

A study on demographic and clinicopathological characteristics of severe acute pancreatitis in a tertiary-level intensive care unit in Nepal

Kishor Khanal¹, Saroj Poudel¹, Anup Ghimire¹, Ashim Regmi¹, Bikash Khadka¹, Manoj Bist¹, Sanjeet Krishna Shrestha², Rabin Sharma³, Umid Kumar Shrestha³

¹Department of Critical Care

²Department of Pulmonary, Critical Care and Sleep Medicine

³Department of Gastroenterology and Hepatology
Nepal Mediciti Hospital, Bhaisepati, Lalitpur, Nepal

Keywords: Severe acute pancreatitis, Biliary, Epidemiology, Conservative management, Outcome



This work is licensed under a Creative Commons Attribution 4.0 Unported License.

Introduction

Acute pancreatitis is a sudden inflammatory process or condition of the pancreas. Despite therapy, it can have serious consequences and a high mortality rate. Severe cases may necessarily require admission to an intensive care unit. In acute pancreatitis, almost 20-25% of patients have severe acute pancreatitis (SAP) with high morbidity and mortality.^{1,2} Early detection of severe AP is critical for management and improving outcomes, so a validated scoring system (such as laboratory and radiologic risk factors, severity grading systems, and serum markers) is required to evaluate the severity of AP.^{3,4}

According to the American College of Gastroenterology and the revised Atlanta Classification, the diagnosis of acute pancreatitis

Abstract

Background and Aims: Severe acute pancreatitis can have serious consequences and a high mortality rate and may necessarily require intensive care unit admission. This study is to describe the demographic and clinicopathological characteristics of severe acute pancreatitis (SAP) in a tertiary-level intensive care unit (ICU).

Methods: The study was designed retrospectively with a diagnosis of severe acute pancreatitis (SAP) admitted to the tertiary-level adult ICU "between" January 2019 to December 2022.

Results: A total of 52 patients were enrolled in this study. The maximum numbers of patients were between 41 to 52 years of age, with a median age of 47.6 years. Gallstone (biliary) was identified as the most important etiological factor associated with severe acute pancreatitis. Among the known etiological factors, 52% of the cases were related to gallstone disease, 28.8% were due to alcohol, 7 (13.4%) to other causes (such as idiopathic, post-viral, post-ERCP, and drug-induced), and 5.7% were due to triglycerides. In our study, the most common symptoms were abdominal pain and vomiting. And the majority of patients recovered with conservative treatment. The majority 48 (92.3%) of patients improved, while 4 (7.6%) died. Eighteen (34.6%) patients required Mechanical ventilation (MV), while 10 (19%) with vasopressor supports. Eleven patients (21%) had evidence of an acute kidney injury on admission. Three patients (5.7%) underwent surgery, including necrosectomy and open cholecystectomy. The median length of ICU stay was 6.3 days.

Conclusions: The most common cause of severe acute pancreatitis was gallstone, followed by alcohol-related. SAP was seen more commonly in the male gender in the age group of 41-52 years. The most common presenting symptoms were abdominal pain and vomiting. Most SAP cases could be managed conservatively.

*Corresponding Author:

Dr. Kishor Khanal
Department of Critical Care,
Nepal Mediciti Hospital, Lalitpur, Nepal
kishorkhanal01@gmail.com

must have at least two of the following three features: characteristic abdominal pain, an elevation of pancreatic enzymes (at least three times the upper limit of normal), and specific Contrast Enhanced Computed Tomography (CECT) findings or, less commonly, Magnetic Resonance Imaging (MRI) or Trans-abdominal Ultrasonography.⁵

Nearly 80% of cases of acute pancreatitis worldwide are caused by gallstone obstruction and alcohol intake.⁶ Other factors, such as hypertriglyceridemia and drugs, account for the remaining portion. The variation in demographic and socio-economic factors has been linked with the etiology and severity of acute pancreatitis.⁷ Consequently, it is imperative to study demographic characteristics to understand the etiology and presentation of acute pancreatitis in different patient populations.⁸ The most severe cases of acute pancreatitis land in tertiary-level intensive care units. As such, gathering data on such patients may help us delineate newer risk factors specific to our population. This can lead us to a management strategy to halt the development and progression of acute pancreatitis.⁹ There is a scarcity of data from intensive care units in Nepal describing the demographics and etiology of patients with acute pancreatitis.

