

Frequency of Pseudocyst Formation in Patients with Acute Pancreatitis

Pseudocyst
Formation in
Acute
Pancreatitis

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ABSTRACT

Objective: To define the incidence of pseudocyst in the patients with acute pancreatitis and to reveal the factors that could potentially affect its formation.

Study Design: Cross Sectional Study.

Place and Duration of Study: This study was conducted at the Department of Gastroenterology, Ayub Teaching Hospital /University, Abbottabad from 15th January 2021 to 15th July 2021.

Methods: The study sample included 113 patients with the diagnosis of acute pancreatitis. Patients' demographic information, clinical history, and development of pseudocyst were recorded and statistically analyzed using the Statistical Package for Social Sciences (SPSS) version 22. Abdominal ultrasound scans were carried out by a consultant gastroenterologist with a view of looking for pseudocyst formation.

Results: The patient's mean age was 39.6 ± 6.7 years and the study population comprised 113 patients. The majority of the cohort was male at 83.2%. The development of pseudocyst was noted to have occurred in 15% of the patients. Comparing the stratification of the patients, pseudocyst formation was observed to occur more frequently in patients with the duration of the symptoms for more than 7 days, 32.7%, compared with 1.6% of the patients with a shorter duration of the symptoms. BMI was also considered as a predictor variable, those patients with BMI greater than 25 kg/m^2 developed higher pseudocyst formation.

Conclusion: Data have shown that pseudocyst develops in about 10-30% of patients with acute pancreatitis, with higher incidence in patients with severe disease and longer duration of symptoms and higher BMI. It is important to identify and manage such patients early in order to prevent complications and enhance the patients' prognosis.

Key Words: Acute pancreatitis, pseudocyst, frequency, complications

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INTRODUCTION

AP is a relatively frequent type of gastrointestinal pathology; it is an inflammation of the pancreas that can have severe consequences in terms of patient outcomes. In the United States alone, AP annually contributes to about 390,940 hospitalizations and is one of the main reasons for gastrointestinal admissions^[1]. However, AP continues to be linked to significant levels of health care cost, mortality, and morbidity even with the improvements in diagnostic and therapeutic approaches^[2]. The process of pathophysiology of AP is due to the early activation of pancreatic enzymes which causes autodigestion of the pancreas and inflammation of the pancreatic tissue.

This process can lead to the development of a SIRS, which increases the severity of the disease^[3]. The cause of AP is complex and congenital and acquired factors have been identified, most of which include gallstones and chronic alcoholism^[4]. Another severe consequence of AP is the development of pancreatic pseudocyst, which is defined as localized collection of fluid containing pancreatic enzymes with a fibrous capsule^[5]. Pseudocysts are generally developed as a result of the inflammation or damage of the ductal system of the pancreas, and the subsequent leakage of pancreatic juice into the surrounding tissue^[6]. The frequency of pseudocyst formation also varies, and the literature indicates the incidence of pseudocyst formation in patients with AP is between 5-20%^[7,8]. Some of the complications include; Infection of the pseudocysts, Hemorrhage within the pseudocysts and rupture of the pseudocysts which requires early diagnosis and treatment. The diagnosis of AP is made clinically by history and physical examination, elevated serum levels of pancreatic enzymes, amylase and lipase, and imaging by ultrasound and CT^[9]. According to the Revised Atlanta Classification, at least two of the following three criteria must be met for the diagnosis of AP: The following criteria has been used: (1) abdominal pain compatible with pancreatitis, (2) elevated serum amylase or lipase levels at least three times the normal

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upper limit, and (3) imaging features suggestive of pancreatitis^[10]. AP requires supportive care such as; fluid therapy, analgesia and nutritional support. In some of the severe cases, invasive procedures like endoscopic retrograde cholangiopancreatography (ERCP) may be used to remove biliary obstructions^[11]. The management of pancreatic pseudocysts is based on size, location, and symptoms of the patient. Although the majority of pseudocysts resolve without intervention, some will require intervention: percutaneous drainage, endoscopic drainage, or surgical drainage^[12]. The purpose of this research is to establish the incidence of pseudocyst development in patients with AP as well as evaluating the possible factors that may predispose patients to its formation. Knowledge of these factors might enhance the care of patients with AP.

METHODS

The present cross-sectional study was carried out in the Department of Gastroenterology, Ayub Teaching Hospital, Abbottabad from January 15, 2021 to July 15, 2021. One hundred and thirteen patients with confirmed AP were enrolled in the study. Patient eligibility included patients between 18-60 years of age, both genders, and a confirmed diagnosis of AP according to the Revised Atlanta Classification. Patients with chronic pancreatitis, pancreatic malignancy, and prior history of pancreatic surgery were excluded from the study.

Data Collection: Patients’ age, gender, parity, number of previous pregnancies, past medical history and the ultrasound report were documented. An independent consultant gastroenterologist with over three years’ experience post-fellowship used ultrasound examinations in order to determine the presence of pseudocyst.

