

The Study of Clinical Profile and Role of Endoscopic Ultrasonography in Chronic Pancreatitis Patients

MD. Ashif Ali Ahmed¹, Bashar Imam Ahmad², Mohammad Zakiuddin³

¹Assistant Professor, Department of General Medicine & In-Charge, Gastroenterology Unit, I.Q City Medical College and Hospital, Durgapur, West Bengal, India

²Professor, Department of General Medicine, I.Q City Medical College and Hospital, Durgapur, West Bengal, India

³Professor & HOD, Department of Physiology, Madhubani Medical College, Madhubani, Bihar, India

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Corresponding Author: Dr. Mohammad Zakiuddin

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Abstract

Background: Endoscopic ultrasound (EUS) provides high-resolution images of both pancreatic parenchyma and duct and therefore is an integral component of evaluating and treating patients with pancreatitis and its complications.

Aims and Objective: To study the clinical profile and its role of endoscopic ultrasonography in chronic pancreatitis patients.

Materials and Methods: A cross-sectional observational study was conducted which included the patients admitted in tertiary care centre presenting with clinical diagnosis of chronic pancreatitis. The study was conducted over period of one year from April 2023 to March 2024 after approving the ethical committee approval in the department of gastroenterology of I.Q City Medical College, Durgapur, West-Bengal. A total sample size of 71 patients was included. Cases of chronic pancreatitis of both genders were enrolled in the study with the written consent. Ethical approval for the study was obtained, and a detailed history such as family history, alcohol consumption, and presence and severity of abdominal pain was recorded. All the patients were subjected to a thorough clinical examination, routine hematologic and biochemical investigations and abdominal ultrasonography. Parameters such as age, sex, abdominal symptoms, serum CEA were recorded. The diagnosis of chronic pancreatitis was established if there was evidence of pancreatic calcification on abdominal ultrasonography.

Results: Maximum cases were seen in age group 21-35 years (males- 27, females- 16) followed by 36-50 years (males- 15, females- 13). Common clinical findings were pain in 57, calcification in 11, diarrhea in 34, jaundice in 22, lump in 17, vomiting in 38 and GI bleed in 31. A significant difference was observed ($P < 0.05$). Parenchymal features were hyperechoic foci with shadowing in 60, lobularity with honeycombing in 54, hyperechoic foci without shadowing in 36, stranding (Minor): hyperechoic lines ≥ 3 mm in length in 48. Ductal features were main pancreatic duct (MPD) calculi in 71, irregular MPD contour in 23, dilated side branches in 15, main pancreatic duct dilatation in 38 and hyper echoic duct margin in 44. A non- significant difference was observed ($P > 0.05$).

Conclusion: Endoscopic ultrasound is the most sensitive imaging modality for diagnosing pancreatic disorders; it can demonstrate subtle alterations in the pancreatic parenchymal and ductal structure even before traditional imaging and functional testing demonstrate any abnormality.

Keywords: Endoscopic Ultrasonography, Diagnostic, Therapeutic and Chronic Pancreatitis.

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Introduction

Chronic pancreatitis (CP) is an inflammatory process characterized by destruction of pancreatic parenchyma and ductal structures with formation of fibrosis. Pain is the predominant symptom of CP and its origin is multifactorial [1]. Treatment is directed toward control of symptoms and management of the structural complications. Medical therapies such as abstinence from alcohol,

dietary alterations, analgesics, oral enzyme supplements, and somatostatin analogs are variably effective in relieving pain. In patients for whom medical management fails, surgical and endoscopic options are available. Endoscopic therapy for CP was introduced more than a decade ago. Endoscopic therapy may reduce or eliminate the need for surgical procedures, may serve as a bridge

to surgery in poor operative candidates, and can predict the response to surgical therapy [2]. If endoscopic therapy is unsuccessful, surgical therapy is still a potential option for most patients. In general, the aim of endoscopic therapy in patients with CP is to alleviate outflow obstruction of the pancreatic duct (PD) or the common bile duct. Endoscopic management should be considered as one management option along with medical, percutaneous, and surgical treatments. This guideline will review the role of endoscopy in the management of CP.