This study will be one of the most significant of its kind in Nepal. There has been no comprehensive study of the clinical profile of severe acute pancreatitis in tertiary-level ICUs. We plan to do a retrospective study to identify the demographic and clinicopathological characteristics of patients with severe acute pancreatitis admitted to our tertiary-level intensive care unit.

MATERIALS AND METHODS

The study was carried out at a 33-bed Multidisciplinary tertiary-level Intensive Care Unit. A retrospective review of all relevant patient records from January 2019 to December 2022 was conducted. The study was approved by the Institutional Ethics and Research Committees. Our study did not require informed consent because we excluded the patient's personal information and photographs.

Sample Size

The study enrolled 52 patients suffering from severe acute pancreatitis. The study included all patients over the age of 17 from both sexes who were diagnosed with severe acute pancreatitis (SAP). SAP was defined as patients with clinical, laboratory, and radiological findings of acute pancreatitis with an APACHE II score > or equal to 9 at presentation.

The study excluded patients with chronic pancreatitis and cancer, those whose medical records couldn't be located, and individuals whose discharges were made against the medical recommendation or advice. History (medical history, family history, personal history and alcohol consumption history) and medical comorbidities (hypertension, diabetes mellitus, chronic kidney disease, chronic liver disease, and chronic obstructive pulmonary disease (COPD)) were recorded. The most likely etiological factor was identified by analyzing history, physical examination, and relevant investigations. Investigations like routine blood tests (TLC, platelets, PT/INR), blood sugar estimation, and routine urine examinations were done. A more specific investigation, such as serum amylase and/or lipase estimation, was also carried out. Ultrasonography of the whole abdomen and pelvis was done in all patients to evaluate for the presence of gallstones and common bile duct pathology. A CT scan was performed 72 hours after admission in selected patients. All of the above information was gathered using a pre-designed proforma. And all patients were initially subjected to conservative measures.

Statistical analysis

The Statistical Package for Social Sciences (SPSS) version 25 tool and Microsoft Excel were used to gather and analyze the data. Nominal data were expressed as frequency, and continuous data as mean + SD or median (percentage).

RESULTS

A total of 52 patients with severe acute pancreatitis were admitted to ICU. 32 (61.5%) of the 52 patients were male, while 20 (38.4%) were female (Figure 1).

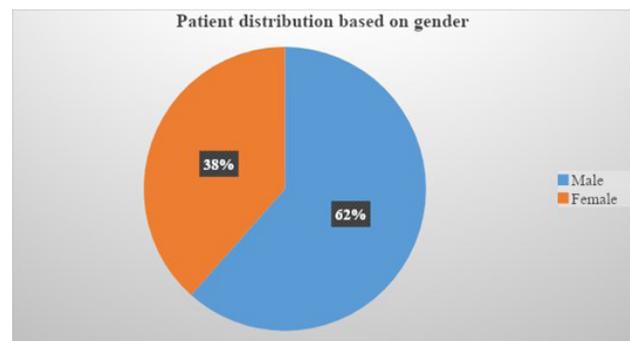


Figure 1: Patient distribution based on gender.

The mean patient age was 49.03 years (median age of 47.6 years), with a range of 17-90 years. Males had a statistically higher median age than females. In the current study, a majority of patients (38.4%) were between the ages of 41 and 52, with 19.2% being between the ages of 29 and 40, 17.3% being between the ages of 53 and 64, 13.4% being between the ages of 65 and 76, and 7.7% being between the ages of 17-28 and, 4% being between the age of 77 and 88.

Overall, 100% reported typical abdominal pain, 61.5% reported vomiting, 38.4% reported fever, and 27% reported abdominal distention. (Table 1)

Table 1: Patient distribution based on the symptoms of Severe Acute Pancreatitis

Symptom	N= no. of patients	Percentage (%)
Abdominal pain	52	100
Vomiting	32	61.5
Fever	20	38.4
Abdominal distension	14	27

The most common comorbidities were hypertension and diabetes mellitus, which were present in 15 (29%) and 10 (19%) patients, respectively, followed by CKD 3 (7.6%), CLD 4 (5.7%), and COPD 1 (2%). Gallstones were identified as the most important etiological factor associated with severe acute pancreatitis in our study. Alcohol consumption was found in 15 cases (28.8%), hypertriglyceridemia in 3 cases (5.7%), and other causes (idiopathic, post-viral, post-ERCP, and drug-induced) in 7 cases (13.4%). (Table 2)

Table 2: Patient distribution based on the causes of Severe Acute Pancreatitis.

