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Intraductal Papillary Mucinous Neoplasm of the Pancreas Presenting as Worsening Hyperglycemia in a 72-Year-Old Patient with Type 2 Diabetes

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Pancreatic cysts are common findings encountered and increasingly detected through cross-sectional imaging. Intraductal papillary mucinous neoplasm (IPMN) is the most common pancreatic cystic neoplasms and may be macroscopic precursor of pancreatic ductal adenocarcinoma.[1] New-onset diabetes or worsening glycemic control may serve as clinical clues to underlying pancreatic neoplasia.[2] We present an interesting case of worsening glycemic control in a patient with long-standing type 2 diabetes (T2D) as the first manifestation of IPMN with high-grade dysplasia.

A 72-year-old Thai male with well-controlled T2DM for 25 years presented with increase in glycated hemoglobin from 6.9% to 8.5% over 3 months, without other accompanying symptoms. He had regular follow-ups every 3-4 months and his glycemic control had never exceeded 7.5% in the past 10 years. His current medications included metformin 2,000 mg per day and simvastatin 20 mg per day. There was no history of new medications or herbal supplements that could contribute to hyperglycemia. To evaluate for occult malignancies, abdominal ultrasonography was performed, revealing a 1.0-cm cystic lesion in the body of the pancreas with diffuse pancreatic ductal dilatation. IPMN with high-risk features (solid component

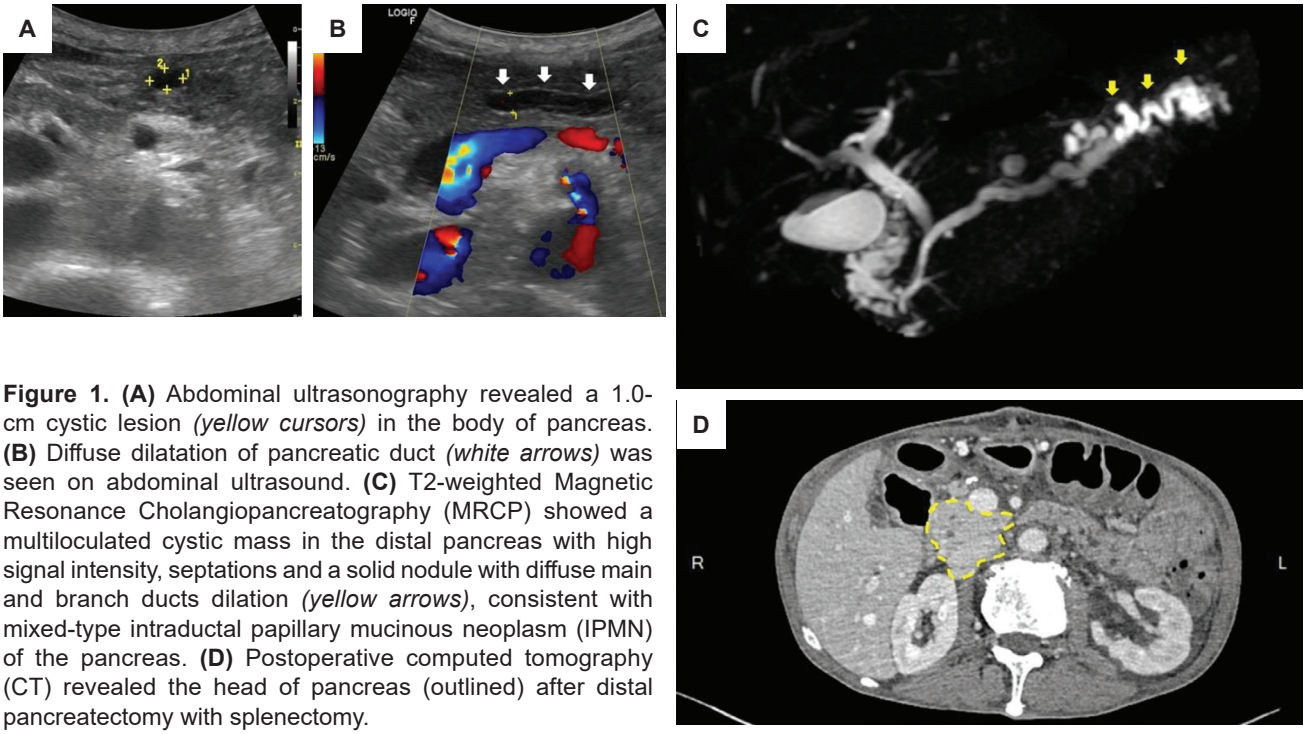

Figure 1. (A) Abdominal ultrasonography revealed a 1.0-cm cystic lesion *(yellow cursors)* in the body of pancreas. **(B)** Diffuse dilatation of pancreatic duct *(white arrows)* was seen on abdominal ultrasound. **(C)** T2-weighted Magnetic Resonance Cholangiopancreatography (MRCP) showed a multiloculated cystic mass in the distal pancreas with high signal intensity, septations and a solid nodule with diffuse main and branch ducts dilation *(yellow arrows)*, consistent with mixed-type intraductal papillary mucinous neoplasm (IPMN) of the pancreas. **(D)** Postoperative computed tomography (CT) revealed the head of pancreas (outlined) after distal pancreatectomy with splenectomy.

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with internal enhancing septation) was confirmed from T2-weighted Magnetic Resonance Cholangiopancreatography (MRCP) and endoscopic ultrasound (EUS). High amylase and lipase levels in the cystic fluid from presumed side branch cysts suggested continuity with the pancreatic main duct. Subsequently, distal pancreatectomy with splenectomy was performed following shared decision making with the patient. Histologic examination revealed high-grade dysplasia of gastric-type IPMN spreading into the main and branch pancreatic ducts, confirming a diagnosis of mixed-type IPMN with high-grade dysplasia. The patient's post-operative recovery was uneventful, and follow-up imaging was unremarkable. One year later, the patient remains well and is maintained on twice daily insulin treatments.

This case highlights the importance of recognizing worsening glycemic control or new-onset diabetes as potential early indicators of IPMN. Although the pathophysiology of diabetes in IPMN is not fully understood, pancreatic neoplasia has been associated with insulin resistance, possibly through paraneoplastic mechanisms involving altered glycogen synthase and phosphorylase activity.[2] This association is supported by a recent study utilizing MRI-based pancreatic cancer screening in patients with new-onset or worsening diabetes.[3] In conclusion, although rare, IPMN should be considered in the differential diagnosis of unexplained worsening glycemic control. Non-invasive imaging modalities such as abdominal ultrasonography should be employed to detect potential underlying malignancies.

Ethical Consideration
Patient consent was obtained before submission of the manuscript.

Statement of Authorship
All authors certified fulfillment of ICMJE authorship criteria.

CRediT Author Statement
YT: Conceptualization, Methodology, Writing – original draft preparation; **NT:** Investigation; **VV:** Resources, Visualization; **SN:** Project administration; **TH:** Writing – review and editing, Supervision.

Data Availability Statement
No datasets were generated or analyzed for this research.

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