

Management Outcome and Associated Factors of Acute Pancreatitis among Patients Admitted with Acute Abdomen in Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia

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Abstract

Background: Acute pancreatitis results from abnormal activation of pancreatic enzymes and inflammatory mediators, leading to an acute inflammatory process. It ranges from mild to life-threatening and is a frequent cause of acute abdominal issues. While its prevalence is rising globally, the specific incidence in Ethiopia remains unknown, with only two hospital-based studies conducted.

Objective: To assess the management outcome and associated factors of Acute Pancreatitis among patients admitted with acute abdomen.

Methods: An institution based cross sectional study was conducted among 60 patients with acute pancreatitis. SPSS statistical software version 25 was used for data entry and analysis. Fisher's exact test used to see association and p-value<0.05 considered statistically significant.

Result: The study found that abdominal pain was the most common symptom by most patients. The most frequent physical findings were tachycardia with abdominal tenderness, followed by abdominal tenderness alone. The primary identified etiology was alcohol in 36.2% of cases, followed by idiopathic, gallstone, and multiple causes in 29.3%, 19%, and 15.5% respectively. The majority of patients had mild acute pancreatitis, with 13.8% and 29.3% experiencing severe and moderate forms, respectively. Most (91.4%) patients showed improvement upon discharge, while 8.6% died in the hospital. Mortality in acute pancreatitis was associated with comorbidities (P<0.023), delayed presentation (P<0.013), age ≥60 years (P<0.003), BISAP >2 (P<0.001), and severe acute pancreatitis (P<0.001).

Conclusion: The study identified alcohol, idiopathic causes, and gallstones as the most common etiologies. Diagnosis of acute pancreatitis relies on clinical presentation, elevated pancreatic enzyme levels, and imaging for uncertain cases. Management typically involves conservative measures. Morbidity and mortality outcomes in acute pancreatitis heavily rely on timely diagnosis and appropriate management.

Keywords: Acute Pancreatitis; Etiologies; Severity scoring

Abbreviations and Acronyms

AA: Addis Ababa.

AP: Acute Pancreatitis.

APACHEA: Acute Physiological and Chronic Health Evaluation.

ARDS: Acute Respiratory Distress Syndrome.

BISAP: Bedside Index of Severity in Acute Pancreatitis.

ICU: Intensive Care Unit.

HPB: Hepatic pancreaticobiliary.

MOF: Multi-Organ Failure.

NPO: Nil Per Os.

N/S: Normal Saline.

PUD: Peptic Ulcer Disease.

R/L: Ringer's Lactate.

SBO: Small Bowel Obstruction.

SPSS: Statistical Package for the Social Sciences.

USA: United States of America.

Y12HMC: Yekatit 12 Hospital Medical College.

Introduction

Acute pancreatitis is a critical public health problem and its burden is increasing resulting from abnormal activation of pancreatic enzymes and the release of several inflammatory mediators. Patients with acute pancreatitis usually need admission to hospital for treatment of either for the primary cause or complications related to the disease(8,9). Presentation ranges from a mild self-limiting to severe form which results in significant morbidity and mortality. Its onset is sudden and mostly encountered in mild form [1-3]. It is a common cause of acute abdominal condition that can progress beyond the pancreas to cause multi organ failure and even death (4). It is the commonly encountered acute abdomen with range of 0.5 %to 1.5% of all emergency cases. It is the commonest of all pancreatic diseases. Over recent years, its incidence is increasing in western countries though its case fatality is decreasing [1, 4].

Management of acute pancreatitis depends on severity scoring. Various prognostic scores exist, including Ranson's criteria, APACHEA II, Glasgow scoring, and BISAP. Ranson's criteria were the first used, Glasgow scoring is similar but assessed within 48 hours. APACHEA II was developed for ICU patients, while BISAP, proposed in 2008, is simple and applicable in resource-limited settings [5-9].

The leading causes of acute pancreatitis are gallstones and alcohol. While alcohol is the primary cause in Africa, gallstones are more common in the Western world, followed by alcohol. Globally, alcohol remains the most prevalent cause. Gallstone pancreatitis is more frequent in females, while alcoholic pancreatitis predominates in males. Microlithiasis contributes to approximately 80% of cases of idiopathic pancreatitis [1, 10-14].

Acute pancreatitis varies globally in its epidemiology. Most research on its incidence, causes, complications, and burden comes from Western nations, with limited studies in Asian, Latin American, and African populations, including Ethiopia. Despite a rising global incidence, only two hospital-based studies have been conducted in Ethiopia, shedding light on the causes, clinical features, and outcomes of acute pancreatitis, despite its prevalence in day-to-day clinical practice [1, 4, 15-17].

