ORIGINAL ARTICLE

# CHARACTERIZATION OF CYSTIC PANCREATIC LESIONS ON EUS, A SINGLE CENTRE EXPERIENCE

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**Background:** Pancreatic cystic lesions are increasingly diagnosed these days due to better imaging techniques. It is important to detect the lesions and perform a detailed analysis as some of them are potentially malignant. **Methods:** From April 2023 to September 2023, all patients with recurrent and/ or persistent abdominal pain lasting for more than a week were assessed in the gastroenterology department of Pak-Emirates military hospital, Rawalpindi. Detailed history and examination was done. Relevant laboratory tests and an ultrasound abdomen were also carried out. Those with pancreatic lesions on ultrasound abdomen underwent EUS (endoscopic ultrasound). Amongst those undergoing EUS, 88 patients were found to have cystic pancreatic lesions. These 88 patients underwent detailed assessment with EUS-FNA (endoscopic ultrasound – fine needle aspiration) so that these pancreatic cysts could be characterized. Only some of the patients undergoing EUS-FNA had one or more of the worrisome features (solid component within the cyst, main pancreatic duct >5 mm in size, symptoms related to the cyst, family history of pancreatic cancer), and later underwent surgical resection. EUS was done with the patient in the left lateral decubitus position under intravenous sedation with midazolam. During the procedure, the patient was monitored using the cardiac monitor. Images of the pancreas, gallbladder and bile tree were obtained with the echoendoscope in the stomach and duodenum. Informed consent for the study and the endoscopic procedure was obtained from all patients. The study protocol was approved by the hospital ethics committee. **Results:** The study population included 50 females and 38 males. Many of these patients had one or more episodes of pancreatitis in the recent past. Most cystic lesions were found in the pancreatic body. The largest number of lesions were due to pancreatic pseudocysts. EUS was performed successfully in all patients. Findings have been summarised in the table according to gender. **Conclusion:** Identifying pancreatic cystic neoplasms is important since some have malignant potential. In that regard, EUS-FNA is a useful diagnostic modality and it can influence the management plan.

**Keywords:** Pancreatic cystic lesions; EUS; EUS-FNA

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## INTRODUCTION

Pancreatic cystic lesions (PCLs) are increasingly detected nowadays, due to the growing use of imaging techniques.[1] A multidisciplinary approach that combines radiological imaging, endoscopic ultrasound (EUS), cytology, cyst fluid analysis, and molecular profiling is the most effective method for diagnosing and risk-stratifying PCLs.[2–5] To differentiate most PCLs, a combination of clinical history, gender, imaging characteristics, cytology, and cyst fluid analyses is typically employed. However, assessing malignancy risk remains a crucial aspect of the diagnostic process.[6]

Recent surgical series on PCLs indicate that frequently resected PCLs are mucinous neoplasms, with intraductal papillary mucinous neoplasms (IPMNs) accounting for about 45% of all resected PCLs, and mucinous cystic neoplasms (MCN) comprising 16%. Among the non-mucinous neoplasms, serous cystic neoplasms (SCN) represent 16%, cystic neuroendocrine tumours (cNET) make up 5%, and solid pseudopapillary neoplasms (SPN) account for 3%.[7] EUS fine-needle aspiration (EUS-FNA) has been introduced to enhance the diagnostic accuracy and management of indeterminate PCLs by providing rapid acquisition of imaging of the internal structures of the lesions.[8] The diagnostic efficiency and accuracy of EUS imaging varies, ranging from 40–96%.[9]

The objective was to analyze pancreatic cyst cases, assessing age, gender, symptoms, cyst location,

diagnosis, laboratory parameters, and histological outcomes**.**

## MATERIAL AND METHODS

From April 2023 to January 2024, we conducted an assessment which included a detailed medical history and physical examination of patients presenting with recurrent or persistent abdominal pain lasting for more than a week within the Gastroenterology department. Additionally, relevant laboratory tests and abdominal ultrasounds were conducted. Those individuals with pancreatic abnormalities on the ultrasound underwent a procedure called EUS. Among those who underwent EUS, we identified 88 patients with cystic pancreatic lesions. a thorough examination was conducted on these 88 patients using EUS-FNA to determine the malignancy or pre-malignancy of the pancreatic cysts. The EUS procedure was carried out by various operators of equivalent expertise, with patients positioned on their left side and administered intravenous sedation comprising midazolam and propofol. A 22-gauge FNA needle was employed for the assessment. Throughout the procedure, patients were monitored using a cardiac monitor. Images of the pancreas, gallbladder, and bile ducts were obtained using an echoendoscope inserted into the stomach and duodenum. Only a subset of the patients who underwent EUS-FNA exhibited specific concerning characteristics (such as a solid component in the cyst, a main pancreatic duct exceeding 5 mm in size, cyst-related symptoms, or a positive family history of pancreatic cancer). Individuals with cysts exhibiting malignant potential underwent assessments to rule out malignancies. Timely surgery is deemed curative in such cases, except pseudocysts. Patients identified with malignant potential were selected for surgical resection, while benign cysts did not require excision.

