Clinico-pathological Profile and Immediate Hospital Outcome of Acute Pancreatitis

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Abstract:

Background: *Acute pancreatitis (AP) is a significant cause of acute abdominal pain, morbidity and hospitalization. Knowing the details of the clinico-pathological presentation and outcome of the disease may aid the better understanding of the disease.*

Objective: *The study was designed to assess the clinico-pathological profile and to estimate immediate hospital outcome of acute pancreatitis patients admitted into a tertiary care hospital.*

Materials and methods: *This hospital based cross-sectional type of observational study was conducted at Dhaka Medical College Hospital (DMCH), for one-year period (June 2018-May 2019).Total 106 established cases of acute pancreatitis were included in this study. Data was analyzed by the SPSS 22 Windows version and graph & chart were expressed by using SPSS 22 and MS Excel. The result was presented with tables and charts.*

Results: *Among 106 patients, mean age of the patients was 42.5 ±11.3 SD (years), with male predominance (male: female-1.2:1).All of the patients complained abdominal pain (100%) while anorexia (48.1%), 43.4% had vomiting and 31.1% had fever. Regarding clinical signs, abdominal distension (45.3%), paralytic ileus (34.9%) and dehydration (43.4%) were found to be the major clinical signs. The common location of pain was in epigastric region (73.6%) with radiation to back in 20.8% patients. Pain was severe agonizing in nature in 76.4% cases. Of all, gall stone disease (17.0%) was the most prevalent cause. According to APACHE-II score, 74.5% patients had mild pancreatitis (APACHE-II <8) while according to Glasgow criteria, 66.0% had mild disease (Glasgow score <3). Mean APACHE-II score was 7.07±2.50 and Glasgow score was 2.90±2.33. Mean hospital stays were 8.9±3.6 days and NPO (nothing per oral) 4.9±1.9 days. Among the patients, 77.4% patients were alive and mortality rate was 22.6%.*

Conclusion: *Although, a larger portion of the patients had no identifiable cause but gall stone was the most common etiology. Pain commonly located in epigastric region with radiation to back. Of all the cases, more than sixty percent of the patients had mild pancreatitis estimated by APACHE II score and Glasgow score. Mean hospital stays were about 9 days and nothing per oral was about 5 days. Overall mortality rate was 22.6%.*

Key words: *Acute pancreatitis, Clinico-pathological profile, Gallstone pancreatitis, Hospital outcome.*

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Introduction:

Acute pancreatitis describes an acute inflammatory process of the pancreas that can range from mild interstitial pancreatitis to severe pancreatitis with pancreatic necrosis and concomitant multi-organ failure. Acute pancreatitis is typically rapid in onset and most commonly encountered in its mild to moderate form[1]. The diagnosis of acute pancreatitis usually requires a combination of clinical, laboratory and radiological findings. A number of international guidelines have suggested two of the following three features are required for the diagnosis: (i) abdominal pain consistent with acute pancreatitis (acute onset of persistent severe epigastric