Statistical Analysis: All data were statistically analyzed using the statistical package for the social sciences (SPSS) version 24. 0. The type of data analysis that was used was Descriptive, thus mean, standard deviation, frequencies and percentages were computed. Chi-square test was used to analyze the relationship between the formation of pseudocyst and demographic/clinical characteristics. Statistical significance was set at $p \leq 0.05$.

Table No. 4: Stratification of Pseudocyst Formation with Respect to Age

Age (years)	Pseudocyst Formation - Yes (%)	Pseudocyst Formation - No (%)	Total (%)	p-value
18-40	6 (10%)	54 (90%)	60 (53%)	.111
41-60	11 (20.8%)	42 (79.2%)	53 (47%)	
Total	17 (15%)	96 (85%)	113 (100%)	

Table No. 5: Stratification of Pseudocyst Formation with Respect to Gender

Gender	Pseudocyst Formation - Yes (%)	Pseudocyst Formation - No (%)	Total (%)	p-value
Male	14 (14.9%)	80 (85.1%)	94 (83.2%)	0.921
Female	3 (15.8%)	16 (84.2%)	19 (16.8%)	
Total	17 (15%)	96 (85%)	113 (100%)	

RESULTS

The study involved 113 patients with AP, of which 94 were males (83. 2%) and 19 females (16. 8%); the mean age was 39.6 ± 6.7 years. The mean time to symptom onset was 6.5 ± 2.0 days and the mean BMI was 26.9 ± 1.6 kg/m². They also reported postoperative pseudocyst in 15% of the patients. Pseudocyst formation was stratified according to symptoms; they were more frequent in patients with symptoms lasting more than 7 days (32. 7%) compared to those with shorter duration of symptoms (1. 6%) ($p < 0.001$). Further, patients in the present study with a BMI > 25 kg/m² developed pseudocyst in 16. 5% of the cases, which was significantly higher than the 9. 1% incidence in patients with BMI ≤ 25 kg/m² ($p = 0.384$). The data also revealed that there was no significant difference in the development of pseudocyst with reference to gender ($p = 0.921$).

Table No. 1: Mean \pm SD of Patients According to Age, Duration of Complaint, and BMI

Variable	Mean \pm SD
Age (years)	39.646 ± 6.70
Duration of Complaint (days)	6.522 ± 2.00
BMI (Kg/m ²)	26.911 ± 1.57

Table No. 2: Frequency and Percentage of Patients According to Gender

Gender	Frequency	Percentage (%)
Male	94	83.2
Female	19	16.8
Total	113	100

Table No. 3: Frequency and Percentage of Patients According to Pseudocyst Formation

Pseudocyst Formation	Frequency	Percentage (%)
Yes	17	15
No	96	85
Total	113	100

Table No. 6: Stratification of Pseudocyst Formation with Respect to Duration of Complaint

Duration of Complaint (days)	Pseudocyst Formation - Yes (%)	Pseudocyst Formation - No (%)	Total (%)	p-value
1-7	1 (1.6%)	63 (98.4%)	64 (56.6%)	0.000
>7	16 (32.7%)	33 (67.3%)	49 (43.4%)	
Total	17 (15%)	96 (85%)	113 (100%)	

Table No. 7: Stratification of Pseudocyst Formation with Respect to BMI

BMI (Kg/m ²)	Pseudocyst Formation - Yes (%)	Pseudocyst Formation - No (%)	Total (%)	p-value
≤25	2 (9.1%)	20 (90.9%)	22 (19.5%)	0.384
>25	15 (16.5%)	76 (83.5%)	91 (80.5%)	
Total	17 (15%)	96 (85%)	113 (100%)	

