Hence this study is planned to correlate the clinical, biochemical, USG abdomen and CT finding to predict the prognosis of acute severe pancreatitis.

MATERIALS & METHODS

The present study was conducted in Government Hospital Barmer, Rajasthan, India. The subjects for

study were taken from patients attending medical outdoor and admitted in various medical and surgical wards. Subjects (n=50): Patient of various age and both sex divided in two groups: Mild acute pancreatitis and Severe acute pancreatitis according to clinical, biochemical, USG, computed tomography and C-reactive protein finding. Ranson (3 or above) and APACHE II Score (8 or above) were determined after 48 hours.

Inclusion Criteria

Patient with severe pain in upper abdomen and at least a 3 folds elevation of pancreatic amylase in blood. Study includes patients of confirmed case of acute pancreatitis. Confirmation of acute pancreatitis is done according to Atlanta symposium 1992. According to that:

Mild acute pancreatitis consist of minimal or no organ dysfunction and uneventful recovery.

Severe pancreatitis: manifest as multiple organ failure and or local complications such as necrosis, abscess and pseudocyst. Other acceptable marker are ≥ 3 – Ranson's criteria or ≥ 8 APACHE II score with CECT scan can distinguish interstitial from necrotizing pancreatitis.

Detailed history, physical examination and various investigations shall be done in each subject. Patients of various ages and both sex with acute pancreatitis diagnosed by Atlanta symposium (1992)¹ were taken for detailed history and physical examination, clinical evaluation by multiple organ failure criteria's, USG abdomen and CT scan abdomen. Morbidity was assessed by duration of hospital stay and requirement of surgery. Correlation were made among all these criteria, USG finding and CT finding to predict poor prognosis of acute pancreatitis.

RESULTS

Overall, mostly patients were recovered (92%) with or without complications only 8% mortality occurred in our study. Out of 46 patients, 18 patients completely recovered and 28 patients recovered with complications. Out of 28 patients, 14 patients in 21-40 years of age group followed by 7 patients in more than 55 years of age group. Mortality occurred mostly (75%) in more than 55 years of age group. (Table 1)

According to symptoms, all the 50 (100%) patients had pain; nausea and vomiting was presents in 35 patients (70%) and 49 patients (98%) had tenderness in abdomen, 35 (70%) patients had rigidity in abdomen. (Table 2)

Table 1: Correlation of age with prognosis

S. No.	Age Groups (years)	Recovered Completely	Recovered with complications	Death	Total
1	10 – 20	1 (20%)	4 (80%)	-	5 (10%)
2	21 – 40	12 (44.44%)	14 (51.85%)	1 (3.70%)	27 (54%)
3	41 – 55	3 (50%)	3 (50%)	-	6 (12%)
4	> 55	2 (16.66%)	7 (58.33%)	3 (25%)	12 (24%)
Total		18 (36%)	28 (56%)	4 (8%)	50

Table 2: Symptomatology

S. No.	SYMPTOMS	Total No.	% of patients
1	Pain	50	100%
2	Nausea & Vomiting	35	70%
3	Fever	17	34%
4	Distension of abdomen	6	12%
SIGN			
1	Tenderness of abdomen	49	98%
2	Rigidity of abdomen	35	70%
3	Guarding of abdomen	31	62%

Table 3: Correlation of serum amylase level with outcome

S. No.	Level of Serum Amylase (IU/L)	No. of Patients	Complete Recovery	Recovery with complications	Death
1	N (0-96)	7 (14%)	1 (14.28%)	5 (71.42%)	1 (14.28%)
2	2 N (97-192)	4 (8%)	1 (25%)	3 (75%)	-
3	3 N (> 192)	39 (78%)	16 (41.02%)	20 (51.28%)	3 (7.69%)
Total		50	18	28	4

Table 4: Correlation of serum lipase level with outcome

S. No.	Level of Serum Lipase (IU/L)	No. of patients	Complete recovery	Recovery with complications	Death
1	0 – 190 IU/L	3 (6%)	-	3 (100%)	-
2	191 – 380 IU/L	14 (28%)	6 (42.85%)	7 (50%)	1 (7.14%)
3	> 381 IU/L	33 (66%)	12 (36.36%)	18 (54.55%)	3 (9.09%)
Total		50	18 (36%)	28 (56%)	4 (8%)

P value < 0.05 significant

Table 5: Ultrasonographical Findings

S. No.	Findings	No. of cases		Total	%
		Male	Female		
1	Normal pancreas	4	2	6	12%
2	Pancreas not seen	1	-	1	2%
3	Pancreatic edema/enlargement	22	9	31	62%
4	GB stone & CBD stones	9	8	17	34%
5	Ascites	9	5	14	28%
6	Pleural effusion	7	4	11	22%
7	Peripancreatic fluid collections	5	1	6	12%
8	Pseudocyst formation	2	4	6	12%
9	Dilated bowel loops	5	-	5	10%
10	Necrosis	3	1	4	8%
11	Others	12	7	19	38%

