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Left Plueral Effusion: In Patients of Acute Necrotizing Pancreatitis

Muhammad Abid Aziz[1*], Tanvir Ahmad Bhatti[2], Abdul Moiz Bhatti [3], Khalid Ali[4], Muhammad Afzal[5], Muhammad Aleem Uddin[6]

[1*]Assistant Professor, Department of General Surgery, Zia Medical College/DHQ Teaching Hospital, Mardan, Pakistan
[2]Assistant Professor, Department of General Surgery, Rai Medical College Teaching Hospital Sargodha /Rai Medical College, Sargodha, Pakistan
[3]Senior Registrar Medicine (OPS), Gujranwala Medical College, Gujranwala, Pakistan
[4]SR Thoracic Surgery, Thoracic Surgery Department, Al-Aleem Medical College, Lahore, Pakistan
[5]Assistant Professor, Medicine Department, Avicenna Medical College, Lahore, Pakistan
[6]Assistant Professor, Medicine Department, Sahara Medical College, Narowal, Pakistan

***Corresponding Author:**
Muhammad Abid Aziz,
Registrar, Surgical B Unit, District Headquarter Hospital, Mardan, Pakistan
Email ID: surgeonabidaziz@gmail.com

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ABSTRACT

Background: Acute pancreatitis (AP) frequently progresses to pleural effusion (PE), the frequency of which varies considerably between research, and the link between PE and death is unclear.

Objective: The objective of this research is to determine how often acute necritizing pancreatitis is accompanied by left plueral effusion.

Methods: This Observational/ case series consisted of 74 patients. Patients with acute pancreatitis and serum amylase levels over 300U/dL were eligible. CT scans evaluated necrotizing pancreatitis prevalence, while chest X-rays assessed left plueral effusion. Complete data was analyzed using SPSS 22.0.

Results: In 74 cases, 39 (52.7%) were males and 35 (47.3%) were females. The most common cause of acute pancreatitis was gallstones, followed by hypertriglyceridemia, alcoholism, medications, hypercalcemia and post ERCP. We found necrotizing pancreatitis in34 (45.9%) cases, and left plueral effusion was found in 31 (91.2%) cases. Among 34 cases of necrotizing pancreatitis 7 (20.6%) cases were died.

Conclusion: We concluded that left pleural effusion in most necrotizing pancreatitis patients. Acute pancreatitis patients with high blood amylase levels and left pleural effusion must be treated early due to severe.

Keywords: *Acute necritizing pancreatitis, Left plueral effusion, Mortality, CT scan*

1. INTRODUCTION

Out of all the acute stomach disorders, acute pancreatitis (AP) is the most common, according to clinical practice [1]. The activation of the pancreatic enzyme within the pancreas is the initial stage, however there are other potential triggers. Edema, hemorrhage, and necrosis will thereafter develop in the pancreatic and adjacent tissues [2]. Acute pancreatitis (AP) can be caused by four main things: gallstones, hypertriglyceridaemia, drinking too much alcohol, and what happens after endoscopic retrograde cholangiopancreatography (ERCP) [3]. In addition, the prevalence of gallstones has been on the rise, and obesity is a major contributor to the worldwide increase in the incidence of AP [4].

In around 20% of cases, acute necrotizing pancreatitis will occur in the affected individuals. Organ failure occurs in 45% of patients.[5] Patients with infected necrotizing pancreatitis were 26.67 percent more likely to die than those with sterile necrotizing pancreatitis, and all of the patients who did die had pancreatic necrosis more than 50%, according to the researchers. Without surgical intervention, the death rate can approach 100%, and with infection, it rises to 43%.It is vital to classify instances of acute pancreatitis according to severity because individuals with severe necrotizing pancreatitis require rapid and aggressive therapy. With prompt diagnosis and treatment, the death rate might be decreased.[7]

Pleural effusion occurs in at least 20% of patients with acute pancreatitis. Pleural effusion is seldom a symptom of mild

pancreatitis. Pleural effusion is a documented complication of acute pancreatitis.[8] A left-sided pleural effusion is a common but temporary complication of acute pancreatitis. Pleural effusion may be caused by blocking lymphatic vessels or by disrupting the pancreatic duct, which might lead to the establishment of a pancreatico-pleural fistula. Just with pancreatitis, pleural effusion eventually goes gone. The prognosis is not good when pleural effusion occurs as a result of severe pancreatitis. In most cases, pancreatitis is caused by an impacted stone located at the base of the common bile duct. Stone extraction can prevent several issues