The study included individuals with cystic lesions both within and outside the pancreas. Patients with pancreatic cysts smaller than 1.5 cm in size, those with symptoms persisting for less than 4 weeks after an episode of acute pancreatitis, and individuals under 12 years of age were excluded from the study.

All patients provided informed consent for both the study and the endoscopic procedure. The study protocol received approval from the hospital's ethics committee.

## RESULTS

The case series comprised 88 patients, encompassing 50 females and 38 males, with a mean age of 47 years. A significant portion of these individuals, approximately 22% had a history of pancreatitis. Meanwhile, the remaining patients exhibited a range of symptoms such as abdominal pain, fever (indicative of infected pancreatic fluid collections), nausea, vomiting, gastric outlet obstruction, jaundice, early satiety, pancreatic insufficiency leading to steatorrhea, abdominal pain, pancreatic insufficiency associated with diabetes mellitus (endocrine insufficiency). Additionally, one patient was incidentally diagnosed, and only 1% of the cases were related to malignancy. Most cystic lesions were located in the body of the pancreas (35%) The predominant pathological diagnoses were as follows: Pancreatic Pseudocyst (46%), serous cystic tumour (16%), Walled-off pancreatic necrosis (15%), Main-duct intraductal papillary mucinous neoplasm (4%), Mucinous neoplasm and Branch-duct intraductal papillary mucinous neoplasm (3%), and cystic neoplasm (23%), with an inconclusive diagnosis observed in 1% of cases based on EUS Imaging.

Whereas, upon histological examination, resection was not conducted in 64% of cases, and Pseudocyst cases were the most prevalent here as well, accounting for 5% of cases, following serous and Main-duct intraductal papillary mucinous neoplasm, each at 4%. Additionally, mucinous neoplasm was 3% leaving Solid pseudopapillary neoplasm and branch-duct intraductal papillary mucinous neoplasm identified in 2% of cases based on histological diagnosis.

Regarding imaging characteristics, the observations were as follows: 44% displayed a well-circumscribed extra-pancreatic structure with a homogenous fluid density, 11% exhibited intra-pancreatic lesions with heterogeneous fluid collections characterized by liquid and non-liquid densities, microcystic or honeycomb and central scar/sunburst calcifications were observed in 9% of cases. Other findings included a dilated (>5 mm) main pancreatic duct with parenchymal atrophy, dilated pancreatic duct branches, and solid components within the cyst, each present in 4% of cases. A microcystic or honeycomb appearance was noted in 3% of cases, while an oligocystic appearance and solid and cystic masses without calcifications were found in 2% of cases. Finally, 1% of cases displayed an oligocystic appearance along with solid and cystic masses with calcifications.

Moreover, results from EUS-FNA demonstrated that 73% of specimens were paucicellular, while 8% contained glycogen-containing cells, and 7% contained mucin-containing cells. Among 88 patients, 22% of Pancreatic lesions were resected, and 21% were kept on surveillance imaging. Whereas some Patients had undergone Endoscopic and Percutaneous drainage constituting 24% and 12% respectively. Only 9 patients were left with no surveillance or additional evaluation done.

## DISCUSSION

This Prospective case series represents the single institution-based case series of cystic neoplasm of the pancreas. Cystic pancreatic neoplasms are currently being identified more frequently than in the past, with the majority of these diagnoses occurring as an unexpected discovery during evaluations for unrelated medical issues. Over time, there has been a significant shift in the approach and management of patients with pancreatic cysts, highlighting the growing utilization of EUS and FNA, as evidenced by our study findings. A study conducted over 15 years revealed a substantial rise in the utilization of EUS/FNA techniques, coupled with a simultaneous decline in the proportion of patients presenting with symptoms.[10]

