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Case Report

# Contrast-Enhanced Endoscopic Ultrasound Guided Fine Needle Aspiration for the Diagnosis of Pancreatic Carcinoma: A Case Report

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## 1. Abstract

The evaluation of pancreatic head lesions poses a great challenge for gastroenterologists. We report a case of pancreatic carcinoma in a 62-year-old man, who presented with a history of intermittent abdominal pain for one month. Due to its nonspecific clinical presentation and imaging features of CT, MRI and endoscopic ultrasound (EUS), diagnosis of pancreatic carcinoma in this patient is challenging. The diagnosis was confirmed by the combination of contrast-enhanced endoscopic ultrasound (CE-EUS) and endoscopic ultrasound-guided fine needle aspiration (EUS-FNA). This case report highlights the diagnostic dilemma of pancreatic head lesions and emphasizes the significance of CE-EUS, and the value of EUS-FNA as a tool for diagnosis confirmation.

**2. Keywords:** Pancreatic carcinoma; Contrast-enhanced endoscopic ultrasound; Endoscopic ultrasound-guided fine needle aspiration

## 3. Introduction

The evaluation of pancreatic head lesions, especially the differential diagnosis of pancreatic carcinoma and IgG4-related pancreatitis, poses a great challenge for gastroenterologists and endoscopists alike. Pancreatic carcinoma is a severe malignance with main presentation of abdominal pain, marasmus, jaundice and dyspepsia. The typical features of pancreatic carcinoma are low density masses in CT image and slightly low signal intensity on T1 weighted image (TIWI), slightly high signal intensity on T2 weighted image (T2WI) in MRI image. Acquisition of a tissue sample by endoscopic ultrasound-guided fine needle aspiration (EUS-FNA) is very important to distinguish pancreatic carcinoma from benign causes [1]. In most pancreatic carcinoma cases, endoscopic ultrasound (EUS) shows a mass with heterogeneous hypoecho. However, some lesions do not show those typical manifestations and the boundary between the lesion and normal tissue is not clear. In those cases, the recognition of puncture site is demanding. Contrast-enhanced endoscopic ultrasound (CE-EUS), which identify the differences in blood flow patterns, can be proposed as an effective method for better targeting of the pancreatic lesion [2].

## 4. Case Description

A 62-year-old male, with a BMI of 18.25 kg/m$^2$, was admitted to the gastroenterology ward with a month history of intermittent abdominal pain mainly under the xiphoid. Other gastrointestinal symptoms and medication history was denied. Vital signs were stable and clinical examination was negative. Most laboratory assessments were unremarkable, with the normal level of aspartate transaminase (AST), glutamic-pyruvic transaminase (ALT), alkaline phosphatase (ALP), γ-glutamyl transpeptidase (GGT), bilirubin, IgG4 and CA199. Abdominal enhancement CT (Figure 1A, B) and MRI scan (Figure 1C, D) documented a plump pancreas, inhomogeneous enhancement of the pancreatic body, tail and part of head, accompanied with pancreatic ductdilation.

Conventional EUS showed a significantly dilation of pancreatic duct and the continuity of the

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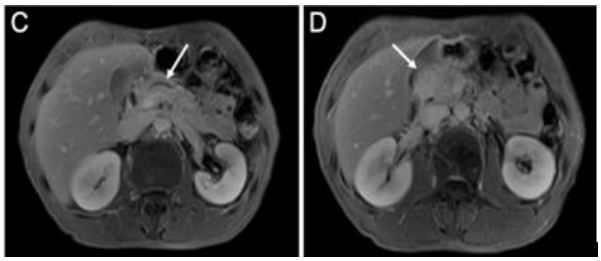
pancreatic duct was compromised in pancreatic head (Figure 2A). The pancreatic head presented as heterogeneous equal echo and no obvious hypoechoic area was detected (Figure 2B), which made it difficult to locate the puncture point accurately. CE-EUS was further processed, and we observed a 1.2*1.2 cm round-like hypo-vascular area with an irregular margin (Figure 2C). 5 needle passes of FNA was then performed under the guidance of CE-EUS and pancreatic adenocarcinoma was finally confirmed based on the histological and immunohistochemistry (IHC) results (Figure 2D, E, F).


