

Clinical Study of Demographic Profile, Etiology, Severity and Outcome of Acute Pancreatitis in a Tertiary Care Teaching Hospital in Northern India

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Abstract

Background: Acute Pancreatitis (AP) is a major health problem with significant morbidity and mortality. There is large geographical variability in incidence, disease severity and outcome with data related to prevalence rates lacking in our country. Early diagnosis and prompt treatments is the mainstay of the therapy in AP for significantly decreasing morbidity and mortality. Present study aimed to observe the clinical course of the disease and its demographic variability.

Methods: First 50 cases of AP admitted in surgery department in a tertiary care hospital in northern India from December 2016 to December 2017 were included in the study, data collected, systematically analyzed and statistically reviewed.

Results: Of the 50 cases, 15 (30%) were male while 35 (70%) were female. The mean age of the study sample (n=50) was 47.30 ± 15.16 (SD) years, ranging from 19-75 years. In 84% cases, gallstones were etiologically responsible for the disease followed by abdominal trauma in 6% cases while alcohol was responsible for 2% cases of AP. Of the 50 cases, 41 (82%) had mild AP while 9 (18%) had severe form of the disease. Among males, 26.67% cases had severe AP while in females it was 14.29%. The age distribution of the severity of AP was also found to be variable among male and female groups. Majority (50%) of severe AP cases in male group were elderly between 56 to 65 years. of age while, among females it was equivocal in 16-25 years and 46-55 years age groups with 40% cases in each group. None of the mild cases developed any immediate complications and were discharged successfully after conservative management. Among severe AP cases, one case developed pseudoaneurysm of major abdominal vessels, while mortality was observed in two cases due to multiple organ failure. Mean length of hospital stay was 6.82 ± 5.24 (SD) days in all the cases while a mortality rate of 4% was observed in the study.

Conclusion: AP is more common among females with gallstones as leading cause in both male and female. Males are more prone to get severe disease with advancing age compared to females. Gallstones are also likely to cause AP in alcoholics then alcohol alone. Smoking is associated with more severe form of the disease. Mortality is low with 4% observed in current study.

Keywords: Acute pancreatitis; Etiology; Gallstones; Trauma; Alcohol; Severity

Introduction

Acute Pancreatitis (AP) is the inflammation of the pancreas varying from parenchymal oedema to necrosis caused by auto-digestion of the gland by its enzymes with significant potential morbidity and mortality [1]. Due to lack of prevalence data only the incidence from the patients admitted in different tertiary care centres all over the country can be obtained [2]. Despite large geographical differences, the incidence of AP has been increasing globally and the actual figures are mainly based on retrospective analyses of hospital admissions [3]. Netherlands and the United Kingdom (UK) have been associated with lowest incidence, while the highest incidence occurs in Scandinavia and the US [4]. Currently, supportive care is the mainstay of management of AP due to lack of specific pharmacotherapy [5].

Gallstones and alcohol, account for up to 80% of cases of AP, but other factors too play role in causation in the absence of these etiological factors [6]. Demographics of the patient have a well-defined role in AP and it is found to be affecting different age groups variably across the globe. The clinical course of the disease is variable among different age groups [7-11]. The etiology, severity as well as the outcome of the disease varies considerably with demographics of the patients and prevalence of the risk factors in different parts of the world. In some regions there is association between the prevalence of risk factors and the disease while in other regions such relation between the risk factors and the disease is lacking [7,12-20]. The age of the patients at the onset of disease can't be generalized and neither can we definitely predict the type of the disease severity at different ages in different sexes [3,9,15,21,22].

Majority of studies on AP are based on the Western population and there is very little information in literature about ethnic variations of AP in the Asian population. It is generally perceived that in Asian countries the etiology and clinical course of AP is different from that of

the Western population due to differences in sociocultural habits. [23]. Outcome in case of severe acute pancreatitis depends upon early diagnosis and specific timely intervention. Variability in geographical distribution of risk factors, diversity in demographics across the world, failure in establishing relation between risk factors and the disease uniformly across the globe by common consensus, ever changing trends in the clinical course of the disease over the last few decades, lack of prevalence data of the disease in the country, changing trends in predictability of severity, complexity of the disease and changing trends in the outcome, prompted us to undertake this study to determine the demographic profile, etiology, severity and outcome of acute pancreatitis in the patients admitted in our institution in the surgery department.

