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## Case Report

# Pancreatic cancer in patient with groove pancreatitis: Potential pitfalls in diagnosis<sup>☆,☆☆</sup>

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## ABSTRACT

Pancreatic cancer is among the leading causes of cancer death in the United States of America. Early detection and intervention are critical as a large majority of patients have either local or distant metastatic disease at the time of diagnosis. However, groove pancreatitis, a rare form of chronic pancreatitis, presents as a challenge for adequate and efficient differential diagnosis of pancreatic cancer as a result of similar clinical symptoms and imaging features. Furthermore, intraductal papillary mucinous neoplasms and pancreatic intraepithelial neoplasia are 2 of the precursor lesions that have been identified with pancreatic ductal adenocarcinoma. Intraductal papillary mucinous neoplasms are cystic tumors of the pancreas characterized by excessive mucin production in either the main pancreatic duct or its branches. Conversely, pancreatic intraepithelial neoplasia are microscopic lesions in the smaller pancreatic ducts. In this article, we report the case of a 46-year-old male with a diagnosis of groove pancreatitis, main duct intraductal papillary mucinous neoplasm, and pancreatic intraepithelial neoplasia whose tumor was excised by means of a Whipple procedure. We focus on optimizing diagnosis and treatment through the application of radiological modalities.

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## Introduction

Pancreatic cancer was the third leading cause of cancer death in the United States in 2020 and, despite recent improvements, the 5-year survival rate is only 10% [1]. Early detection and intervention are crucial as the 5-year survival rate increases to

39% in cases where the cancer remains localized at the time of diagnosis [2]. Unfortunately, approximately 80% of diagnoses are rendered surgically inoperable due to patients' malignancies being locally advanced or having distant metastatic disease [3]. One potential pitfall in diagnosing pancreatic neoplasms is groove pancreatitis (GP). An uncommon form of chronic pancreatitis (CP), GP involves the area between the

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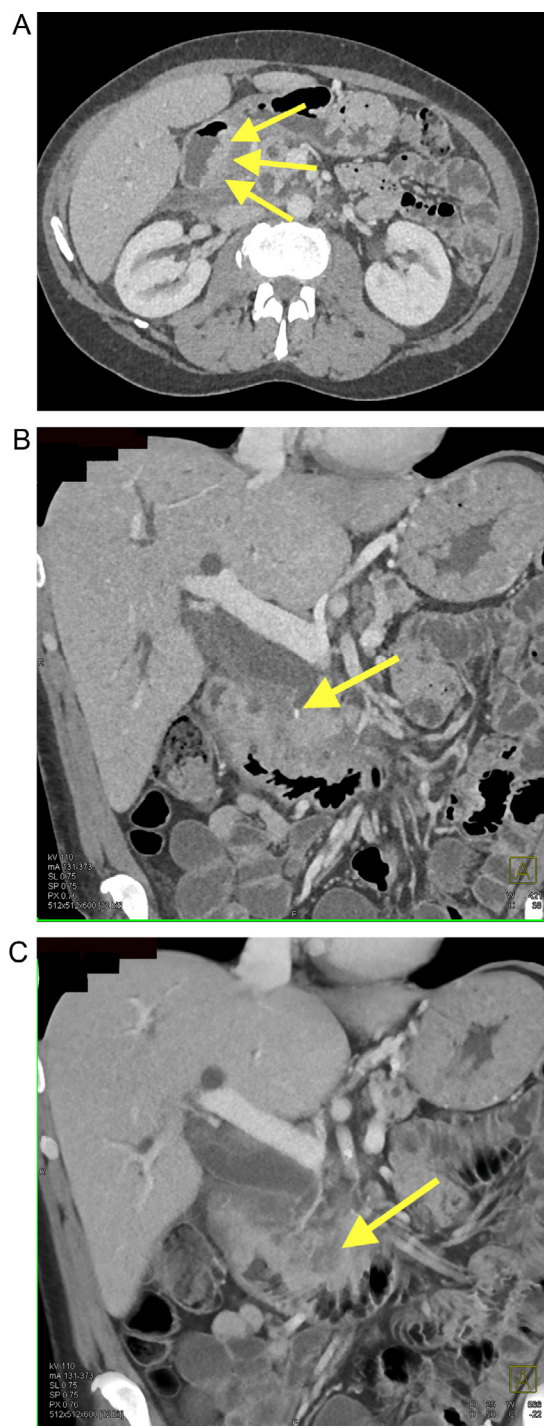
pancreatic head, the common bile duct, and the duodenum. It is characterized by pancreatic head enlargement, thickening of the duodenal wall, and narrowing of the common bile duct, all features that are also associated with pancreatic cancer [4]. Furthermore, there are 3 primary lesions associated with pancreatic cancer: pancreatic intraepithelial neoplasms (PanINs), intraductal papillary mucinous neoplasms (IPMNs), and mucinous cystic neoplasms (MCNs). PanINs are microscopic lesions, usually less than 5 mm, located in small intralobular pancreatic ducts. These lesions may be flat or papillary, with differing amounts of mucin. IPMNs are exocrine neoplasms that arise within the pancreatic ducts and are characterized by their excessive mucin production. These heterogeneous lesions are classified into 3 distinct subtypes: main duct (MD), branch duct (BD), and mixed type. Due to the potential overlap of GP and pancreatic ductal adenocarcinoma (PDAC), proper and early recognition, management, and surveillance are crucial [5–7].

