

ORIGINAL ARTICLE

Pattern of gall stone size in patients presenting with acute biliary pancreatitis.

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ABSTRACT... Objective: To forecast the likelihood of severe pancreatitis and make more informed treatment decisions if they comprehend the pattern of gallstone size in ABP. **Study Design:** Descriptive, Cross Sectional study. **Setting:** Department of Surgery, Allied Hospital, Faisalabad. **Period:** April 2025 to September 2025. **Methods:** Total 200 patients between the ages of 20 and 85 years who had acute biliary pancreatitis were included, regardless of gender. Patients with a history of trauma, pregnancy-related gallstone-induced pancreatitis, acute pancreatitis from reasons other than gallstones, concomitant conditions such diabetes, hypertension, or heart disease, or those with features of chronic pancreatitis or cancer were excluded. Common bile duct (CBD) diameter, number of gallstones, size of the largest and smallest gallstones, and presence or absence of CBD stones were recorded. Gallstones smaller than 10 mm were classified as tiny gallstones, and those larger than 10 mm were classified as large gallstones. **Results:** The study's age range was 20 to 85 years old, with a mean age of 58.25 ± 9.30 years. With a male to female ratio of 1:4.6, 34 (17.0%) of the 200 patients were men and 166 (84.0%) were women. In our study, the average length of illness was 5.71 ± 2.18 months. The mean BMI was 27.44 kg/m^2 -2.98. There were 9.43 ± 4.56 gallstones on average, with the largest gallstone measuring 24.33 ± 5.43 mm and the smallest measuring 5.63 ± 3.13 mm. The diameter of the CBD was 5.78 ± 0.87 mm. In our study, 186 individuals (93.1%) had little gallstones and 14 patients (7.0%) had large gallstones. **Conclusion:** The GS were more frequent and smaller in patients with acute biliary pancreatitis. Incorporating the size and quantity of GS into the decision-making process may be beneficial given the uncertainties surrounding the referral of patients with non-specific symptoms for cholecystectomy.

Key words: Acute Biliary Pancreatitis, Gall Stones, Size.

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INTRODUCTION

Acute pancreatitis (AP) is an inflammatory disease of the pancreas that can affect distant organs as well as other local tissues. According to estimates, there are between 4.9 and 73.4 occurrences of acute pancreatitis for every 100,000 individuals worldwide.¹ Between 5% and 20% is the range of the total mortality rate, depending on the severity of pancreatitis. There are three levels of severity for this condition: mild, moderate, and severe.²

There are numerous causes of acute pancreatitis, including gallstones, hypertriglyceridemia, and some medications. The most prevalent cause of discomfort in the biliary tract is gallstones. Although there has been suspicion of a link between gallbladder stones and pancreatitis since at least the 17th century, there has been significant discussion about how gallstones increase the risk of the condition.³ After

ten years of follow-up, about one-fifth of people with gallstone disease show symptoms, while the majority are asymptomatic. The best method for checking for gallstones is ultrasound. Gallstones are more common in some areas than others.⁴ A very sensitive test for gallstones, ultrasound may identify the size of gallstones as well as the existence of biliary sludge or microlithiasis.⁵ Clinically predicting the severity of an illness at presentation is still quite difficult. The usefulness of various grading systems, including BISAP, APACHE II, and Ranson's criteria, in gallstone-specific pancreatitis has been inconsistently confirmed. To enhance outcomes, lessen the strain on the intensive care unit, and inform choices about procedures like early ERCP, cholecystectomy, or intense supportive care, it is essential to identify patients who are at risk for serious complications early.⁶

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A study by Sharma M et al. sought to determine whether tiny gallstones and the development of acute pancreatitis were related. Gallstones were separated into two groups based on their size patterns. 65 patients (92.8%) had gallstones in the size ≤ 10 mm category, which was classified as a tiny gallstone. The average size of tiny gallstones was 5.27 ± 4 mm. However, 5 (7.2%) patients had gallstones larger than 10 mm, which were classified as big gallstones. The average size of big gallstones was 9.35 ± 5.34 mm.⁷

Acute biliary pancreatitis (ABP) is a dangerous illness that can be fatal. The purpose of this study is to look into the gallstone size pattern in people who have ABP. Clinicians may be better equipped to forecast the likelihood of severe pancreatitis and make more informed treatment decisions if they comprehend the pattern of gallstone size in ABP.