Materials and Methods

This prospective cohort study was conducted between December 2016 to December 2017 with a sample size of 50 consecutive cases admitted in the department of general surgery in a tertiary care hospital in northern India with all newly diagnosed cases of acute pancreatitis admitted in the surgery department with age ≥ 16 years and no past history of AP were included in the study. The demographics of each patient were recorded i.e. age, sex, address, occupation, marital status, BMI, habits etc. A detailed clinical history was obtained from each patient and thorough clinical examination was done to establish clinical diagnosis of the condition. Laboratory investigations like serum amylase, lipase, BUN, blood sugar, serum triglycerides, serum calcium, TLC etc. were done and all the values analyzed and recorded. USG and X-rays were done in each case as the first radiological investigations and thereafter CT SCAN was done. Diagnosis of acute pancreatitis was established based on revised Atlanta classification, which includes fulfilling two of the following three criteria: Acute onset, severe abdominal pain consistent with acute pancreatitis; three folds increase in serum amylase or serum lipase levels of upper limit of normal; radiological investigations i.e. USG or CT SCAN or MRI showing evidence of acute pancreatitis.

BISAP score was used to determine severity of the pancreatitis as first scoring system. Patients with score of ≥ 3 were classified as being having severe illness while patients with score of <3 were classified as being having mild form of the disease. CTSI (CT Severity Index) score was calculated with Balthazar grading and necrosis score using NCCT and CECT abdomen findings. Cases with CTSI score of <7 were classified as mild and those with score of ≥ 7 were classified as severe. Outcome of the cases was recorded in terms of successful discharge, referral for any intervention elsewhere, LAMA (Left Against Medical Advice), and death. All the data was statistically analyzed using descriptive statistics including mean, standard deviation, median, range etc. with the help of Microsoft Excel 2016 (v16.0).

Results

Of the 50 cases, 15 (30%) were male while 35 (70 %) were female. The mean age of the study sample (n=50) was 47.30 ± 15.16 (SD) years, ranging from 19-75 years. The mean age in female patients (n=35) was 47.60 ± 14.70 (SD) years. The mean age in male patients (n=15) was 46.60 ± 16.16 (SD) years. 10 cases (20%) gave history of smoking while 40 cases (80%) were non-smokers. Among females (n=35), 2 cases (5.71%) were smokers while 8 cases (53.33%) were smokers in males' group (n=15). 5 cases (10%) of the study group were alcoholic and subgroup analysis revealed that 33.33% of male patients group were alcoholic and rest non-alcoholic.

5 cases (10%) of the total (n=50) were between 16-25 years of age. Among males (n=15), 2 cases (14%) were between 16-25 years of age. While, among females (n=35), 3 cases (8%) were in this age group. 8 cases (16%) were between 26-35 years of age. Among males (n=15), 3 cases (20%) were between 26-35 years of age. Among females (n=35), 5 cases (14%) were in this age group. 11 cases (22%) out of the total (n=50) were between 36-45 years of age. Among males (n=15), 2 cases (13%) were between 36-45 years of age. While, among females (n=35), 9 cases (26%) were in this age group. 8 cases (16%) were between 46-55 years of age. Among males (n=15), 2 cases (13%) were between 46-55 years of age. While, among females (n=35), 6 cases (17%) cases were in this age group. 15 cases (30%) of the total (n=50) cases were between 56-65 years of age. Among males (n=15), 6 (40%) cases were between 56-65 years of age. While, in females (n=35), 9 cases (26%) were in this age group. 3 cases (6%) of the total (n=50) were between 66-75 years of age. Among males (n=15), 0% cases were between 66-75 years of age. While, in females (n=35), 3 cases (9%) were in this age group (Table 1).