The symptoms of acute pancreatitis may manifest quickly or take some time to manifest, and they may stay localized or spread to other organs. The risk of problems increases with advanced age, gallstones, pancreatic necrosis, and organ failure. [6]The main sign of illness severity and consequences, according to experts, is pancreatic necrosis. One way to grade pancreatic inflammation using CT scans is the modified CT severity index, or MCSI. [7] Considerations such as the amount of fluid collections, the proportion of necrosis, and the involvement of the extra pancreas are used to arrive at this number. Its problem-prediction capabilities have been shown. [8] Acute pancreatitis can develop into severe acute pancreatitis (SAP) in up to 20% of patients. In the early phases of the disease, there is a substantial fatality risk linked with MSOF [9]. Approximately 80% of patients with MSOF develop or advance despite intensive care treatment, and acute pancreatitis is defined as having at least one organ failure on admission [10]. The mortality rate was 42% in this group, compared to 12% in the SAP group that did not have organ failure. There is a 35% to 55% mortality rate linked to the progression of organ failure [12]. Systemic symptoms of acute respiratory distress syndrome (ARDS) or hypoxemia in the lungs are among the most common signs of systemic SAP. in [11] Pulmonary dysfunction is the leading cause of death in 22–25 percent of AP patients, and it is a contributory factor in another 30 percent of those individuals [10]. Patients with SAP are more likely to die young because respiratory failure comes before liver, kidney, and cardiac failure. Respiratory failure was the primary cause of death in the autopsy results of that research, which found that 60% of patients with acute pancreatitis died within 7 days after being hospitalized. Having an oxygen saturation level of 92% or below, which is observed in 44% of SAP patients, is a known independent predictor of the severity of AP. Pleural effusion, hypoxemia, and pulmonary infiltrates are the hallmarks of SAP [12, 13]. A logistic regression analysis of anomalies detected on chest radiographs revealed a death rate fifteen times higher than the general population [14]. Our research set out to quantify the frequency of acute necritizing pancreatitis-related complications, including left plueral effusion.

2. MATERIAL AND METHODS

This observational/case series was conducted at District Headquarter Hospital, Mardan and comprised of 74 patients, during December 2022 to December 2023.

Participants ranged in age from fourteen to seventy-five years old and had a diagnosis of acute pancreatitis. People who had a history of persistent cough, TB, or chronic obstructive pulmonary disease were not included in the study. We included patients who came to the emergency room with symptoms of acute pancreatitis, such as nausea, vomiting, and upper abdominal pain that spreads to the back.

The patient's vitals were documented at the emergency department, including their temperature, pulse, blood pressure, respiration rate, and any abnormalities seen in the abdomen. Blood, urea, creatinine, liver function tests, serum calcium, serum amylase, x-ray of the chest, urine comprehensive report, and blood complete panel were among the many tests that were conducted. Acute pancreatitis was diagnosed in patients whose blood amylase levels were more than three times the usual limit. Patients with critically stable pancreatitis were considered to have moderate pancreatitis, but those with unstable conditions were considered to have severe pancreatitis. During the first week of hospitalization, patients who were admitted to the inpatient department underwent CT scans of the abdomen utilizing a pancreatic protocol. A more serious sickness was identified for the patient if a CT scan revealed pancreatic necrosis. To determine if a pleural effusion was present, chest radiographs were taken.
Endoscopic retrograde cholangiopancreaticography was used to diagnose individuals with acute pancreatitis who also had a stone at the common bile duct's lower end. If a suspicion of infection was raised by the CT results, fluid was aspirated and submitted for sensitivity testing and culture. An exploratory laparotomy with necrosectomy was carried out if microbiological examination revealed the presence of microorganisms. It was determined how often left plueral effusion occurred.

The frequency, mean ± standard deviation (SD), and other descriptive statistics were used to represent the data. For the statistical analyses, the Fisher's exact test was utilized. We used SPSS 22.0 to analyze all of the data.