Limited research in our country has left many aspects of acute pancreatitis, including its causes, symptoms, management, and associated factors, largely unknown. As a result, efforts aimed at disease prevention, timely treatment, and reducing recurrence have been impeded.

Methods and Materials

Study area and period

The study was conducted in Y12HMC which is an academic institution found in Addis Ababa, Ethiopia under Addis Ababa City Administration. The study was conducted from March 2021 to April 2023 by revising patients' electronic medical registry.

Study Design

An Institution based cross sectional study design was used using secondary data sources.

Source and Study population

All patients admitted with acute abdomen within the study period were considered as source population while patients admitted with the diagnosis of acute pancreatitis with complete electronic medical record and age above 15 years within the study period were considered study population.

Inclusion and exclusion criteria

All patients diagnosed with acute pancreatitis with complete electronic medical records and age above 15 years included in the study whereas Pediatrics age group (those less than 15 years of age) and incomplete electronic medical record were excluded from study group.

Study variable

Independent variables:- Sociodemographic, Duration of onset of symptoms, Etiologies, Severity, BISAP score, Options of management implemented and Length of Hospital stay .Dependent variables:- Outcome of Acute Pancreatitis.

Data collection technique and quality control

The data collection tool was adopted from previous researches and it had sociodemographic, identification of signs and symptoms of acute pancreatitis, and identification of the etiologies sections. The data was collected by individuals trained by the principal investigator after pretest was done. The data were collected by structured and pretested data abstracting checklist. The data collectors were given adequate training with practical demonstrations before they have started the collection. The principal investigator was supervising the quality of data.

Data analysis and presentation

Once data completeness was ensured, it was inputted into SPSS Version 27 for analysis. Descriptive statistical methods were employed to ascertain frequencies, means, and standard deviations of both dependent and independent variables. Fisher's exact test, with a significance level of <0.05 and a confidence interval of 95%, was utilized to assess associations between dependent and independent variables. Analysis results were conveyed through tables and graphs where applicable.

Results

Sociodemographic Characteristics

During the study period, 2983 patients were admitted with acute abdomen, with 60 diagnosed with acute pancreatitis, accounting for 2.01%. Electronic medical records were accessed, with 58 records complete for data collection, representing 96.7%. Among these, 19% (11) were females and 81% (47) were males, resulting in a male-to-female ratio of 4.27:1. The mean age was 38 years ($\pm 14SD$), with the majority (88%) aged 20 to 59 years, and 8.6% aged 60 or above. Two patients were younger than 20 years old. About 15.5% had comorbidities such as hypertension, diabetes mellitus, bronchial asthma, or retroviral infection (Table 1).

Variables		Frequency	Percent
Sex	Female	11	19.0
	Male	47	81.0
Age	Less than 20 years	2	3.4
	20-39 years	36	62.1
	40-59 years	15	25.9
	60 or Above years	5	8.6
Comorbidity	Yes	9	15.5
	No	49	84.5

Table 1: Demographic characteristics of AP patients Admitted to Yekatit 12 Hospital Medical College, from March 2021 to April 2023 (n=58).

Clinical Presentations and Diagnosis of Acute Pancreatitis

The mean symptom duration till hospital presentation was 3 days (± 2.8). Majority (56.9%) presented within 3 days, while 39.7% presented within 3 to 7 days, and 3.4% after 7 days. Abdominal pain alone or with nausea/vomiting was common (50% and 46.6% respectively). Few had nausea/vomiting alone (1.7%) or other symptoms (1.7%). Most common physical findings were tachycardia with abdominal tenderness (41.4%) and abdominal tenderness alone (37.9%). About 10.3% had tachycardia with other organ system findings. Amylase or lipase was determined in all but seven patients. Diagnosis was mostly clinical, except in five patients where acute pancreatitis was diagnosed intraoperatively, accounting for 8.6% of cases. Three patients underwent laparotomy with preoperative diagnoses of perforated PUD, complicated acute appendicitis, and gangrenous primary small bowel volvulus in one patient each (Table 2).

Variable		Frequency	Percent
Symptoms	Abdominal pain	29	50.0
	Nausea and Vomiting	1	1.7
	Abdominal pain, Nausea and Vomiting	27	46.6
	Others	1	1.7
Signs	Tachycardia	6	10.3
	Abdominal tenderness	22	37.9
	Tachycardia and abdominal tenderness	24	41.4
	Abdominal tenderness, Tachycardia and others	6	10.3

Table 2: Clinical signs and symptoms of Patients with AP at the time of presentation at Y12HMC, from March 2021 to April 2023(n=58).