Chronic pancreatitis is a progressive inflammatory disease leading to irreversible damage of the pancreas with resultant exocrine and endocrine insufficiency. Abdominal pain is one of the most distressing symptoms of chronic pancreatitis and leads to significant impairment of quality of life [1]. Steatorrhea and diabetes mellitus develop in the long term [2]. Though the disease is well characterized in adults, there is limited data in children and adolescents; and most of the reported series include small number of subjects [3-5]. We conducted this study to evaluate the etiology, clinical presentation, complications and management of chronic pancreatitis in children. Endoscopic ultrasound (EUS) has been used for the diagnosis of chronic pancreatitis (CP) for over two decades. Its primary attribute is its ability to detect mild parenchymal and ductal abnormalities not seen with computed tomography (CT) scans [1]. EUS is of most use in patients with abdominal pain of suspected pancreatic origin and non-diagnostic cross-sectional imaging. In a report entitled "Minimal change chronic pancreatitis.[2]. The pancreas is well assessed by EUS due to the method's high resolution and the proximity of the transducer to the pancreas with the possibility of avoiding air in the gut [3]. In patients with CP, EUS was performed initially for diagnosis, then for differential diagnosis, and later for therapeutic purpose.[4] Clinical experience suggests that evidence of chronic pancreatitis (CP) is frequently identified in the background pancreatic parenchyma of IPMN patients by EUS (EUS-CP findings). CP is a well-known risk factor for pancreatic malignancy, including pancreatic ductal adenocarcinoma. However, the relationship between malignant transformation of IPMNs and pathological changes of the pancreatic parenchyma, such as atrophy, inflammation, and fibrosis, remains unclear [5] Walsh described 16 patients with typical pancreatic pain and negative or equivocal CT and endoscopic retrograde cholangiopancreatography (ERCP) images [6] All patients underwent pancreatic resection due to a strong suspicion of CP. Despite its advantage of assessing the pancreas at very close range, EUS, being operator dependent, is still imperfect in establishing the diagnosis of chronic pancreatitis [7]. The various pathological aspects of the disease are

shown as different EUS features, and the same importance for diagnosis has been attributed to all of them. There have been several attempts to define the disease on ductal and parenchymal criteria, initially embracing 11 criteria [8]. Considering this, the present study aimed at ultrasonography assessing findings pancreatitis patients.

Imaging the Pancreas by EUS: Pancreas can be imaged well both by the radial scanning echoendoscope or the linear scanning echoendoscope. For diagnostic purposes, either of the two is sufficient and provides excellent imaging of the pancreas and its adjacent structures. In addition to imaging the pancreas, one often needs to examine the biliary system not only due to their intricate anatomical relationship, but also because either a biliary pathology is the cause of pancreatitis or vice versa. The various parts of the pancreas, i.e., the head, uncinate process, genu, body and tail can be imaged from different locations in the stomach and duodenum (also termed as imaging stations). EUS has the ability to image both parenchymal and the ductal changes in the pancreas, which aid in arriving at a diagnosis. Peripancreatic changes might be of importance too. The head of the pancreas is most frequently involved in pancreatic pathologies be it pancreatitis or cancer. It can be imaged well from the duodenal bulb. While using the radial echoendoscope as the scope is introduced into the duodenal bulb, the pancreatic head is visualized between the scope and the portal vein on the left side of the screen from 6 O' clock to 11 O' clock position.

Aims and Objective: To study the clinical profile and its role of endoscopic ultrasonography in chronic pancreatitis patients.

Material and Methods

Seventy-one cases of chronic pancreatitis of both genders were enrolled in the study. Enrolment of all patients into the study was done with the written consent. Ethical approval for the study was obtained from the institutional ethical committee from April 2023 to March 2024 after approving the ethical committee approval in the department of gastroenterology of I.Q City Medical College, Durgapur, West-Bengal. A detailed history such as family history, alcohol consumption, and presence and severity of abdominal pain was recorded. All the patients were subjected to a thorough clinical examination, routine hematologic and biochemical investigations and abdominal ultrasonography. Parameters such as age, sex, abdominal symptoms, serum CEA (10 mm) were recorded. Abdominal symptoms were defined as including abdominal or back pain/discomfort, weight loss, appetite loss, and jaundice. The diagnosis of chronic pancreatitis was established if there was evidence of pancreatic calcification on abdominal ultrasonography. The patients with ICP were divided into early-onset and late-onset ICP depending on the age of onset of

symptoms. Results of the present study after recording all relevant data were subjected for statistical inferences using chi-square test. The level of significance was significant if p value is below 0.05 and highly significant if it is less than 0.01.

Method of Study: A cross-sectional observational study.

Study Period: April 2023 to March 2024.