3. RESULTS

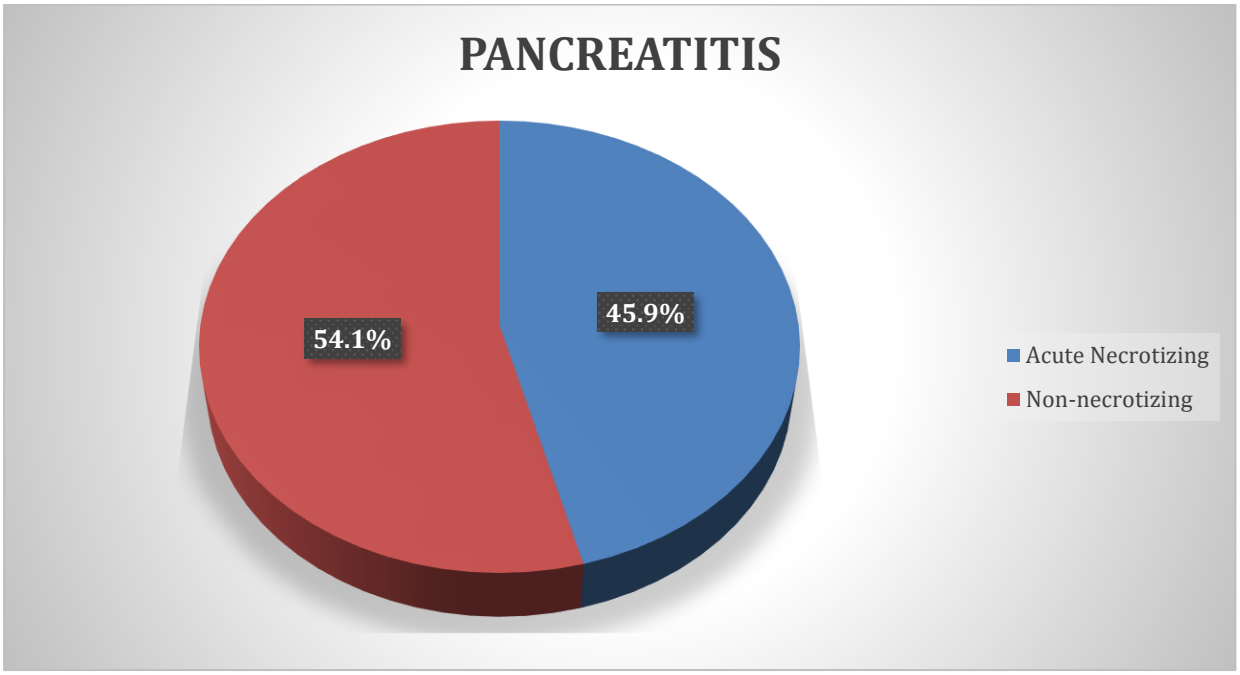
In 74 cases, 39 (52.7%) were males and 35 (47.3%) were females. The patients mean age was 42.18$\pm$13.52 years. The mean BMI of the cases was 22.17$\pm$8.27 kg/m^2.The most common cause of acute pancreatitis was gallstones, followed by hypertriglyceridemia,alcoholism, medications, hypercalcemia and post ERCP.(table 1)

Table 1: Characteristics of presented cases

Characteristics	Frequency/Percentage
Gender	
Male	39 (52.7%)
Female	35 (47.3%)
Mean age (years)	42.18±13.52
Mean BMI (kg/m^2)	22.17±8.27
Causes of Acute Pancreatitis	
gallstone	31 (41.9%)
hypertriglyceridemia	20 (27.03%)
alcoholism	11 (14.9%)
medications	6 (8.1%)
hypercalcemia	4(5.4%)
Post-ERCP	2(2.7%)

We found acute necrotizing pancreatitis in 34 (45.9%) cases and 40 (54.1%) cases were non-necrotizing pancreatitis.(figure 1)

Figure-1: Frequency of acutenecrotizing pancreatitis



Among 34 cases of necrotizing pancreatitis, left plueral effusion was found in 31 (91.2%)patients.(table 2)

Table-2: Frequency of left pleural effusionin necrotizing pancreatitis

Characteristics	No./Percentage (34)
Left Plueral Effusion	
Yes	31 (91.2%)

No	3 (8.8%)

In 31 cases of left plueral effusion, lung damage, empyema, pneumothorax and pleural thickening were the complications observed. Frequency of ICU admission was 17 (54.8%) and 7 (20.6%) cases were died among them.