Age group (in years)	Total	Male	Female
16-25	5	2	3
26-35	8	3	5
36-45	11	2	9
46-55	8	2	6
56-65	15	6	9
66-75	3	0	3

Table 1: Age distribution of cases.

The mean BMI of the study group was 24.52 ± 2.40 kg/m² with a range of 20-32 kg/m². Majority of patients had history of pain abdomen (84%), nausea/vomiting (88%). On clinical examination, abdominal tenderness was elicited in majority of cases (98%). However, ultrasonography was able to diagnose AP in only 44% cases which might be because of bowel gases obscuring underlying pancreas. 90% cases had serum amylase levels elevated more than three times of the upper limit of the normal. Elevated serum triglycerides levels were observed in only 8% of the cases (Table 2).

Category	Present	Absent
H/o Pain Abd.	42	8
H/o Nausea/Vomit.	44	6
Abd. tenderness	49	1
↑ Serum Amylase	45	5
↑Serum Lipase	13	5
USG s/o AP	22	27
↑ S. Triglycerides	4	31

Table 2: Distribution of cases based on history, examination and lab investigation findings.

Gallstones were the cause of AP in 42 cases (84%) of the study group (n=50) with 31 females and 11 males. Abdominal trauma was etiological factor for AP in 3 cases (6%) with 2 males and one female.

All cases were of blunt trauma to the abdomen without any penetrating injury. 2 cases (4%) of the study group (n=50) were diagnosed with AP induced post operatively (cholecystectomy).

Of these, one was male and one female. There were 5 patients (all males) with history of chronic alcoholism but alcohol was the etiological factor in one case (2%) of the study group (n=50). There was no case of alcohol induced AP among females (Table 3).

Etiology	Total (n=50)	Male	Female
Gallstones	42	11	31
Trauma	3	2	1
Alcohol	1	1	0
Post Op.	2	1	1
Drugs	1	0	1
Post ERCP	1	0	1

Table 3: Distribution of cases on the basis of etiology.

Disease severity was determined on the basis BISAP score at the admission and at later stages (as per norms which advocate CT SCAN only after 48 hours of admission) based on CTSI score. Of the total cases (n=50), 41 (82%) had mild AP while 9 (18%) cases had severe form of the disease.

Among males, 4 (26.7%) cases had severe AP while 11 (73.3) cases had mild form of the disease. Among females too majority, 30 cases (85.7%), had mild AP and only few, 5 cases (14.3%), had severe AP. However, compared to females, males had more percentage of cases falling into severe AP category (Figure 1).

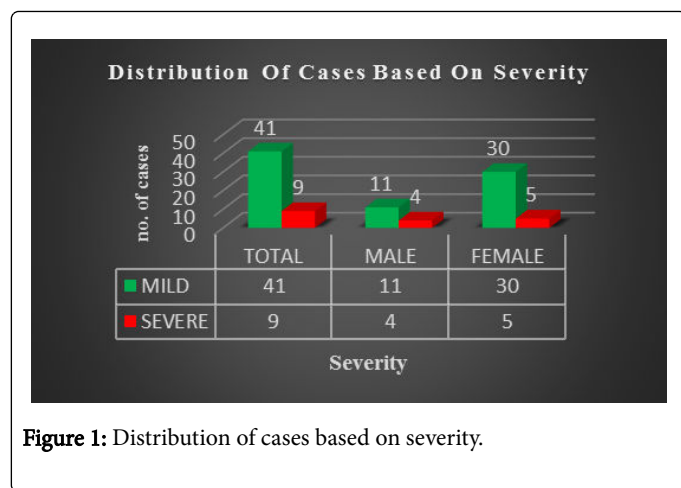


Figure 1: Distribution of cases based on severity.

Majority of cases of mild AP were in the age groups 36-45 years and 56-65 years with 10 and 13 cases respectively. There was no case of severe AP in 66-75 years age group. Among males there were no cases of AP in 65-75 years age category.