Causes	N= no. of patients	Percentage (%)
Biliary (Gallstone)	27	52
Alcohol	15	28.8
Triglycerides	3	5.7
Others	7	13.4
Total	52	99.9

Serum lipase levels were elevated in 30 (57.3%) of the 52 cases, while serum amylase levels were elevated in 22 (42.3%) of the cases, both of which were more than three times the upper limit of normal. (Table 3) Based on radiological imaging, USG was done in the majority of patients 39 (75%) followed by CT in 29 (55%). (Table 4)

Table 3: Patient distribution based upon serum Amylase/Lipase levels

Investigation	N= no. of patients	Percentage (%)
Amylase \geq 294 (3xULN)	22	42.3
Lipase \geq 294 (3xULN)	30	57.7
Total	52	100

Table 4: Patient distribution based on radiology

Imaging	N= no. of patients	Percentage (%)
Ultrasound	39	75
CT	29	55

The mean ICU stay for the patients in the study was 6.3 days. While 4 (7.6%) patients died, the majority of 48 (92.3%) improved. Mechanical ventilation (MV) was required in 18 (34.6%) patients, while 10 (19%) required vasopressor support. Three patients (5.7%) had surgery that included necrosectomy and open cholecystectomy. The most common complication observed was acute kidney injury followed by ARDS. (Figure 2)

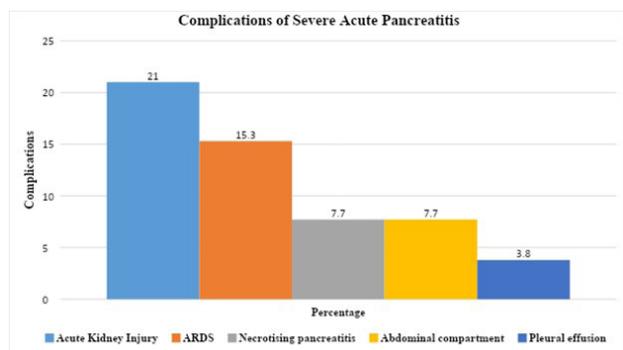


Figure 2: Complications of Severe Acute Pancreatitis

DISCUSSION

This is the retrospective study conducted in a 33 bedded tertiary-level ICU. Only severe cases that required ICU admission were included in this study. Although alcoholic pancreatitis is the most common type of acute pancreatitis, gallstone pancreatitis was reported higher in our study with ICU admission requirements. A study done by Abu-Zidan (2001) shows gallstone pancreatitis as a severe form of pancreatitis, with mortality rates ranging from 2-17%.

Gallstone pancreatitis accounted for about 27 (52%) of the cases of pancreatitis that presented to us during the study period. This incidence was comparable to that reported by Singh et al in another study at Nepal's University Teaching Hospital. Garcia, S. C et al found Biliary pancreatitis in 327 (51%) of cases and alcohol consumption in 315 (49%) of cases.⁶

In this study, the patient's age range was 17 to 90 years with the mean age of presentation being 49.03 years. Yadav et al, Das et al, and Reid et al showed a maximum age of 80 years while Alkareemy et

al, showed up to 73 years with a mean age of 39.1 years, 36.5 years, and 50.96 \pm 9.71 years respectively.¹¹⁻¹³

In our studies, the majority of patients (38.4%) were between the ages of 41 and 52, with 19.2% being between the ages of 29 and 40, 17.3% being between the ages of 53 and 64, 13.4% being between the ages of 65 and 76, and 7.7% being between the ages of 17-28 and, 4% being between the age of 77 and 88. This is comparable to the studies done by Das et al, where 63% were in the age group of 20-39 years, 28% were in the age group of 40-59 years, 4 % in less than 20 years, and 5 % in the age group of 60 – 80 years.¹²