METHODS

This Descriptive Cross-sectional study was conducted in Department of Surgery at Allied Hospital in Faisalabad between April 2025 to September 2025. After the institutional ethical review committee gave its approval (No.48.ERC/FMU/2023-24379), 200 patients who satisfied the inclusion criteria were selected via non-probability sequential sampling. The informed consent of each patient was sought. A sample size of 200 cases was established with a 7.2%⁷ frequency of big gallstones in patients with acute pancreatitis, a 95% confidence level, and a 3.6% margin of error. Serum lipase levels that were at least three times the upper limit, abdominal pain and other symptoms typical of acute pancreatitis, and imaging evidence (such as ultrasound or CT scans) showing features indicative of pancreatic inflammation related to biliary obstruction, specifically implicating gallstones or biliary system pathology, were all included in the study, regardless of gender, for all patients aged 20 to 85 with acute biliary pancreatitis. Patients with a history of trauma, pregnancy-related gallstone-induced pancreatitis, acute pancreatitis from reasons other than gallstones, concomitant conditions such as diabetes, hypertension, or heart disease, or those with features of chronic pancreatitis or cancer were excluded.

Age, gender, BMI, and whether or not a patient has previously experienced symptoms are among the demographic information gathered through clinical history and examination. To find gallstones, all patients underwent ultrasounds. Common bile duct (CBD) diameter, number of gallstones, size of the largest and smallest gallstones, and presence or absence of CBD stones were recorded. Gallstones smaller than 10 mm were classified as tiny gallstones, and those larger than 10 mm were classified as large gallstones. A pre-made proforma was used to enter all of the data.

SPSS V-25 was used to enter all of the data. For every quantitative variable, including age, weight, height, BMI, number of gallstones, highest and smallest gallstone sizes, and CBD diameter, the mean and standard deviation were computed. For every qualitative feature, including gender, the presence or absence of a CBD stone, prior symptoms, pattern, and gallstone number, frequency and percentage were computed. Gallstone patterns in several groups were ascertained using the chi-square test. Using stratification, effect modifiers such as age, gender, BMI, and prior symptoms were managed. Using the post-stratification chi-square test, a P-value of less than 0.05 was considered significant.

RESULTS

The study's age range was 20 to 85 years old, with a mean age of 58.25 ± 9.30 years. 147 patients, or 73.50% of the total, were between the ages of 51 and 85. With a male to female ratio of 1:4.6, 34 (17.0%) of the 200 patients were men and 166 (84.0%) were women. In our study, the average length of illness was 5.71 ± 2.18 months. The average height was 157.87 ± 11.32 cm. 85.64 ± 8.67 kg was the average weight. The mean BMI was $27.44 \text{ kg/m}^2 - 2.98$. There were 9.43 ± 4.56 gallstones on average, with the largest gallstone measuring 24.33 ± 5.43 mm and the smallest measuring 5.63 ± 3.13 mm. The diameter of the CBD was 5.78 ± 0.87 mm. Table-I displays the distribution of patients with additional confounding variables.

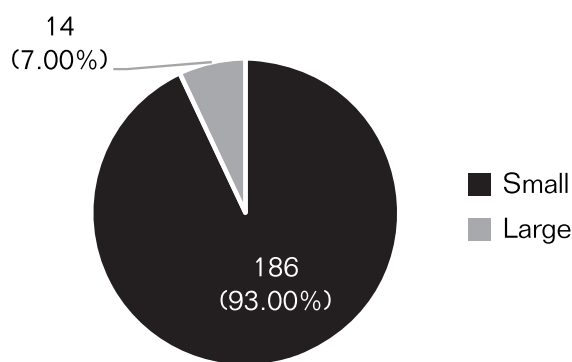
In our study, 186 individuals (93.1%) had little gallstones and 14 patients (7.0%) had large gallstones (Figure I). Table-II displays the stratification

of gallstone patterns according to impact modifiers.

TABLE-I
Distribution of patients with other confounding variables (n=370)

Confounding Variables	Frequency	%age	
Age (years)	20-50	53	26.50
	51-85	147	73.50
Gender	Male	34	17.0
	Female	166	83.0
Duration of disease (months)	≤6	142	71.0
	>6	58	29.0
BMI (kg/m ²)	≤25	55	22.50
	>25	145	77.50
CBD stones	Yes	28	14.0
	No	172	86.0
Previously symptomatic	Yes	57	28.50
	No	143	71.50
Number of gallstones	Single	49	24.50
	Multiple	151	75.50
Place of residence	Rural	70	35.0
	Urban	130	65.0

FIGURE-1
Pattern of gallstones (n=200).