Etiologies, Severity, and BISAP score

Alcohol was the most common cause at 36.2%, followed by idiopathic, gallstone, and multiple causes at 29.3%, 19%, and 15.5% respectively. In female patients, idiopathic, gallstone, and alcohol accounted for 45.5%, 36.4%, and 18.2% respectively, with no cases of multiple causes. In males, alcohol was the most common cause at 40.4%, followed by idiopathic, multiple causes, and gallstone at 25.5%, 19.1%, and 14.9% respectively.

According to Atlanta severity grading, most patients had mild acute pancreatitis (56.9%), while 29.3% had moderate and 13.8% had severe cases. The BISAP score ranged from 0 to 5, with a mean of 0.84 and standard deviation of 1.17. Half of the patients had a BISAP Score of 0, followed by 1, 2, 3, 4, and 5 in 32.8%, 6.9%, 5.2%, 3.4%, and 1.7% of cases respectively (Table 3).

Variables		Frequency	Percent
Severity According to Atlanta Classification	Mild	33	56.9
	Moderate	17	29.3
	Severe	8	13.8
BISAP Score	0	29	50
	1	19	32.8
	2	4	6.9
	3	3	5.2
	4	2	3.4
	5	1	1.7

Table 3: Showing frequency and percent of Severity According to Atlanta Classification and BISAP Score patients admitted with AP in Y12HMC from March 2021 to April 2023 (n=58).

Cross tabulation of etiologies with disease severity per the Atlanta classification revealed that patients with gallstone-induced pancreatitis had 54.5%, 45.5%, and 0% with mild, moderate, and severe cases respectively. For alcohol-induced pancreatitis, 61.9% were mild, while moderate and severe cases each accounted for 19%. Patients with idiopathic causes had 58.8% mild, 29.4% moderate, and the remaining 11.8% severe cases. Among those with multiple causes, 44.4% were mild, 33.3% were moderate, and 22.2% were severe. To determine which cause resulted in higher BISAP scores, cross tabulation was conducted. Patients with gallstone as the cause had BISAP scores of 2 or less, while for idiopathic, multiple causes, or alcohol-induced cases, over 2 was observed in 17.6%, 11.1%, and 9.5% of cases respectively.

Management of Acute Pancreatitis

Patients diagnosed with acute pancreatitis were managed either conservatively with fluid resuscitation, analgesics, and nutrition post-resolving nausea/vomiting, or underwent operative management for complications or unsettled preoperative diagnoses. Among 58 patients, 44 (75.9%) received conservative management, while 14 (24.1%) underwent surgery for complications or unsettled diagnoses. In conservative management, normal saline was used in 97.3% of cases, and Diclofenac and Tramadol were the prescribed analgesics. Among 11 patients with biliary acute pancreatitis, 63.6% underwent cholecystectomy during the initial admission, while 36.4% opted for interval cholecystectomy due to patient preference.

Management Outcome and Length of Hospital Stay

Most patients (91.4%) had a favorable outcome (discharged improved), while 8.6% (5 patients) died in the hospital. The length of hospital stay ranged from 2 to 49 days, with a mean of 9 days and a standard deviation of 8. Half of the patients stayed in the hospital for 7 days or less, while 8.6% stayed for more than 14 days. The remaining patients stayed in the hospital for 8 to 14 days.

Factors Associated with outcome of Acute Pancreatitis

Fisher’s exact test was employed to determine the association between management outcomes and other factors. Mortality in acute pancreatitis was significantly associated with comorbidities such as diabetes mellitus, retroviral infection, hypertension, and bronchial asthma ($p = 0.023$, $p < 0.05$). Disease severity (Severe acute pancreatitis by Atlanta classification) and BISAP score (> 2) at presentation were significantly linked to mortality ($p < 0.001$ each). Patients aged 60 years or older had a significant association with

mortality ($p = 0.003$). Delayed presentation (> 72 hours after symptom onset) was also significantly associated with mortality ($p = 0.013$) (Table 4).

Variables		Outcome of AP				p value
		Favorable		Unfavorable		
		No.	%	No.	%	
1.Age	<60	51	96.2	2	40	0.003
	≥ 60	2	3.8	3	60	
2.Delayed presentation	≤ 72 hours	42	79.2	1	20	0.013
	> 72 hours	11	20.8	4	80	
3.Presence of Comorbidities	Yes	6	11.3	3	60	0.023
	No	47	88.7	2	40	
4.Severe AP according to Atlanta classification	Yes	4	7.5	4	80	<0.001
	No	49	92.5	1	20	
5.BISAP score	≤ 2	51	96.2	1	20	<0.001
	> 2	2	3.8	4	80	

Table 4: Shows factors associated with unfavorable outcome of AP among patients admitted to Y12HMC from March 2021 to April 2023.