Most cases of Acute Pancreatitis were seen in the 41-52 year age group (38.4%), which was similar to the study conducted by Reid et al, Manandhar et al, while Saxena et al showed 31.23% within the age groups of 30-44 years.^{9,13,18}

In this study, the incidence of gallstones was 52% whereas the incidence of alcohol-induced pancreatitis was 28.8% which is quite similar to the study done by Yadav et al, where the incidence of gallstones was found to be 71.1% and of alcohol 26.6%.¹¹ In the study done by Reid GP et al, the incidence of gallstones was also high at 71.4%.¹³ Other studies by Manandhar et al also show the incidence of biliary pancreatitis at 28%.⁹

Hypertriglyceridemia is the third most common cause of acute pancreatitis. In our study, 3 (5.7%) patients have acute pancreatitis due to high triglyceride levels. A study done by Zhang et al (2015) shows 122 (54.5%) has triglycerides level of more than 1000 mg/dl.¹⁴ Our study did not find any cause of acute pancreatitis for almost 7 (13.4%) of the cases and we assumed it could be due to other causes and labeled it as IAP (idiopathic acute pancreatitis). K. Khanal et al (2023) explained 2 cases that were due to viral causes (i.e dengue fever).¹⁵

In this study, the most common presentation was abdominal pain (100%) followed by vomiting (61.5%), abdominal distention (38.4%), and fever (27%). Our study was compared with Das et al, where abdominal pain (100%) was followed by vomiting (85%) and fever (3%). were seen respectively.¹² In the study done by Reid GP et al, vomiting (71.8%) and abdominal tenderness (96.7%) were noted in the majority of patients.¹³

In our study, diagnosis of severe acute pancreatitis was made based on clinical presentation, serum enzymes (Lipase and Amylase), Ultrasound of the whole abdomen, and computerized tomography (CT). Serum lipase levels were elevated in 30 (57.3%) of the cases while serum amylase levels were elevated in 22 (42.3%) of the cases, both more than three times normal levels. Similarly to this, Manandhar S et al, demonstrated that the majority of patients had elevated serum lipase levels, 73%. Ultrasound was the most commonly utilized imaging modality, in 75% of patients, whereas approximately 55% received a CT scan.⁹ Alkareemy et al made a diagnosis of SAP in 11 (22%) patients based on CT findings.¹⁶ We used APACHE II scores to calculate the severity with a mean average of 17.57 (APACHE II score \geq or equal to 9).

As a complication of severe acute pancreatitis, the most occurring local complication was acute kidney injury, which occurred in 21% of cases, and acute respiratory distress syndrome was observed in 15.3% of cases, 7.7% of cases have necrotizing pancreatitis and abdominal compartment syndrome, and 3.8% have pleural effusion (Figure 2). Our study was compared with Reid GP et al, showing respiratory (66.7%) and renal (14.3%) failure was the most common complication followed by pancreatic necrosis (15%), which was similar to our study.¹³

Of the 52 patients, 48 (92.3%) were treated with conservative management, and in the remaining 3 (5.7%) cases underwent surgery with necrosectomy and open cholecystectomy. 4 (7.6%) patients died of multi-organ failure requiring vasopressor and mechanical ventilator support. Saxena et al, Alkareemy et al, and Ahlawat V et al showed similar mortality rates of 6.38%, 8%, and 4%, respectively.

CONCLUSION

This is the first study done in the tertiary-level intensive care unit of Nepal where biliary pancreatitis was found to be the most common type of severe acute pancreatitis. The diagnosis of severe acute pancreatitis requires a clinical examination as well as biochemical and radiological findings. The treatment is primarily conservative, with surgery reserved for patients with biliary pancreatitis and those who develop complications as a result of acute disease.

CONFLICTS OF INTEREST: None

FUNDING: None

ACKNOWLEDGMENTS:

We would like to express our sincere gratitude to all our colleagues in the intensive care unit of the Nepal Medicit Hospital for their support and guidance.