**Figure 1A, B:** Contrast enhanced abdominal CT and MRI scan. The pancreatic duct dilation (A, white arrow) and a plump pancreas (B) were observed at contrast enhanced abdominal CT.




**(Figure 1C, D):** Similarly, MRI scan showed a dilated pancreatic duct (C, white arrow) and a swelling pancreas (D, white arrow).

**Figure 2A:** Conventional EUS/CE-EUS and pathological result. Conventional EUS showed the pancreatic duct dilation (A, white arrow).

**Figure 2B:** A heterogeneous equal echoic area without clear margin at the pancreatic head (B).

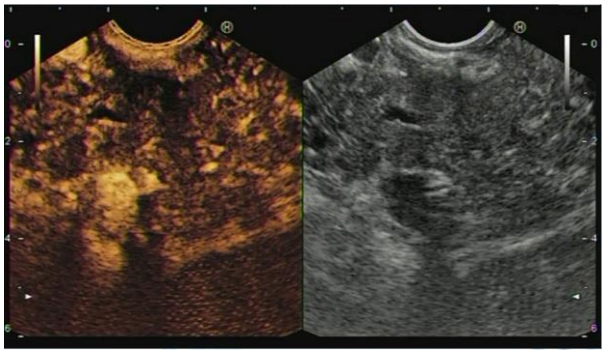
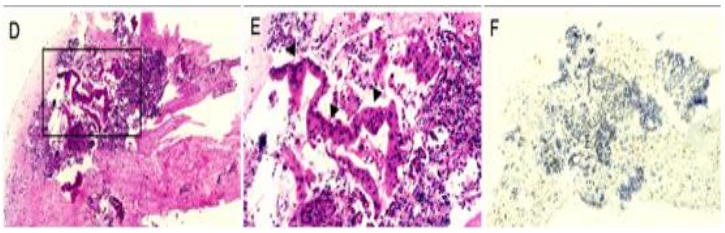


**Figure 2C:** While a round-like area with hypo-vascular and irregular margin was visible under CE-EUS (C).




**(Figure 2D, E, F):** H&E staining showed some heteromorphic cells surrounded by normal pancreatic tissue (D, E, black arrow) and the heteromorphic cells were negative for DPC-4 in IHC (F).

## 5. Discussion

The most common causes of pancreatic head lesions are IgG4 related pancreatitis and pancreatic adenocarcinomas. Treatment and prognosis of these two diseases are obviously different, and early diagnosis is of great importance for subsequent therapeutic decision. Evaluation of pancreatic head lesions, however, is a common clinical challenge. The differential diagnosis is mainly based on the combination of clinical manifestations, imaging features, laboratory tests and histopathological examination, among which pathological diagnosis is the gold standard [3, 4].

Hitherto, EUS-FNA is still the most sensitive and effective method available for sample acquisition of pancreatic lesions, especially for those with small sizes [5, 6]. In most cases, pancreatic adenocarcinomas present as an irregular and heterogeneous hypoechoic mass with indistinct boundary under EUS. In some rare cases as we reported, a hypoechoic mass was not detected under conventional EUS, and the recognition of tumor location and puncture site is relatively difficult.

CE-EUS enables qualitative and quantitative assessment of the lesion based on real-time perfusion imaging and may provide more information for the clinical diagnosis and the targeted puncture. Previous studies indicated that CE-EUS could present pancreatic head tumors as hypo-enhanced lesions, with sensitivity and specificity of 88% and 94%, respectively [7]. Another study suggested that EUS-FNA under CE-EUS can significantly improve the diagnostic accuracy of pancreatic diseases to 94% [8]. Besides, the presence of CE-EUS allows adequate biopsy specimens with fewer needle passes [9]. In the present case, the lesion presents as a hypo-enhanced mass under CE-EUS. CE-EUS guided FNA was performed and a diagnosis of

pancreatic adenocarcinoma was made based on the histological and IHC results.

## 6. Conclusion

CE-EUS guided FNA is an effective option for suspected malignance of pancreatic lesions with atypical imaging features under conventional EUS.

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