DISCUSSION

Our research showed that GS were more frequent and smaller in patients with acute biliary pancreatitis. The impact of GS size and quantity on the incidence of problems has been assessed in earlier research, with varying degrees of success. Persson⁸ determined that expectant management

is warranted and prospectively assigned patients with proven symptomatic GS to either early CCY or expectant treatment. According to their findings, there was no correlation between the number and size of GS and the emergence of biliary problems.⁸ However, we think that risk classification based on sonographic features was insufficient because the incidence of biliary problems in that prospective trial was low.

TABLE-II
Stratification of pattern of gallstones with respect to effect modifiers.

		Small Stones (n=186)	Large Stones (n=14)	P-Value
Age (years)	20-50	49 (92.45%)	04 (7.55%)	0.856
	51-85	137 (93.20%)	10 (6.80%)	
Gender	Male	29 (85.29%)	05 (14.71%)	0.053
	Female	157 (94.58%)	09 (5.42%)	
Duration of disease (months)	≤6	131 (92.25%)	11 (7.75%)	0.517
	>6	55 (94.83%)	03 (5.17%)	
BMI (kg/m ²)	≤25	51 (92.73%)	04 (7.27%)	0.926
	>25	135 (93.10%)	10 (6.90%)	
CBD stones	Yes	28 (100.0%)	00 (0.0%)	0.118
	No	158 (91.86%)	14 (8.14%)	
Previously symptomatic	Yes	55 (96.49%)	02 (3.51%)	0.222
	No	131 (90.34%)	12 (9.66%)	
Number of gallstones	Single	41 (83.67%)	08 (16.33%)	0.003
	Multiple	145 (96.03%)	06 (3.97%)	
Place of residence	Rural	65 (92.86%)	05 (7.14%)	0.954
	Urban	121 (93.08%)	09 (6.92%)	

After 17.4 years of follow-up, a large retrospective Danish cohort research found an 8% biliary

complication rate. A GS diameter greater than 10 mm was linked in that study to CCY, acute cholecystitis, and simple symptomatic illness. Nonetheless, several GS were linked to complex diseases, including AP, which is in line with our findings.⁹

Doherty et al.¹⁰ documented the quantity and size of GS recovered during surgery in patients undergoing CCY for AP, cholecystitis, or biliary colic that was symptomatic but not complex. Patients who had at least one GS smaller than 5 mm were four times more likely to develop AP, according to their multivariate study.¹⁰ Although there were some methodological discrepancies between the studies, overall, these results are similar to our research. Instead of taking direct measurements of the stones, we used sonography in our experiment. Furthermore, rather than comparing sonographic parameters within a group, we also examined them across subgroups with biliary problems. Additionally, our results showed that biliary problems were linked to both the quantity and size of stones.

A group of patients—AP, obstructive jaundice, cholecystitis, and uncomplicated biliary disease—were compared in terms of GS features by Chen et al. (2022).¹¹ In contrast to the other two groups, patients with AP and obstructive jaundice showed smaller and more GS. Multivariate analysis, however, showed that the only independent risk variables for AP were small GS size and advanced age. In contrast, our results show that smaller GS are linked to biliary problems in general as well as AP.

The emergence of biliary problems is significantly influenced by the presence of GBS.^{12,13} GBS has a varied natural history, with results ranging from the creation of tiny GS to spontaneous resolution over time.¹⁴ In individuals with GBS symptoms, very high incidences of cholecystitis, acute ascending cholangitis, and AP. According to a different study, GBS is a cause of acute idiopathic pancreatitis that is not well known.¹⁵ Although not statistically significant, our results showed that the study group had greater rates of GBS.