pain often radiating to the back), (ii) serum lipase activity (or amylase activity) at least three times greater than the upper limit of normal[2] and iii) characteristic findings of acute pancreatitis on abdominal ultrasound (a CT scan or MRI is considered if the diagnosis is uncertain)[3]. Amylase and lipase are released from acinar cells during acute pancreatitis and their concentration in the serum is used to confirm diagnosis. Serum amylase concentrations exceeding three times the normal upper limit support the diagnosis of acute pancreatitis. Amylase concentrations generally rise in the serum within a few hours after the onset of symptoms and return to normal values within 3–5 days[4]. However, amylase activity might remain within normal range on admission in 19% of the patients[5]. Conventional abdominal ultrasound scan should be performed in every patient. Plain radiograph finding may range from no abnormalities in mild disease to localized ileus of a segment of small intestine ("sentinel loop") or the colon cut-off sign in more severe disease. Imaging is used to assess severity of acute pancreatitis by using Computed Tomography (CT) grading system of Balthazar and the CT Severity Index (CTSI). Severity of acute pancreatitis is linked to the presence of systemic organ dysfunctions and/or necrotizing pancreatitis[6]. Though the exact pathogenesis of acute pancreatitis remains elusive, many theories have been proposed like abnormal bilio-pancreatic duct common pathway theory, pancreatic auto digestion theory, gallstone migration theory, enzyme activation theory, kinin and complement activation theory, microcirculation disturbance theory, and pancreatic acinar cell apoptosis and necrosis theory. In a study conducted by VineetChoudhary et al.[7] found that increase of serum lipase was better diagnostic tool. Blood sugar >200mg%, serum calcium < 8 mg% were important poor prognostic indicators[7]. By raising the cut off level to 1000 IU/l (more than three times then the normal limit) serum amylase has a specificity approaching 95%, but a sensitivity as low as 61% in some studies. In case of lipase, at a cut off activity of 600 IU/l, most studies have reported specificities above 95%, with sensitivities ranging between 55% and 100% [8]. Local complications of acute pancreatitis are[9]-acute peri-pancreatic fluid collections, pancreatic pseudocysts, acute necrotic collections, walled-off pancreatic necrosis (WON). Systemic consequences are[10]- 1. Priming of neutrophils, 2. Endotoxemia, 3. Bacterial translocation, 4. Impaired systemic immunity, 5. Multiorgan failure. Most episodes of acute pancreatitis are mild and self-limiting, needing only brief hospitalization. However, 20% of patients develop a severe disease with local and extra-pancreatic complications characterized by early development and persistence of hypovolemia and multiple organ dysfunctions.

Materials and Methods:

This study was done in Medicine Department of Dhaka Medical College Hospital for one year (Jun 2018-May 2019). Informed written consent from the patient or relatives were taken. It was a Cross-sectional type of observational study. Consecutive sampling was used. Total 106 patients were included in the study. Severity classification of acute pancreatitis was defined as follows- Mild: AP without organ failure (OF), Moderate: AP without OF, but with local complications, Severe: Early severe acute pancreatitis (SAP)- A. Fulminant: OF within 72 hours, B. Sub fulminant: OF within 4–7 days. Late SAP – OF or infected pancreatic necrosis (IPN) after 7 days. Critical AP: Persistent OF + IPN. Following admission, patient diagnosed as acute pancreatitis according to Atlanta classification and patients were classified into mild, moderate and severe acute pancreatitis and Glasgow scoring, CT severity index (CTSI), complete hemogram were done for all the patients and Contrast-enhanced computed tomography (CECT) abdomen was done when indicated. After confirmation all the AP cases were selected in according to the inclusion and exclusion criteria. Statistical significance was set as 95% confidence level at 5% acceptable error level. Patients' characteristics were reported as percentages or mean ± standard deviation when variables were continuous while categorical variables were expressed with count (percentage). Statistical analysis was done by Chi Squared test and t-test. Data was analyzed by the SPSS 22 Windows version and graph & chart were expressed by using SPSS 22 and MS Excel. The result was presented with tables and charts.

Result:

Among 106 patients, mean age was 42.5 ±11.3 years. Highest age was 68 years and minimum age was 22 years. Majority of the patients (40.6%) were from age group 31-40 years (Table 1).

Table 1 : *Age distribution of study population (N=106)*

Age (Years)	Percentage
18-30 years	8.5
31-40 years	40.6
41-50 years	28.3
51-60 years	14.2
>60 years	8.5

Among the study participants, 54.7% patients were male and 45.3% were female with male to female ratio was 1.2:1. All of the patients complained abdominal pain. 43.4% patients had vomiting and 31.1% had fever. (Table 2) The common location of pain was in epigastric region (73.6%) with radiation to back in 20.8% patients. Pain was severe agonizing in nature in 76.4% cases. (Table 3)