Studies have shown that Mucin-producing neoplasms were most common, Whereas, intraductal papillary mucinous neoplasm (IPMN) is the most frequent neoplasm followed by MCN in patients.[11] Whereas in our case series, most of the patients were diagnosed with Pancreatic pseudocyst constitutes 48% of all cases followed by serous cystic tumour (15%) of all cases. According to studies conducted at major academic centres, there is a growing trend of incidentally diagnosing pancreatic cystic neoplasms.[12,13] In contrast, in our cases, only one patient was incidentally diagnosed in a minor academic centre from Underdeveloped countries. The general occurrence rate of pancreatic pseudocysts is minimal, typically ranging from 0.5 to 1 case per 100,000 adults annually[14] making them very rare and therefore worth discussing and presenting. The primary and commonly applied therapeutic use of EUS for pancreatic cystic lesions is the drainage of pseudocysts due to their less invasiveness and complications.[15] In our case, most patients have undergone EUS drainage of the cysts 24% followed by Resections and percutaneous drainage. In summary, the use of EUS along with imaging and histology can help diagnose patients with pancreatic cysts reducing the chances of incidental findings for better prognosis and lesser mortality. Pancreatic Pseudocysts should be kept in view while diagnosing patients with different symptoms.

## AUTHORS' CONTRIBUTION

FRK: Data collection and writing. RSAK: Data collection and analysis. EH: Study design and data collection. FAS: Literature search. MMHN: Data interpretation. Salahuddin: Data collection. ZRK: Writing and proofreading.

## REFERENCES


1. Tanaka M, Fernández-del Castillo C, Kamisawa T, Jang JY, Levy P, Ohtsuka T, *et al*. Revisions of international consensus Fukuoka guidelines for the management of IPMN of the pancreas. Pancreatology 2017;17(5):738–53.
2. Ardeshna DR, Cao T, Rodgers B, Onongaya C, Jones D, Chen W, *et al*. Recent advances in the diagnostic evaluation of pancreatic cystic lesions. World J Gastroenterol 2022;28(6):624–34.
3. Buerlein RCD, Shami VM. Management of pancreatic cysts and guidelines: what the gastroenterologist needs to know. Ther Adv Gastrointest Endosc 2021;14:26317745211045769.
4. Kim HS, Jang JY. Management Algorithms for Pancreatic Cystic Neoplasms. Arch Pathol Lab Med 2022;146(3):322–9.
5. Turner RC, Melnychuk JT, Chen W, Jones D, Krishna SG. Molecular Analysis of Pancreatic Cyst Fluid for the Management of Intraductal Papillary Mucinous Neoplasms. Diagnostics 2022;12(11):2573.
6. Chen W, Ahmed N, Krishna SG. Pancreatic Cystic Lesions: A Focused Review on Cyst Clinicopathological Features and Advanced Diagnostics. Diagnostics 2022;13(1):65.
7. Esposito I, Haeberle L. Nonmucinous Cystic Lesions of the Pancreas. Arch Pathol Lab Med 2022;146(3):312–21.
8. Chauhan SS, Abu Dayyeh BK, Bhat YM, Gottlieb KT, Hwang JH, Komanduri S, *et al*. Confocal laser endomicroscopy. Gastrointest Endosc 2014;80(6):928–38.
9. Lévy P, Rebours V. The Role of Endoscopic Ultrasound in the Diagnosis of Cystic Lesions of the Pancreas. Visc Med 2018;34(3):191–5.
10. Gaujoux S, Brennan MF, Gonen M, D'Angelica MI, DeMatteo R, Fong Y, *et al*. Cystic Lesions of the Pancreas: Changes in the Presentation and Management of 1,424 Patients at a Single Institution over a 15-Year Time Period. J Am Coll Surg 2011;212(4):590–600.
11. Valsangkar NP, Morales-Oyarvide V, Thayer SP, Ferrone CR, Wargo JA, Warshaw AL, *et al*. 851 resected cystic tumours of the pancreas: A 33-year experience at the Massachusetts General Hospital. Surgery 2012;152(3):S4–12.
12. Walsh RM, Vogt DP, Henderson JM, Hirose K, Mason T, Bencsath K, *et al*. Management of suspected pancreatic cystic neoplasms based on cyst size. Surgery 2008;144(4):677–85.
13. Spinelli KS, Fromwiller TE, Daniel RA, Kiely JM, Nakeeb A, Komorowski RA, *et al*. Cystic Pancreatic Neoplasms. Ann Surg 2004;239(5):651–9.
14. Misra D, Sood T. Pancreatic Pseudocyst. 2023. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024.
15. Seewald S, Ang TL, Teng KCYK, Soehendra N. EUS-guided drainage of pancreatic pseudocysts, abscesses and infected necrosis. Dig Endosc 2009;21(Suppl 1):61–5.



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