It is estimated that 15% to 20% of GS patients

have CBD stones.¹⁶⁻²⁰ The natural history of CBD stones is not as well known as that of GS. It's still unknown how common GS migration into the CBD is and what risk factors are involved. Furthermore, it's unclear which GS will create problems because of their retention in the CBD or pass silently into the duodenum. Acute ascending cholangitis, hepatic abscesses, AP, and obstructive jaundice are among the consequences that can arise from partial or total biliary obstruction caused by CBD stones.²¹ Despite affecting a small percentage of patients, these complications are linked to significant rates of morbidity and mortality.^{22,23}

According to the most recent guidelines, CCY should be performed on individuals who exhibit symptoms or who have acquired biliary problems. On the other hand, conservative care should be given to people who don't exhibit any symptoms. It's still unclear how to handle people who exhibit vague or moderate symptoms, though.^{24,25}

According to a U.S. study, the likelihood of a symptom return is low for patients who are still asymptomatic five years after a mild initial presentation.²⁶ Additionally, a significant portion of patients who have CCY still have stomach pain, which raises the possibility that there are other causes for their symptoms.²⁷ There are several factors that influence the choice to carry out CCY.²³ Therefore, we believe it is fair to include the sonographic features of GS in this decision-making process.

Because of its cross-sectional nature, our study has a number of limitations. For example, there was insufficient power to discern statistical significance between the subgroups due to the small sample size. Furthermore, there is no follow-up time, which would have been necessary to detect long-term issues. Additionally subjective and susceptible to observer bias are sonographic measurements. Finally, we were unable to determine whether these people had concurrent asymptomatic CBD stones since sophisticated imaging methods such as computed tomography and magnetic resonance imaging were not used.

This is the only study that we are aware of that compares the number and size of GS in patients with

biliary problems. Patients with minor GS symptoms are now advised to “watch and wait” rather than being immediately referred for surgery. Small and many GS are risk factors for all kinds of biliary problems, according to our data. Therefore, a lower threshold for surgical referral is recommended, and the “watch and wait” strategy for these patients should be carried out with increased caution. It could be advantageous to use sonographic criteria, including GS size and number, in the decision-making process. However, more investigation is required to validate our results.

CONCLUSION

The GS were more frequent and smaller in patients with acute biliary pancreatitis. Incorporating the size and quantity of GS into the decision-making process may be beneficial given the uncertainties surrounding the referral of patients with non-specific symptoms for cholecystectomy. We advise frequently estimating the amount of gallstones in patients whose imaging scans reveal cholelithiasis. Ultrasonography has been demonstrated to be reasonably accurate in detecting the diameter and quantity of gallstones when used specifically to measure gallstone burden.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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REFERENCES