Table 2: *Clinical profile of patients with acute pancreatitis of study population (N=106).*
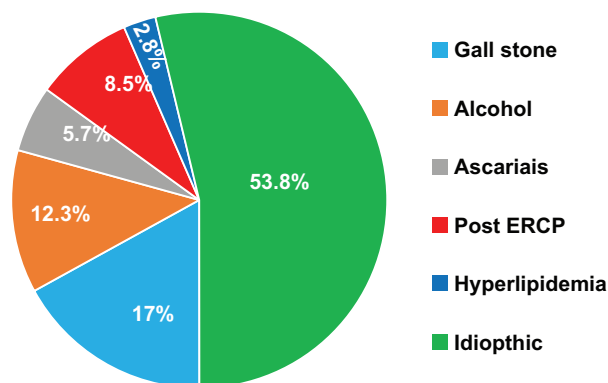
Clinical features	Frequency (n)	Percentage (%)
Symptoms		
Abdominal pain	106	100
Vomiting	46	43.4
Fever	33	31.1
Nausea	18	17.0
Anorexia	51	48.1
Signs		
Abdominal tenderness	106	100
Anaemia	61	57.5
Abdomnal distension	48	45.3
Dehydration	46	43.4
Paralytic ileus	37	34.9
Pleural effusion	31	29.2
Jaundice	19	17.9
Respiratory distress	18	17.0

Table 3: *Character of abdominal pain in the studied patients N=106).*

Abdominal pain	Frequency (n)	Percentage (%)
Location		
Epigastric	78	73.6
Diffuse	28	26.4
Character		
Severe agonizing	81	76.4
Dull aching	25	23.6
Radiation to back	22	20.8
Relieved by forward bending	57	53.8
Exacerbated by taking heavy meal	52	49.1
Total duration of pain: Mean ± SD (days)	3.88±1.55	

Most common cause was gall stone disease (17.0%). This was followed by alcohol (12.3%) and Post-Endoscopic retrograde cholangiopancreatography (ERCP) status (8.5%). (Figure 1) In 53.8% cases, no cause was found (idiopathic).
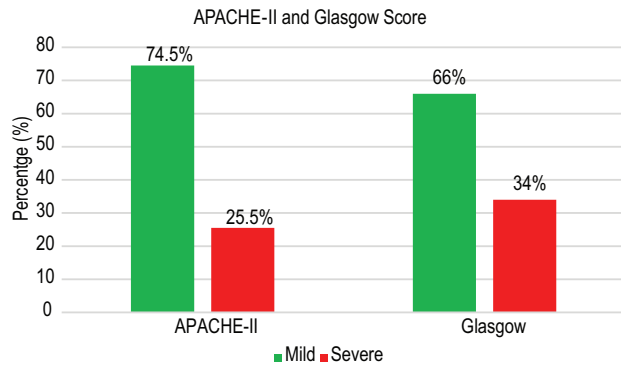

Causes of acute pancreatitis

- Gall stone
- Alcohol
- Ascariais
- Post ERCP
- Hyperlipidemia
- Idiopthic

(2.8%, 8.5%, 5.7%, 53.8%, 12.3%, 17%)

Figure 1: *Causes of acute pancreatitis in study population (n=106).*

Laboratory findings of study population showed that, all the patients had leukocytosis and raised C-reactive protein. Hypocalcemia was prevalent in 34% patients (Table 4).

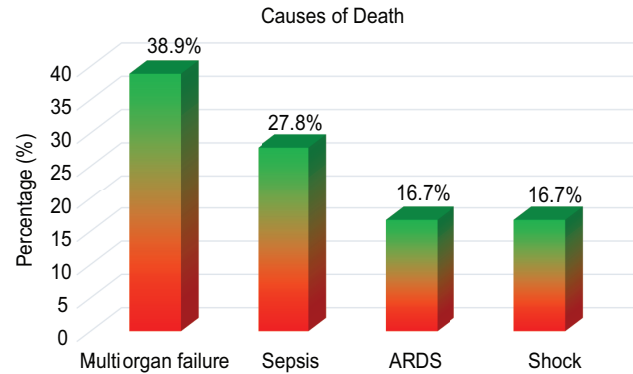**Table 4:** *Laboratory findings in patients with acute pancreatitis (N=106)*

Lab parameters	Value
Mean amylase (IU/L)	577.12±292.92
Mean lipase (IU/L)	464.04±303.26
CRP (mg/L)	113.84±44.91
Raised	106 (100%)
Mean calcium (mg/dL)	8.66±1.28
Hypocalcemia	36 (34.0%)
Normal Calcium	70 (66.0%)
Leukocytosis	106 (100%)