### Case report

A 46-year-old male presented to his local hospital with acute pancreatitis. Despite a previous cholecystectomy, the patient suffered from constant postprandial abdominal pain with occasional jaundice. These episodes of pancreatitis were often exacerbated by the consumption of alcohol and specific foods. A computed tomography (CT) scan displayed an enlarged pancreatic head with adjacent inflammatory stranding and free fluid, consistent with groove pancreatitis. A follow-up endoscopic ultrasound-guided fine-needle aspiration (EUS-FNA) revealed a spindle cell neoplasm; however, a biopsy was non-diagnostic. The patient was eventually hospitalized for pancreatitis a few months later, and despite an esophagogastroduodenoscopy (EGD) showing a circumferential periampullary mass, a subsequent biopsy was once again negative. Imaging at the time demonstrated a dilated common duct and pancreatic duct with abrupt cutoff, and mass effect by the head of the pancreas, suspicious for GP. Ultimately, a repeat EGD highlighted a periampullary mass, the pathology of which resulted in gastric mucin cell metaplasia along with reactive changes. An ensuing CT scan displayed dilated common, intrahepatic, and pancreatic ducts extending to the ampulla, as well as circumferential wall thickening of the first through fourth portions of the duodenum, consistent with a periampullary mass (Fig. 1). After undergoing an endoscopic retrograde cholangiopancreatography (ERCP) to remove the patient's biliary obstruction, he underwent a Whipple procedure. Pathology revealed chronic pancreatitis, pancreatic MD IPMN with high grade dysplasia, and low-grade PanIN. Additionally, lymph nodes were negative for tumor.

### Discussion

This article reviews a case of pancreatic ductal adenocarcinoma with concurrent groove pancreatitis, and potential delayed diagnosis and management. PDAC was the third leading



**Fig. 1 – A.** Axial CT demonstrates the changes of groove pancreatitis with thickened duodenum and lobulations along the pancreas/duodenum interface (arrows). **B.** 3D coronal CT view demonstrates dilated common bile duct (CBD) stone near distal CBD (arrow). Lobulations along the interface between the duodenum and pancreas are consistent with groove pancreatitis. **C.** Coronal CT view of dilated common bile duct and low-density changes between duodenum and pancreas. Pancreatic cancer was found in the inferior aspect of the pancreatic head (arrow).

cause of cancer death in the United States in 2020, accounting for an estimated 8% of all cancer-related deaths [1]. Pancreatic cancer's low survival rate can be attributed to the difficulties associated with early identification as approximately 52% of patients have distant metastasis at the time of diagnosis [2]; therefore, rapid detection, treatment, and management of PDACs as well as its precursor lesions, PanINs and IPMNs, are critical steps toward improving the survival rate [3]. However, given the similarities in imaging features as well as related symptoms between pancreatic cancer and groove pancreatitis, this rare form of chronic pancreatitis presents a diagnostic challenge.

Pancreatic intraepithelial neoplasms, which are considered the most common pancreatic cancer precursor lesions, are noninvasive microscopic ductal lesions that are characteristically asymptomatic. They may be either papillary or flat and are comprised of columnar to cuboidal cells with differing amounts of mucin. PanINs are ranked into 3 tier groups: PanIN-1A and PanIN-1B (low-grade), PanIN-2 (intermediate-grade), and PanIN-3 (high-grade) [3,8,9]. Intraductal papillary mucinous neoplasms are noninvasive epithelial neoplasms stemming from mucin-producing cells in the pancreatic ducts classified into 3 categories: main duct, branch duct, and mixed types. Specifically, MD IPMNs, which are considered to be more malignant, are characterized by the existence of segmented or diffuse dilation of > 5 mm in the main pancreatic duct with no further obstruction [10,11].

We report a 46-year-old male who presented due to recurring bouts of pancreatitis along with abdominal pain and episodic jaundice. While PanINs are characteristically asymptomatic lesions, signs of IPMNs include epigastric discomfort and jaundice, which are triggered by the effects of mucin hyperproduction obstructing normal pancreatic secretion and the common bile duct, respectively. Other symptoms include backache, nausea, vomiting, diabetes, and weight loss [12,13]. Patients with groove pancreatitis often experience obstructive jaundice as a result of alcohol abuse, as well as abdominal pain, weight loss, and postprandial vomiting due to duodenal obstruction [4]. Given the similar symptoms associated with groove pancreatitis and IPMNs, effective diagnosis and subsequent treatment of pancreatic ductal adenocarcinomas are further complicated. Moreover, acute pancreatitis has been reported in 12%–67% of patients with intraductal papillary mucinous neoplasms, with no distinction between MD and BD lesions [14]. In fact, an association has been made between IPMNs manifesting as acute pancreatitis and increased cancer risk [9]. Ultimately, the patient underwent a Whipple procedure for complete resection, and subsequent pathology confirmed the diagnosis of IPMN, PanIN, and chronic pancreatitis. Fortunately, there was no lymph node metastasis.

Given the low survival rate associated with pancreatic cancer, early detection and intervention are vital to increased survival rates. Guidelines established by the European Study Group on Cystic Tumors of the Pancreas in 2018 state that the accuracy of abdominal CT scans for properly recognizing pancreatic cystic neoplasms ranges from 40% to 81% [15]. Furthermore, previous studies determined that multidetector CTs (MDCT) are capable of predicting IPMN malignancy. Studies revealed that compared to pathological diagnosis, MDCT's specificity, accuracy, and sensitivity were 87.5%, 95%, and 100%, re-

spectively [16]. However, the occurrence of multiple pathologies including GP and pancreatic adenocarcinoma should result in careful follow-up of these patients, especially if clinical symptoms persist.

## Patient consent

The patient reported in the manuscript signed the informed consent/authorization for participation in research which includes the permission to use data collected in future research projects including presented case details and images used in this manuscript.

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