Table 6: Correlation of Level of CT Severity Index With Prognosis

S. No.	CT Severity Index	Complete Recovery	Recovery with complications	Death	Total
1	0 – 3	16 (55.17%)	12 (41.38%)	1 (3.45%)	29 (58%)
2	4 – 6	2 (13.33%)	13 (86.67%)	-	15 (30%)
3	7 – 10	-	3 (50%)	3 (50%)	6 (12%)
Total		18	28	4	50

P value < 0.05 significant

Serum amylase level > 3 times of normal level, out of them 16 patients (41.02%) recovered completely, 20 patients (51.28%) recovered with complications and 3 patients (7.69%) were died (table 3) and Serum lipase level >3 times of normal, found to be significant (P < 0.05) to predict severity of acute pancreatitis.(Table 4)

In ultrasonographic findings, 31 patients (62%) had pancreatic edema and enlargement followed by 17 patients (34%) had cholelithiasis and CBD stones, 14 patients (28%) had ascites, 11 patients (22%) had pleural effusion. (Table 5) Under CTSI between 0-3, there were 29 patients, 16 were completely recovered (55.17%), 12

patients recovered with complications (41.37%) and 1 died (3.4%). Whereas 6 patients under CTSI (7-10), out of 6, 3 were recovered with complication (50%) and 3 (50%) were died. The statistical association between CT severity index, established with severity of acute pancreatitis ($P < 0.05$). (Table 6)

DISCUSSION

In this study the common age of presentation of acute pancreatitis was 21-40 years for both male and female. The cardinal symptoms were pain in upper abdomen in 50 patients (100%), nausea and vomiting were in 35 patients (70%). Gambel (1960)³ were reported that common symptoms was epigastric pain along with vomiting. But Ranson (1999)⁴ said that the initial symptoms may vary and epigastric pain is seen in 85% of the cases and nausea, vomiting may be noted in 92% of the patients and this is correlates with our study. Gurleyik (2004)⁵ said the biliary symptoms were the most common presenting features. Pramoolsinsap C. (1969-1984)⁶ said that abrupt epigastric pain occurred in 71.7%, nausea and vomiting in 32% and fever in 18.8% patients.

In this study tenderness present in 98%, rigidity in 70% and guarding were present in 62% cases but according to Pramoolsinsap C. (1969-1984)⁶, localized abdominal tenderness was present in 55.7%, generalized tenderness in 31.1% and palpable mass in 16% cases but in our study it were presents in 5 cases (10%).

In this study, serum amylase level >3 times of normal, found to be significant ($P < 0.05$), to predict the severity of acute pancreatitis. Johnson (1999)⁷ said that presence of serum amylase 4 times above normal is indicative of the disease, as in our study 78% of patient had serum amylase level > 3 of normal level. Steer (1999)⁸ said that elevated serum level of amylase is very important diagnostic finding and the level rises within the first 12 hours and then often fall to normal within 40-72 hours.

In this study, serum lipase level >3 times of normal, found to be significant ($P < 0.05$), to predict the severity of acute pancreatitis. Ranson (1999)⁴ said that elevated level of lipase were seen in 95% cases of acute pancreatitis which correlates with our study i.e. in 94% cases. Steer (1998)⁸ found that the level of serum lipase are also elevated in cases of acute pancreatitis and they are more specific for acute pancreatitis. Comfort et al.^{9,10} also said that the degree to which serum lipase level rise correlates with the rise of serum amylase levels but there levels remain elevated for longer duration and lipase level are more reliable as pancreas is main source of lipase.

Pramoolsinsap C (1969-1984)⁶ found that elevated serum amylase was the most useful single diagnostic test i.e. it was elevated in 100 (94.3%) patients.

In this study pancreas could not be visualized by ultrasonography in 1 (2%) cases. The pancreas was

normal in 6 (12%) and there were pancreatic edema and enlargement in 31 cases (62%) cases. According to Kreel (1977)^{11,12} USG is best suited to patients with little or no fat planes and with no overlying gas he also found that the main use of USG is in demonstrating the stone in gall bladder and CBD as has also been shown by Nyberg (1983)¹³, Johnson⁷ & Jeffrey^{14,15} has shown the examination by USG, play an important role in monitoring the inflammatory process of pancreas after an attack which may take several directions resolution, pseudocyst formation or chronic pancreatitis.

In this study 18 patients (36%) had shown necrosis. This is similar to that shown by Donovan (1982)¹⁶, that differentiation between necrotic and non-necrotic pancreas can be made by CT scan only. Similar conclusions were also drawn by Nyberg (1983)¹³ and Federle (1981).¹⁷

Robert JH (2003)¹⁸ stated that pancreatic imaging by CT scan was insufficiently predictive, whereas the presence of extrapancreatic fluid collections was more indicative of outcome.

Lackner K¹⁹ stated that accuracy of CT scan is 87% in normal pancreas, while in patients of acute pancreatitis sensitivity was 79% in our study CT sensitivity was 94% and CT is better in demonstrating calcification in the pancreas.

CONCLUSION

We concluded that acute pancreatitis still represents a condition of variable severity and differentiation cannot be made between necrotic and non-necrotic pancreatitis by USG but is evident on CT scan.

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