1. Walkowska J, Zielinska N, Karauda P, Tubbs RS, Kurtys K, Olewnik Ł. **The pancreas and known factors of acute pancreatitis.** *J Clin Med.* 2022; 11:5565.
2. Lakananurak N, Gramlich L. **Nutrition management in acute pancreatitis: Clinical practice consideration.** *World J Clin Cases.* 2020; 8(9):1561-73.
3. Yang AL, McNabb-Baltar J. **Hypertriglyceridemia and acute pancreatitis.** *Pancreatol.* 2020; 20(5):795-800.
4. Lammert F. **Gallstones: The thing in itself.** *Clin Liver Dis.* 2022; 20:57-72.
5. Wang J, Shen S, Wang B, Ni X, Liu H, Ni X, et al. **Serum lipid levels are the risk factors of gallbladder stones: A population-based study in China.** *Lipids Health Dis.* 2020; 19(1):1-6.
6. Pujari KK, Naveen K. **Risk stratification and clinical outcomes in gallstone-related acute pancreatitis: Prospective observational analysis from a tertiary centre.** *J Contemp Clin Pract.* 2025; 11(5):804-9.
7. Sharma M, Gupta AK, Gupta J, Thakur DVS. **Study on association between gallstone size and pancreatitis.** *Int J Curr Adv Res.* 2019; 08(04):18194-97.
8. Mallick B, Anand AC. **Gallstone disease in cirrhosis—pathogenesis and management.** *Journal of Clinical and Experimental Hepatology.* 2022 Mar 1; 12(2):551-9.
9. Shabanzadeh DM, Sørensen LT, Jørgensen T. **A prediction rule for risk stratification of incidentally discovered gallstones: Results from a large cohort study.** *Gastroenterology.* 2016; 150:156-67.e1.
10. Doherty G, Manktelow M, Skelly B, Gillespie P, Bjourson AJ, Watterson S. **The need for standardizing diagnosis, treatment and clinical care of cholecystitis and biliary colic in gallbladder disease.** *Medicina.* 2022 Mar 5; 58(3):388.
11. Chen J, Gao Q, Huang X, Wang Y. **Prognostic clinical indexes for prediction of acute gangrenous cholecystitis and acute purulent cholecystitis.** *BMC Gastroenterology.* 2022 Nov 28; 22(1):491.
12. Lee YS, Kang BK, Hwang IK, Kim J, Hwang JH. **Long-term outcomes of symptomatic gallbladder sludge.** *J Clin Gastroenterol.* 2015; 49:594-8.
13. Hill PA, Harris RD. **Clinical importance and natural history of biliary sludge in outpatients.** *J Ultrasound Med.* 2016; 35:605-10.
14. Leonhard SE, Papri N, Querol L, Rinaldi S, Shahrizaila N, Jacobs BC. **Guillain–Barré syndrome.** *Nature Reviews Disease Primers.* 2024 Dec 19; 10(1):97.
15. Fugazzola P, Podda M, Tian BW, Cobiainchi L, Ansaloni L, Catena F. **Clinical update on acute cholecystitis and biliary pancreatitis: Between certainties and grey areas.** *EClinicalMedicine.* 2024 Nov 1; 77.
16. Sebghatollahi V, Parsa M, Minakari M, Azadbakht S. **A clinician’s guide to gallstones and common bile duct (CBD): A study protocol for a systematic review and evidence-based recommendations.** *Health Science Reports.* 2023 Sep; 6(9):e1555.
17. Narang G, Moore J, Wymer K, Chang YH, Lim E, Adeleye O, et al. **Effect of cannabidiol oil on post-ureteroscopy pain for urinary calculi: A randomized, double-blind, placebo-controlled trial.** *The Journal of urology.* 2023 Apr; 209(4):726-33.
18. MacCormick A, Jenkins P, Gafoor N, Chan D. **Percutaneous transcystic removal of gallbladder and common bile duct stones: A narrative review.** *Acta Radiologica.* 2022 May; 63(5):571-6.
19. Mohseni S, Bass GA, Forssten MP, Casas IM, Martin M, Davis KA, et al. **Common bile duct stones management: A network meta-analysis.** *Journal of Trauma and Acute Care Surgery.* 2022 Nov 1; 93(5):e155-65.
20. Benjaminov F, Yassin S, Stein A, Naftali T, Konikoff FM. **Presence of small and multiple gallstones increases the risk of biliary complications.** *International Journal of Gastrointestinal Intervention.* 2024 Apr 30; 13(2):37-40.

21. Rajpal Meena DJ, Meena V, Meena S. **Prospective and retrospective clinical study and management of obstructive jaundice.** International Journal of Medical and Pharmaceutical Research. 2025 Oct 2; 6:1001-7.
22. Mederos MA, Reber HA, Girgis MD. **Acute pancreatitis: A review.** Jama. 2021 Jan 26; 325(4):382-90.
23. Miura F, Okamoto K, Takada T, Strasberg SM, Asbun HJ, Pitt HA, et al. **Tokyo Guidelines 2018: Initial management of acute biliary infection and flowchart for acute cholangitis.** J Hepatobiliary Pancreat Sci. 2018; 25:31-40.
24. Lamberts MP. **Indications of cholecystectomy in gallstone disease.** Curr Opin Gastroenterol. 2018; 34:97-102.
25. European Association for the Study of the Liver (EASL). **EASL Clinical Practice Guidelines on the prevention, diagnosis and treatment of gallstones.** J Hepatol. 2016; 65:146-81.
26. Ballouz T, Menges D, Anagnostopoulos A, Domenghino A, Aschmann HE, Frei A, et al. **Recovery and symptom trajectories up to two years after SARS-CoV-2 infection: Population based, longitudinal cohort study.** BMJ. 2023 May 31; 381.
27. Lamberts MP, Lugtenberg M, Rovers MM, Roukema AJ, Drenth JP, Westert GP, et al. **Persistent and de novo symptoms after cholecystectomy: A systematic review of cholecystectomy effectiveness.** Surg Endosc. 2013; 27:709-18.

AUTHORSHIP AND CONTRIBUTION DECLARATION

1	Muhammad Hassan Saeed: Data collection, data entry.
2	Muhammad Dilawaiz Mujahid: Proofreading, critical review.
3	Muhammad Hasan Saeed: Data collection.
4	Hamid Raza: Data entry.
5	Memoona Aslam: Data analysis.