Inclusion Criteria: Patients are generally included if they meet clinical, radiological, or functional indicators of chronic pancreatitis:

- **Age and consent:** Adult patients (usually ≥ 21 years) who provide written informed consent for the procedure.
- **Clinical Presentation:** Repeated episodes of upper abdominal or epigastric pain, weight loss, chronic diarrhea and/or back pain consistent with pancreatic origin or suspected pancreatic exocrine insufficiency.
- **Imaging Findings/Evidence:** Presence of characteristic features on conventional imaging with evidence of chronic pancreatitis on CT, MRI, or abdominal ultrasound. e.g., pancreatic calcifications and or pancreatic ductal dilation on CT
- **Functional Abnormalities:** Documented abnormal pancreatic enzyme levels (serum or urine) or impaired pancreatic exocrine function.
- **Risk Factors:** History of heavy alcohol intake (typically $>60-80$ g/day)
- **EUS Indication:** Patients undergoing EUS for suspected, indeterminate, or suspected early-stage chronic pancreatitis, often based on specific criteria like parenchymal/ductal changes.

Exclusion Criteria

- **Acute Pancreatitis:** Patients with acute pancreatitis within the past 6 months.

- **Pancreatic Malignancy:** Known or suspected pancreatic cancer, which may mimic CP
- **High-Risk Acute Conditions:** Severe acute exacerbation of pancreatitis or complications requiring immediate, different interventions.
- **Contraindications to EUS:** Severe cardiovascular disease, inability to tolerate endoscopy/sedation, coagulopathy, or pregnancy.
- **Prior Surgery:** Previous pancreatic resection, which alters pancreatic anatomy.
- **Commonly Evaluated EUS Features (Study Focus)**
- **Parenchymal changes:** Hyperechoic foci, lobularity, stranding, and cysts.
- **Ductal changes:** Hyperechoic duct wall, irregular duct margin, dilated main pancreatic duct, and visible side branches.

Statistical Analysis: It was performed using SPSS 16.0. All measurements were expressed as mean \pm SD. Continuous variables were compared using Student's t-test. p value of < 0.05 was considered statistically significant.

Results

Maximum cases were seen in age group 21-35 years (males- 27, females- 16) followed by 36-50 years (males- 15, females- 13). Common clinical findings were pain in 57, calcification in 11, diarrhea in 34, jaundice in 22, lump in 17, vomiting in 38 and GI bleed in 31. A significant difference was observed ($P < 0.05$). Parenchymal features were hyperechoic foci with shadowing in 60, lobularity with honeycombing in 54, hyperechoic foci without shadowing in 36, stranding (Minor): hyperechoic lines ≥ 3 mm in length in 48. Ductal features were main pancreatic duct (MPD) calculi in 71, irregular MPD contour in 23, dilated side branches in 15, main pancreatic duct dilatation in 38 and hyperechoic duct margin in 44. A non-significant difference was observed ($P > 0.05$).

Table 1: Age and Gender Distribution

Age groups (Years)	Male	Female	Total
21-35	27	16	43
36-50	15	13	28
Total	42	29	71

Maximum cases were seen in age group of 21-35 years (Males-27, females-16) followed by 36-50 years (Males-15, females-13).

Table 2: Assessment of clinical features

Clinical features	Number	p value
Pain	57	< 0.05
Calcification	11	
Diarrhea	34	
Jaundice	22	
Lump	17	
Vomiting	38	
GI bleed	30	

Common clinical findings were pain in 58, calcification in 12, diarrhea in 35, jaundice in 23, lump in 17, vomiting in 40 and GI bleed in 32. A significant difference was observed ($P < 0.05$).

Discussion

Chronic pancreatitis is characterized by irreversible damage to the pancreas that eventually leads to pain and/or exocrine and endocrine insufficiency [9]. It is a major health problem worldwide and is associated with considerable morbidity. In spite of a large number of reports on chronic pancreatitis, it remains a fascinating process of uncertain pathogenesis, unpredictable clinical course, and unclear treatment.[10] Although alcohol is an important cause of chronic pancreatitis, in a large proportion of patients with chronic pancreatitis, no etiology can be identified, and they are labeled as having idiopathic chronic pancreatitis (ICP)[11].

The present study aimed at assessing endoscopic ultrasonography findings in chronic pancreatitis patients.

Conclusion

Endoscopic ultrasound is the most sensitive imaging modality for diagnosing pancreatic disorders; it can demonstrate subtle alterations in the pancreatic parenchymal and ductal structure even before traditional imaging and functional testing demonstrate any abnormality.

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