REFERENCES:

1. Beger HG, Rau BM. Severe acute pancreatitis: Clinical course and management. *World J Gastroenterol.* 2007;13:5043.
2. Banks PA. Practice guidelines in acute pancreatitis. *Am J Gastroenterology.* 1997;92:377-386.
3. Kuo DC, Rider AC, Estrada P, Kim D, Pillow MT. Acute pancreatitis: What's the score? *J Emerg Med.* 2015;48:762-70.
4. Fagenholz PJ, Fernández-del Castillo C, Harris NS, Pelletier AJ, Camargo CA., Jr Direct medical costs of acute pancreatitis hospitalizations in the United States. *Pancreas.* 2007;35:302-7
5. Bardley El. A clinically based classification system for acute pancreatitis. *Arch Surg,* 1993; 128(5): 586-589.
6. Garcia, S. C., Toolis, M., Ubels, M., Mollah, T., Paul, E., Pandey, A., Thia, B., Wong, T., & Tiruvoipati, R. (2021). Comparison of clinical characteristics and outcomes between alcohol-induced and gallstone-induced acute pancreatitis: An Australian retrospective observational study. *SAGE Open Medicine.* <https://doi.org/10.1177/20503121211030837>
7. Banks P and Free M. Practice guidelines in acute pancreatitis. *Am J Gastroenterology.* 2006; 101(10): 237-400.
8. Saxena R, Kumar S, Nafe Z, et al. (February 14, 2023) Clinical, Biochemical, and Radiological Correlation in the Severity of Acute Pancreatitis: A Retrospective Study. *Cureus* 15(2): e34996. doi:10.7759/cureus.34996.
9. Manandhar S, Giri S, Poudel P, Bhandari RS, Lakhey PJ, Vaidya P. Acute biliary pancreatitis: an experience in a tertiary level hospital of Nepal. *Indian J Surg.* 2013 Dec;75(6):449-53. doi: 10.1007/s12262-012-0533-5. Epub 2012 Jun 8. PMID: 24465101; PMCID: PMC3900759.
10. Abu-Zidan F (2001) Predicting severe pancreatitis. *Arch Surg* 136:1210
11. Yadav, A. P., Raya, A., Rai, B. K., & Shah, R. P. (2022). Clinical Profile of Acute Pancreatitis. *Janaki Medical College Journal of Medical Science,* 10(2), 65-69. <https://doi.org/10.3126/jmcjms.v10i2.47870>.
12. Das, S. K., & Das, S. (2020). Clinical profile of patients with acute pancreatitis in a tertiary care center in Tripura: A retrospective study. *Asian Journal of Medical Sciences,* 11(6), 96-100. <https://doi.org/10.3126/ajms.v11i6.29233>
13. Reid, G. P., Williams, E. W., Francis, D. K., & Lee, M. G. (2017). Acute pancreatitis: A 7-year retrospective cohort study of the epidemiology, aetiology, and outcome from a tertiary hospital in Jamaica. *Annals of Medicine and Surgery,* 20, 103-108. <https://doi.org/10.1016/j.amsu.2017.07.014>
14. Zhang, Xiao-Li; Li, Fei; Zhen, Ya-Min; Li, Ang; Fang, Yu. Clinical Study of 224 Patients with Hypertriglyceridemia Pancreatitis. *Chinese Medical Journal* 128(15);p 2045-2049, August 05, 2015. | DOI: 10.4103/0366-6999.161361
15. Khanal, Kishor & Poudel, Saroj & Ghimire, Anup & Regmi, Ashim & Bhattarai, Rashmita & Pandey, Akash (2023). Dengue Fever Presenting as Acute Pancreatitis: A Case Series. *Journal of Advances in Internal Medicine.* 11. 60-63. [10.3126/jaim.v11i2.52414](https://doi.org/10.3126/jaim.v11i2.52414).
16. Alkareemy, E. A., Ahmed, L. A., Abbas, M., Habib, H. A., & Mustafa, M. H. (2020). Etiology, clinical characteristics, and outcomes of acute pancreatitis in patients at Assiut University Hospital. *The Egyptian Journal of Internal Medicine,* 32(1), 1-6. <https://doi.org/10.1186/s43162-020-00025-w>
17. Ahlawat V and Godara R (2018) Clinical Study of Demographic Profile, Etiology, Severity and Outcome of Acute Pancreatitis in a Tertiary Care Teaching Hospital in Northern India . *J Gastrointest Dig Syst* 8: 575. <https://doi.org/10.4172/2161-069X.1000575>