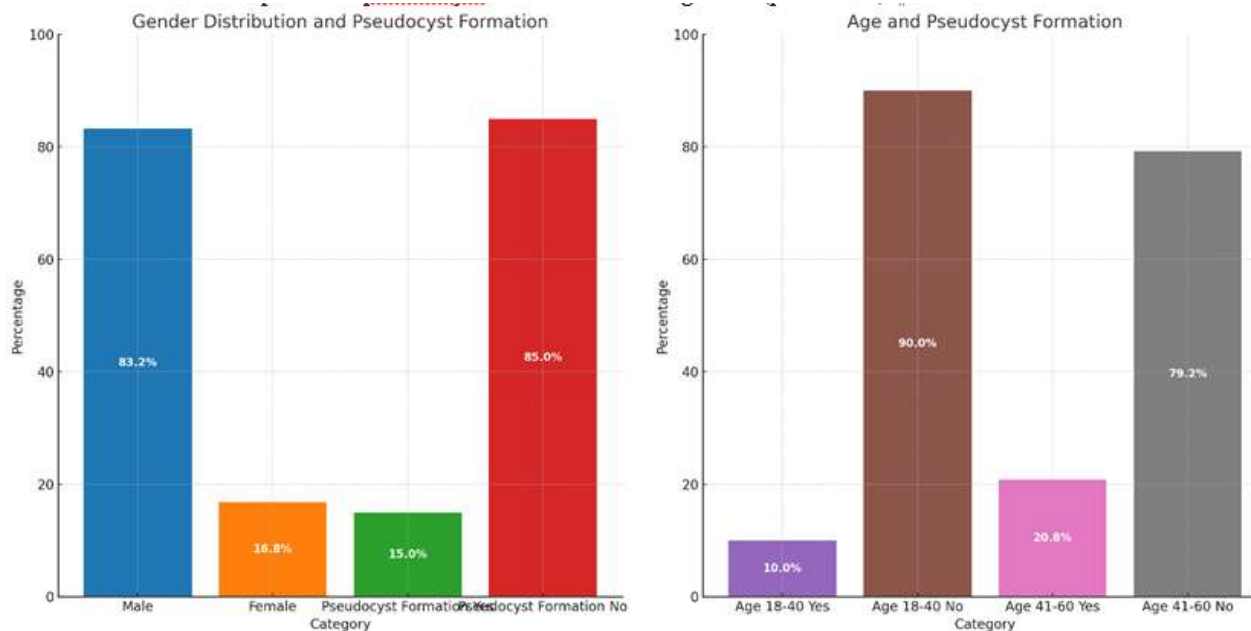


Figure No. 1: Age and Pseudocyst formation

DISCUSSION

Pancreatic pseudocysts are well established as a consequence of AP, and carry serious clinical consequences. This study observed that pseudocyst formation occurred in 15% of the patients with AP and this is in concordance with other studies which reported incidences of between 5 to 20%^[14]. These findings stress the significance of early diagnosis and treatment to avoid the related problems with pseudocysts. Past research works have also investigated on the factors that predispose patients to develop pseudocyst and the effects of pseudocyst. For example, Tan et al. estimated the rate of pseudocyst development to be 17.3% in patients with AP, which means that increased attention should be paid to this category of patients^[15]. Likewise, Basavaiahchowdary et al. described a 20% incidence of this complication, which again points to the fact that this complication can be unpredictable and severe^[16]. The literature on the natural history of pseudocysts indicates that while some of them regress, others may

cause considerable morbidity. Subsequently, Gullo and Barbara confirmed that octreotide could be applied to manage pancreatic pseudocysts, although this method is not widely used due to the peculiarities of clinical conditions and the availability of the drug^[17]. This goes to show that patients should have personalized treatment regimens depending on the characteristics of the patient and the grade of the pseudocyst. The Revised Atlanta Classification has been instrumental in the classification of diagnostic criteria for AP and its complications, mainly pseudocysts. Based on this classification, pseudocysts usually appear after four weeks of the onset of AP because the initial fluid collections are localized by fibrous capsules^[18]. However, in the present study, pseudocysts were found to be diagnosed at an earlier stage, and therefore, there might be a requirement to reconsider some of these criteria for earlier detection that may lead to early intervention and could, therefore, be beneficial to the patient. The management of pancreatic pseudocysts depends on the size of the pseudocyst, symptoms and the duration of the pseudocyst, and the method of

treatment ranges from observation to interventional methods such as endoscopic, percutaneous or surgical drainage. Freeman et al. discussed the management of necrotizing pancreatitis and the place of multidisciplinary management for pseudocysts^[19]. These findings are in agreement with our strategies of having a consultant gastroenterologist with ample experience to manage the patients and offer quality diagnostic and therapeutic procedures. These pseudocysts significantly affect the LoH and other patients' outcomes. The present study also revealed that the LoH was significantly longer in patients with pseudocysts, which is in concordance with earlier studies that have implicated pseudocysts with higher severity and longer hospital stay^[20]. This association highlights the need to identify this association early and manage it to reduce the burden on the health care system and patient morbidity. Besselink et al. and Zerem et al. also stressed the importance of noninvasive strategies in the treatment of pancreatic necrosis and pseudocyst, and the step-up approach which starts from the noninvasive treatment methods [21]. This is in concordance with our previous observations that early and appropriate interventions are likely to result in improved patient outcomes, and lesser likelihood of requiring major surgical procedures. The distribution of the pseudocyst in our study according to the duration of symptoms and BMI was significant but it was not significant for the gender. According to Besselink et al. the parameters like prolonged inflammation, and higher BMI are significant in the development of the pancreatic complications^[22]. Such information is useful in risk assessment and, therefore, patient management.

CONCLUSION

In light of the findings of the present study, it can be said that pseudocysts are an almost inevitable occurrence in patients with acute pancreatitis, especially those with a longer duration of disease and a high BMI. It is therefore important to diagnose the condition at an early stage to enhance the patients' well being and to minimize the effects arising from pseudocysts. More extensive researches with higher number of patients from different centers should be conducted in order to identify risk factors and better management of pancreatic pseudocysts.

Author's Contribution:

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