According to APACHE-II score, 74.5% patients had mild pancreatitis (APACHE-II <8) while according to Glasgow criteria, 66.0% had mild disease (Glasgow score <3). Mean APACHE-II score was 7.07±2.50 and Glasgow score was 2.90±2.33. (Figure 2) Total duration of hospital stays were found 3 to 16 day, and nothing per oral was found 2 to 10 days. (Table 5) Complications of acute pancreatitis such as liver dysfunction, renal dysfunction 17.9%, 18.8% respectively and pneumonia 14.2%, pseudocyst 8.4%. (Table 6)

APACHE-II and Glasgow Score

Figure 2: *Severity of acute pancreatitis according to APACHE-II and Glasgow scoring criteria within 24 hours of admission (n=106).*

Causes of Death

Figure 3: *Causes of death due to acute pancreatitis of our study population (N=24).*

Among 106 patients 77.4% patients were alive and mortality rate was 22.6% and 38.9% patients died due to multi-organ system failure and 27.8% due to sepsis, 16.7% due to ARDS. (Figure 3)

Table 5 : *Clinical course in acute pancreatitis (N=106).*

Clinical course and outcome	Mean	Std. Deviation	Min-Max
Hospital stays (days)	8.97	3.65	3-16
NPO (days)	4.89	1.92	2-10
Time to alleviation of symptoms (days)	3.89	1.65	1-7

*NPO-Nothing per oral

Association between APACHE-II and outcome of the patients with acute pancreatitis showed that death was significantly more (p<0.001) prevalent in patients with APACHE-II ≥8. Association between Glasgow score and outcome of the patients with acute pancreatitis showed that death was significantly more (p<0.001) prevalent in patients with Glasgow score ≥3. (Table 7)

Table 6: *Complications of study population (N=106)*

Characters	Number	Percentage
Renal dysfunction	20	18.8
Liver dysfunction	19	17.9
ARDS	18	17.9
Sepsis	18	17.0
Pneumonia	15	14.2
Shock	12	11.0
Pseudocyst	9	8.4

Table 7 : *Association between APACHE-II and Glasgow score with outcome of patients with acute pancreatitis (N=106).*

APACHE-II	Outcome		P-value
	Alive	Death	
<8 (Mild)	N79 (100%)	0	<0.001
ed 8 (Severe)	N9 (33.3%)	N18 (66.7%)	
Total	N88(100%)	N18 (100%)	
Glasgow score <3 (Mild)	N70(100%)	0	0.001
≥3 (Severe)	N18(50%)	N18(50%)	
Total	N88 (83%)	N18 (17%)	

Mean serum amylase and CRP level was significantly higher in dead patients (p=0.003 and <0.001) with acute pancreatitis. Serum lipase level is higher in dead patients but the study was non-significant (p=0.166). Mean serum calcium level was significantly higher in alive patients than dead (p<0.001). (Table 8)

Table 8: A*ssociation between mean serum biochemical parameters and outcome of patients with acute pancreatitis (n=106).*

Biochemical parameters (Mean ± SD)	Outcome		P-value
	Alive	Death	
Serum amylase (IU/L)	538.86±276.98	764.14±304.53	0.003
Serum lipase (IU/L)	445.55±306.89	554.40±275.05	0.166
CRP (mg/L)	102.12±38.58	171.11±25.62	<0.001
Serum calcium (mg/dL)	9.03±1.01	6.82±0.76	<0.001

Multivariate regression analysis of different risk factors for developing acute pancreatitis was done. All the risk factors which had a significance level of p<0.05 in univariate analysis was included. Age was found to be independently associated with death in the study population (p=0.013). Age had OR of 1.087 (95%CI 1.018-1.160). (Table 9)

Table 9 : *Multivariate analysis of risk factors for death (N=106).*

Variables	Odds ratio	95% CI	p-value
Age (years)	1.087	1.018-1.160	0.013
Hospital stays (days)	1.087	0.515-2.294	0.827
Time to alleviation of symptoms (days)	1.457	0.320-6.640	0.626
Serum amylase (IU/L)	1.001	0.999-1.003	0.426

Discussion:

Acute pancreatitis is an inflammatory process of the pancreas with varying involvement of regional tissues or remote organ systems[11][12]. Acute pancreatitis (AP) is a relatively common disease with incidence of 5–80 per 1,00,000 members of the population and the number of new cases has shown a steady increase in recent years[13]. Most patients with AP show spontaneous resolution without complications; however, 10 %-20 % of patients experience a severe attack with increased risk of mortality up to 25%[14].