Discussion

In the past two decades, there's been a noticeable increase in acute pancreatitis incidence and hospitalization rates worldwide. While most studies focus on the Western world, research from Asia, Latin America, and Africa is lacking[15]. (Our study found acute pancreatitis accounted for 2.01% of acute abdomen admissions, higher than previous reports (0.23%) from Minilik II referral hospital, possibly due to population differences. This suggests a growing prevalence of acute pancreatitis in our country, consistent with global trends. Patients, averaging 38 years old, were predominantly male (47%), similar to findings from St. Paul referral hospital (mean age: 40 years; male predominance)[1, 4].

The most frequent symptoms observed were abdominal pain, either alone or accompanied by nausea and vomiting. The most common physical finding was abdominal tenderness with tachycardia, which aligns with findings from St. Paul referral hospital, as well as studies conducted at hospitals in Bangladesh and Kenya[4, 18, 19].

In our study, the most common causes of acute pancreatitis were alcohol consumption, followed by idiopathic cases and gallstones. Alcohol was predominant among males, while idiopathic cases were more common among females. Globally, gallstones are reported as the most common cause, followed by alcohol and idiopathic cases, as indicated by systematic reviews and meta-analyses. Our findings align with those from Minilik hospital, where alcohol was also the leading cause identified. However, St. Paul referral hospital reported idiopathic cases as the most common cause [1, 4, 20].

This study observed that acute pancreatitis severity, per the Atlanta classification, was most commonly mild, followed by moderate and severe forms. Alcohol-induced pancreatitis often resulted in more severe cases compared to other causes. Similar trends were seen in a study from Thailand, with 72% mild, 16% moderate, and 12% severe cases. In contrast, a US study reported 52% mild, 23.5% moderate, and 24.5% severe cases, with severe cases slightly more prevalent, possibly due to the tertiary center setting handling more critical cases[16, 21].

The main goal in managing acute pancreatitis (AP) is symptom relief and complication prevention by reducing pancreatic secretions and correcting fluid/electrolyte imbalances. Initially, patients receive fluid resuscitation, are kept NPO, and given pain relief. A recent triple-blind randomized controlled trial compared Ringer's lactate (R/L) to normal saline (N/S) and found R/L to be preferable due to its anti-inflammatory properties. However, fluid choices varied; in a Singapore study, N/S was used in 38.8% of cases compared to 23% using R/L. Similarly, a Thailand study showed N/S use in 60% of cases and R/L in only 30%[16, 22].

The study discovered that normal saline (N/S) was used in 97.3% of acute pancreatitis (AP) cases for resuscitation, despite recommendations from the randomized controlled trial (RTC). We attribute this deviation to two primary reasons. Firstly, physicians may not be aware of the recommended resuscitation fluid. Secondly, Ringer's lactate (R/L) might not be easily accessible in hospitals, especially in resource-limited countries like ours.

For acute biliary pancreatitis patients, it's usually advised to have cholecystectomy during the initial admission, unless specific reasons necessitate delay, like peri pancreatic fluid collection. This prevents recurrence, especially in recurrent cases. However, a Singapore study found only 21.4% of patients underwent cholecystectomy during the initial admission, contrary to guideline recommendations[23, 24]. Our study found that 63.6% of acute biliary pancreatitis patients had cholecystectomy during the initial admission. This indicates a priority for cholecystectomy during this period, possibly due to the presence of HPB surgeons, despite the relatively low number of patients diagnosed with this condition.

Outcomes of acute pancreatitis vary among studies. Reported mortality rates include 11.1% from Minilik II referral hospital, 20% from St. Paul hospital, and range from 2.9% to 9.8% in studies from Kenya, South Africa, Egypt, Bangladesh, and Thailand[1, 4, 11, 16, 18-20, 25]. Our study's findings on acute pancreatitis (AP) outcomes are consistent with these findings, with 91.4% of patients showing improvement and being discharged, while 8.6% died in the hospital. The average hospital stay was 9 days, with half of the patients discharged within 7 days. Approximately 8.6% of patients stayed over 14 days, while the rest stayed for 8 to 14 days.

A study from Egypt linked factors such as advanced age, comorbidities, severity of acute pancreatitis (AP), complications, and etiology to mortality (23). This aligns with our findings, which identified elderly age (≥ 60 years), comorbidities, and disease severity at presentation as predictors of poor outcomes. Additionally, delayed presentation beyond 72 hours and a BISAP score of >2 were associated with higher mortality rates in our study.

Declaration

Ethical Approval and Consent to participants

Ethical clearance was obtained from the Institutional Review Board of Y12HMC. Permission and written consent was taken from the college management. The information gained from the patients upon data collection was kept confidential by using codes for each card throughout the study. The procedures followed were by the ethical standards of the Helsinki Declaration.

Availability of supporting data

All data supporting the case report is available with the crosspondance.

Competing Interests

There are no competing interests that could potentially influence the objectivity and integrity of this research article.

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