Table-3: Complications and mortality among cases of left plueral effusion

Characteristics	**No./Percentage (31)**
Complications	
lung damage	15 (48.4%)
empyema	8 (25.8%)
pneumothorax	5 (16.1%)
pleural thickening	3 (9.7%)
ICU admission	
Yes	17 (54.8%)
No	14 (45.2%)
Mortality	
Yes	7 (20.6%)
No	24 (79.4%)

4. DISCUSSION

When acute pancreatitis is accompanied by pleural effusion, it is typically tiny, left-sided, recurring, and difficult to drain. By definition, it has more than 3 g/dl of protein and an amylase level of 1000 U/L. In 2.3% to 4.5% of individuals with pancreatic pseudocyst, pancreaticopleural fistula (PPF) comes to light. Diagnosis need CT scan, ultrasound or ERCP. The initial step in managing a pseudocyst is to drain the fluid using a chest tube. If it is unsuccessful, further options such as percutaneous or endoscopic drainage may be attempted.Patients with AP often experience pleural effusion, a typical consequence of the chest [13]. Among AP patients, pleural effusion was reported in 3.0–50.0% of cases in earlier studies [13,14]. Up to 46.0–72.3% of the population may be affected, according to recent research [15,16]. An further finding from earlier research was that pleural effusion in AP patients is typically seen on the left side [13]. In our study, left plueral effusion was found in 31 (91.2%) patients. Our findings are in line with those of other studies in several respects [13–16]. The study conducted by Peng et al. [17] found that out of 309 patients with AP, 39.8% (123/309) had pleural effusion. Of this, 65.0% (80/123) were found on both sides, 30.1% (37/123) on the left side, and 4.9% (6/123) on the right side (p-values are <.0001). The PEV in patients with persistent organ failure was comparable to that of temporary organ failure, according to Peng [17] and our study. In contrast, the PEV in patients without organ failure was lower than in patients with organ failure ($p < .05$ for both). Although Peng [17] did not mention it, we discovered that the PEV was lower in patients without pancreatic necrosis compared to those with pancreatic necrosis ($p < .0001$).

One of the most deadly forms of pancreatitis is infected necrotizing pancreatitis, which can cause a variety of problems or even death. In this study, cholelithiasis was found to be the most prevalent cause of acute pancreatitis. Organ failure and infected necrotizing pancreatitis are associated with a 35.2% mortality rate. There is a 1.4% mortality rate for sterile necrotizing pancreatitis with organ failure compared to necrotizing pancreatitis without organ failure. [18]

Among 74 cases, prevalence of necrotizing pancreatitis was 45.9%. The most common cause of acute pancreatitis was gallstones, followed by hypertriglyceridemia, alcoholism, medications, hypercalcemia and post ERCP.Acute necrotizing pancreatitis is a potentially fatal condition, it is vital to get it recognized and monitored as soon as possible. Infection of necrosed tissue can be avoided if detected early. Infective necrosis requires surgery to be treated. With endoscopic necrosectomy, internal drainage is possible. [19]

In addition, other research has shown findings that differ from ours [20,21]. First, the use of different imaging modalities (e.g., chest radiography, ultrasonography, and CT) might account for much of the discrepancy. In the context of AP, chest

radiographs are usually taken at the patient's bedside using portable devices; nevertheless, due to issues with placement and picture overlap, some effusions may go undetected. Ultrasonography, in contrast to chest radiography and CT, relies on the operator's skill and is inappropriate for AP patients who are overweight because of echo attenuation. Contrarily, chest CT may detect even small quantities of pleural effusion and can even show signs of infection, such as the so-called "split pleura sign" [13].

The left side of the body is the most common location for mild to moderate effusions. When fluid amylase levels are normal, these effusions on the left side are usually chemically generated or sympathetic in character. Pleural effusions are an uncommon complication of chronic pancreatitis; nonetheless, they might occur as a result of pancreatic fistula development. [22] is a Patients with pancreatitis typically have a chest radiograph taken to check for pleural effusion. Because the patient is unable to maintain correct posture when supine, mild to moderate effusions may go unnoticed. Because of its sensitivity and accessibility, ultrasonography is the gold standard for identifying even a little amount of pleural effusion in the intensive care unit. The presence of septations and internal echoes during an ultrasonography might raise suspicions of infection. This diagnosis is infrequently made with chest CT scans, despite their sensitivity to detect even minute amounts of fluid in the pleural area. Known as the "split pleura sign," a thickening of the pleural wall distinguishes infected effusions on computed tomography images from one another. [23] Consistent with other studies, our mortality rate came in at 20.6%.[24]

5. CONCLUSION

We concluded that left pleural effusion in most necrotizing pancreatitis patients. Acute pancreatitis patients with high blood amylase levels and left pleural effusion must be treated early due to severe.

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