Majority of cases (2) of severe AP among males were in 56-65 years age category. Among females, more cases of mild AP were from 36-45 years and 56-65 years age category with 9 cases each. Severe AP was more prevalent in younger female ≤ 35 years of age with a total of 3 cases (Table 4).

Age Group	Mild AP (no. of cases)		Severe AP (no. of cases)	
	Male	Female	Male	Female
16-25 Years	2	1	0	2
26-35 Years	2	4	1	1
36-45 Years	1	9	1	0
46-55 Years	2	4	0	2
56-65 Years	4	9	2	0
66-75 Years	0	3	0	0

Table 4: Distribution of cases on the basis of severity in different age groups in male and female.

Among smokers (n=10), 7 (70%) had mild AP while 3 (30%) had severe acute pancreatitis. Among alcoholics (n=5), 4 (80%) had mild form of the disease while 1 (20%) had severe AP.

The mean length of stay in the hospital in the current study was 6.82 ± 5.24 (SD) days. Among cases with mild AP (n=41), the mean length of stay was 5.73 ± 2.91 (SD) days. The mean length of stay for patients with severe AP (n=9) was 11.78 ± 9.15 (SD) days. 44 (88%) cases were successfully discharged after the treatment of their acute condition in the present study group (n=50). Death occurred in 2 (4%) cases in the present study. Both died because of multiple organ failure. Of these 2 cases, one was case of biliary acute pancreatitis having severe form of the disease dying on second day of the hospital stay.

The second death was seen in a case of AHP (Acute Haemorrhagic Pancreatitis) having severe form of the disease, who died on the first day of admission because of multiple organ failure. The death occurred in 2 cases (22.22%) cases of severe AP (n=9). Among patients with mild form of the disease (n=41), no mortality was observed. In the current study it was observed that 2 (4%) cases were referred to higher centre after initial management. Of these 2 cases, one case was referred for ERCP as it was a case of biliary AP with choledocholithiasis. The second case was of post ERCP AP who had ANP (Acute Necrotizing Pancreatitis) and developed pseudo aneurysm of the major abdominal vessels. Patient didn't come for follow up and continued treatment at the higher centre and subsequent communication couldn't be established.

Discussion

Acute Pancreatitis (AP) is a relatively common disease with incidence of 5-80 per 100,000 members of the population worldwide. Although, its prevalence varies in different countries and even in different areas of a given country, there has been a significant increase in the number of new cases in recent years [18]. Early diagnosis and prompt treatment is the mainstay of the therapy in AP for significantly decreasing morbidity and mortality. AP can affect both males and females with variable frequency. In our study we found AP affecting 70% Patients in our study were found to be females and 30% were males (M:F=0.4:1) showing a female predominance which is in contrary to the studies done earlier. However, compared to other Indian studies with majority of cases of biliary AP as done by Pawan et al. [19], our study has yielded different results with female predominance in our study compared to male predominance in their study, which indicates demographics vary considerably within the

same country in different regions. Results of some of the studies compared to present study are summarized in Figure 2.

S. No.	Authors	Place	Yr. (no. of cases)	Male: Female
1	P Kandasami et al. [4]	Singapore	1994-1999(133)	1.4:1
2	SE Roberts et al [23]	UK	1999-2010 (10589)	1.03:1
3	Stimac D et al [17]	Croatia	2000-2009 (922)	1.3:1
4	F. Anderson et al [34]	South Africa	2001-2006(282)	2.03:1
5	Justyna Bogdan et al [62]	Poland	2005-2010(298)	2.33:1
6	Gail P. Reid et al [18]	Jamaica	2006-2012(91)	0.3:1
7	KU Ahmed et al. [63]	Bangladesh	2009-2011(50)	1.78:1
8	Supot Pongprasobchai et al. [64]	Thailand	2011-2014(250)	1.27:1
9	Pawan Kumar Jha et al [32]	India (BIH)	2014-2016(104)	1.89:1
10	Mukherjee et al. [65]	India (WB)	2014-2017(234)	2.22
11	Present study	India (HAR)	2016-2017(50)	0.43:1

Figure 2: Male: Female ratio in different studies in comparison with present study.