In this study, the age range of patient was 22 to 68 years with a peak incidence is in the fourth decade (31-40 years) followed by 41-50 years (28.3%). Mean age was 42.5±11.3 years. This is comparable to the studies done by Raghu M G et al. and Negi et al. where it was 42.9±15.9 years and 42.89 ± 12.53 years respectively[15][16]. In our country the lower age incidence of acute pancreatitis may be due to lower life expectancy of Bangladeshi people, occurrence of gallstone disease in the female in early age due to early marriage and multiple pregnancies. Study data showed that ascariasis, mumps and trauma are common aetiological factors that more commonly affect younger age group[17]. Males (54.7%) were predominant than females (45.3%) and the male to female ratio was 1.2:1[18][19].

Abdominal pain is the cardinal symptom of acute pancreatitis. It occurs in 95% of cases and usually it is generalized to upper abdomen[20]. All of the patients in this study complained abdominal pain, especially epigastric pain (73.6%). Among them, 20.8% had radiation to back. Pain exacerbated by taking heavy meal in 49.1% cases and in 53.8% cases the pain was relieved by forward bending. Jeffrey CF also described similar characters of pain in acute pancreatitis.

Regarding clinical signs, abdominal distension was found in 45.3% cases, 34.9% had paralytic ileus, 43.4% had dehydration and 48.1% had anorexia. Peri-pancreatic spread of inflammatory process may cause generalized ileus leading to distended abdomen[20]. Most common cause of acute pancreatitis was gall stone disease (17.0%) which was followed by alcohol (12.3%), post-ERCP complication (8.5%) and ascariasis (5.7%) cases. Hyperlipidemia was found in 2.8% cases. In 53.8% cases, no cause could be found (idiopathic). This finding was nearly similar to the study conducted by Ahmed KU et al. In their study entitled "Clinical profile of acute pancreatitis in a teaching hospital". The high incidence of idiopathic acute pancreatitis in our country is due to higher prevalence of infections because of poor nutrition, poor sanitation, overcrowding and lack of knowledge.

Serum amylase measurement showed that the mean value was 577.12±292.92 IU/L which is many times higher than normal. Similarly, mean serum lipase level was 464.04±303.26 IU/L which is also higher than normal value. CRP was raised in 100% cases. It is an acute phase protein, raised in many condition eg. Major trauma, sepsis, acute pancreatitis. CRP is of no value in the diagnosis of acute pancreatitis but sharply rises in pancreatic necrosis and that is a useful early marker of severity of pancreatitis[21]. CRP levels > 150 mg/L at 48 hours predict disease severity. Serum calcium levels fall in about 34% of cases, and that signifies severe pancreatitis. Association between Glasgow score and APACHE-II score with outcome of the patients showed that death was significantly more prevalent in high APACHE-II and high Glasgow score. Mean hospital stay was 8.97±3.65 days with mean NPO 4.89±1.92 days. The longer the hospital stay and NPO, the severe the disease. Clinical outcome showed that, 22.6% of our patients were died in spite of treatment among whom; the major cause of death was organ failure in 38.9% cases and sepsis in 27.8% patients. But acute pancreatitis has an overall low mortality, of approximately 1%[22].

The risk of death increases with age, co-morbidities, and severe disease; in a recent **meta-analysis**, the risk of death was the highest among patients with both organ failure and infected necrosis[23]. In this study 22.6% people died. This is approximately double the findings of Ahad A. and colleagues[17].

Limitation

This was a single-center study seen**;** no follow-up and only in-hospital outcome was considered and less scope for details investigations.

Conclusion:

Acute pancreatitis patients most commonly present with abdominal pain, abdominal distension along with anorexia. Although a larger portion of the patients had no identifiable cause but gall stone was the most common etiology. Pain commonly located in epigastric region with radiation to back. Of all the cases, more than sixty percent of the patients had

mild pancreatitis estimated by APACHE II score and Glasgow score. Mean hospital stays were about 9 days and nothing per oral was about 5 days. Overall mortality rate was 22.6%.

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