Further studies are required however, before jumping to conclusion.

Any age group can be affected by AP. The age distribution of AP is quite variable. There was no significant difference in mean age among males and females as it was 46.60 ± 16.16 years and 47.60 ± 14.70 years respectively.

But the median age for males was 55 years which was quite higher compared to females with median age 46 years which can be explained by higher incidence of AP among older males compared to females with incidence equally distributed on either side of the mean. In many of the studies done in Asian countries, the mean age is relatively lower compared to that of western population indicating ethnic variations in demographics of AP worldwide. The results of some of the studies are summarized in Figure 3.

S. No.	Authors	Place	Year (no. of cases)	Mean Age
1	P Kandasami et al. [4]	Singapore	1994-1999(133)	43.5
2	SE Roberts et al [23]	UK	1999-2010(10589)	57.7
3	Stimac D et al [17]	Croatia	2000-2009(922)	60.9
4	Justyna Bogdan et al [62]	Poland	2005-2010(298)	50.5
5	Gail P. Reid et al [18]	Jamaica	2006-2012(91)	45.7
6	KU Ahmed et al. [63]	Bangladesh	2009-2011(50)	37
7	Supot Pongprasobchai et al. [64]	Thailand	2011-2014(250)	58
8	Pawan Kumar Jha et al [32]	India(BIH)	2014-2016(104)	40.9
9	Mukherjee et al. [65]	India(WB)	2014-2017(234)	44.4
10	Present study	India(HAR)	2016-2017(50)	47.3

Figure 3: Mean age in different studies in comparison with current study.

Even in the same country the results are variable as the mean age of our study group is higher compared to other studies done across the country as mentioned earlier. Etiology of AP varies considerably across

the globe. In our study we found the following as the causative factors: gallstones, alcohol, drugs, post-operative, ERCP and abdominal trauma. Majority of the patients had gallstones as the causative factor (84%) for inducing AP followed by abdominal trauma (6%), post-cholecystectomy (4%), alcohol (2%), drugs (2%), ERCP (2%). Gallstones were the leading cause for AP in both males and females contributing to 73% and 88% cases respectively. However, in the study done in Singapore by Kandasami et al. [23], they found gallstones causing AP in only 15.9% cases. Their study included patients from multiple ethnicity with Indians contributing 56.8% of the total and even among Indians, gallstones were responsible for AP in only 6.7% cases while alcohol was the leading cause there with 73.3% falling in this category which is in contrast to the results of our study.

This difference indicates etiology of AP depends on the life styles and place and not just the race. Unlike most of the other studies, blunt abdominal trauma was the second most common cause of AP in our study. Penetrating abdominal trauma is commonly associated with AP instead of blunt trauma however, in our study all cases were of blunt trauma [19]. So, our study suggests that blunt trauma patients should be evaluated for AP. Alcohol contributed to only 2% cases of AP in our study though 10% patients had history of alcoholism. All cases with history of alcoholism were male. These low proportions of alcohol induced AP in our study can be explained by the fact that majority of patients in our study group were females and all non-alcoholic. Among males 33.33% gave history of alcoholism but only 6.67% males had alcohol induced AP. This finding is similar to that of Vidarsdottir et al. [12] who had higher number of cases with history of alcoholism while only few experienced alcohol-induced AP. Moreover, AP depends upon the type, frequency and quantity of alcohol consumption [12,24].

Majority of cases in our study were found to have mild AP (82%) while, only 18% cases were of severe AP. Of these cases of severe AP, 44.44% cases were below the age of 35 years and 44.44% cases were more than 46 years of age. However, total cases of AP with age below 35 years were 26% of total and that above 46 years were 52% of the total cases. After taking this data into account, 31% cases below 35 years of age were found to have severe AP and 15% of cases above the age of 46 years were found to have severe AP, indicating major proportion of severe AP in young subjects compared to older ones. Reid et al. in their study in Jamaica noted similar findings with majority of their cases of severe AP between 20-39 years age category [4]. But in the study done by Malik in Jamshoro, Pakistan, severe AP was found to be more common in older subjects [25].

Among males as well females, majority of cases were of mild AP. However, after subgroup analysis it was found that among all male subjects, 26.67% had severe AP while, in the female group 14.3% cases had severe AP. This shows proportionate male predominance of severe AP in our study. On age distribution analysis it was found that in males, severity was more among older subjects while among females, severity was distributed proportionately with age as both younger and older subjects had proportionate cases of severe AP. Lankisch et al. [26] in their study concluded that no difference is there in severity distribution of cases based on gender. In the study by Reid et al. [4], majority of cases of severe AP were females which is contrary to our findings. Similarly, in the study by Jha et al. [19], severe AP was proportionately more common among males with 33.33% males having severe AP and 25.92% females having severe AP. However, when compared to the results of our study, they had more proportion of females with severe AP i.e. 25.92% compared to 14.3% in our study. This indicates that there was proportionate male predominance in

having severe AP compared to females. So, from our results we can say that males were found to be more prone to get severe AP compared to females.

Of all the cases of biliary AP, 85.71% cases had mild AP and 14.29% had severe AP. On sub group analysis, it was found that of all the cases of male biliary AP, 27.27% cases had severe form of the disease while of the cases of biliary AP among females, 9.67% cases had severe AP which shows males are more prone to develop severe biliary AP compared to females. In the study in Jamaica by Reid et al. [4], 9.4% cases had severe AP which is low compared to that of our study. While in the study by Jha et al. [19], 22.72% cases of biliary AP had severe AP which quite high compared to our study. This shows variability in the severity and unpredictability in the clinical course of the disease in different regions. However, mortality has decreased substantially over the time in AP.

The mean length of stay in our study was found to be 6.82 days. In mild and severe AP, it was 5.73 and 11.78 days respectively. Overall, it was lower as compared to mean hospitalisation time of 9.6 days for all cases, 20 days for severe AP of the Polish study by Justyna et al. [27] and 9.51 days of the Jamaican study by Reid et al. [4]. As 2 cases in our study were referred to higher centres and 2 cases left against medical advice, we observed relatively lower mean length of stay. We observed overall mortality of 4%, all being cases of severe AP. Reid et al. [4] observed mortality of 2% in their study which is lower compared to ours and Ahmed et al. [28] observed an overall mortality of 6% in their study.

However, further studies are needed as we didn't include paediatric patients in our study and the sample size was only 50 cases with time limit of conducting this study in fixed duration of time.

Conclusion

Acute pancreatitis more commonly occurs in females than males, in males it is more common in elderly subjects. Most of the patients present with characteristic abdominal pain of AP and elevated serum amylase and/or serum lipase levels but USG are able to diagnose AP in only 44% of the cases. Gallstones are the most common cause of acute pancreatitis. Blunt abdominal trauma, not penetrating trauma, is the most common cause of traumatic AP which is contrary to earlier studies. Most of the cases of AP have mild form of disease. Overall, severe AP is proportionately less common among elderly subjects which are contrary to earlier studies. Severe AP is proportionately more common among males than females. Smokers are more likely to develop severe acute pancreatitis compared to non-smokers. Gallstones are more likely to cause AP in alcoholics than alcohol alone. Most of the cases of AP don't require ICU admission for survival. Mean length of stay in hospital is more in severe AP compared to mild AP. Overall, Mortality rate of acute pancreatitis is low which is around 4% with multiple organs failure as the main cause of death but morbidity related to the disease is high. However, further studies are recommended involving larger population group.

Ethical Approval

The study was approved by the ethical committee of the institution.

Conflicts of Interest

The authors have no conflicts of interest.

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