

A pancreatic mucinous cystic neoplasm undergoing intriguing morphological changes over time and associated with recurrent pancreatitis

A case report

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Abstract

Rationale: Mucinous cystic neoplasms (MCNs) are pancreatic mucin-producing cystic lesions with a distinctive ovarian-type stroma. The diagnosis is generally easy in typical cases; however, differential diagnosis is difficult in others such as in the case we report herein.

Patient concerns: A 27-year-old woman with sudden onset of epigastric pain was referred to our hospital for suspected acute pancreatitis. Contrast-enhanced computed tomography revealed a 25-mm cystic lesion in the pancreas and a low density area with delayed enhancement at the right upper side of the cystic lesion.

Diagnoses: During its clinical course, the cystic lesion underwent various morphological changes. Eventually, it presented typical findings of MCNs, and could be accurately diagnosed.

Interventions: Laparoscopic distal pancreatectomy was performed on the patient by preserving the spleen.

Outcomes: The patient revealed no symptoms till 1 year after the operation.

Lessons: This case of MCN with intriguing short-term morphological changes was associated with recurrent pancreatitis. A combination of imaging modalities is essential for accurate diagnosis of MCNs, and follow-up with serial imaging might be useful for certain unusual lesions.

Abbreviations: CE-CT = contrast-enhanced computed tomography, EUS = endoscopic ultrasonography, MCN = mucinous cystic neoplasm, MRI = magnetic resonance imaging, T2WI = T2-weighted image.

Keywords: morphological changes, pancreatic MCN, pancreatitis, SPINK1

1. Introduction

Mucinous cystic neoplasms (MCNs) arise almost exclusively in the middle-aged women. These mucin-producing cystic lesions localized in the body-tail of the pancreas typically reveal

a cyst-in-cyst appearance and are encapsulated by a thick fibrous wall.^[1–4] The standard of care for MCNs includes resection owing to their malignant potential.^[5] In typical cases with defined clinical and imaging characteristics, diagnosis is straightforward; however, when the characteristic features are absent, it can be difficult to differentiate the MCNs from pseudocysts or other cystic lesions of the pancreas. We herein report a rare case of MCNs that indicated various morphological changes and was associated with recurrent acute pancreatitis.

2. Case presentation

A 27-year-old woman was referred to our hospital with suspected acute pancreatitis after a sudden onset of epigastric pain, and serum amylase elevation of 628 U/L. The patient revealed a previous history of epigastric pain occurring several times a year for nearly a decade, which always healed spontaneously. She smokes 10 cigarettes per day, drinks socially, but has no family history of pancreatic diseases. Physical examination revealed moderate epigastric tenderness. The laboratory tests indicated a slight elevation of white blood cell count, and serum amylase levels decreased within the normal limits. Abdominal contrast-enhanced computed tomography (CE-CT) demonstrated a 25-mm cystic lesion (Fig. 1A) and a low-density area on the right upper side of the cystic lesion (Fig. 1B and C). The patient

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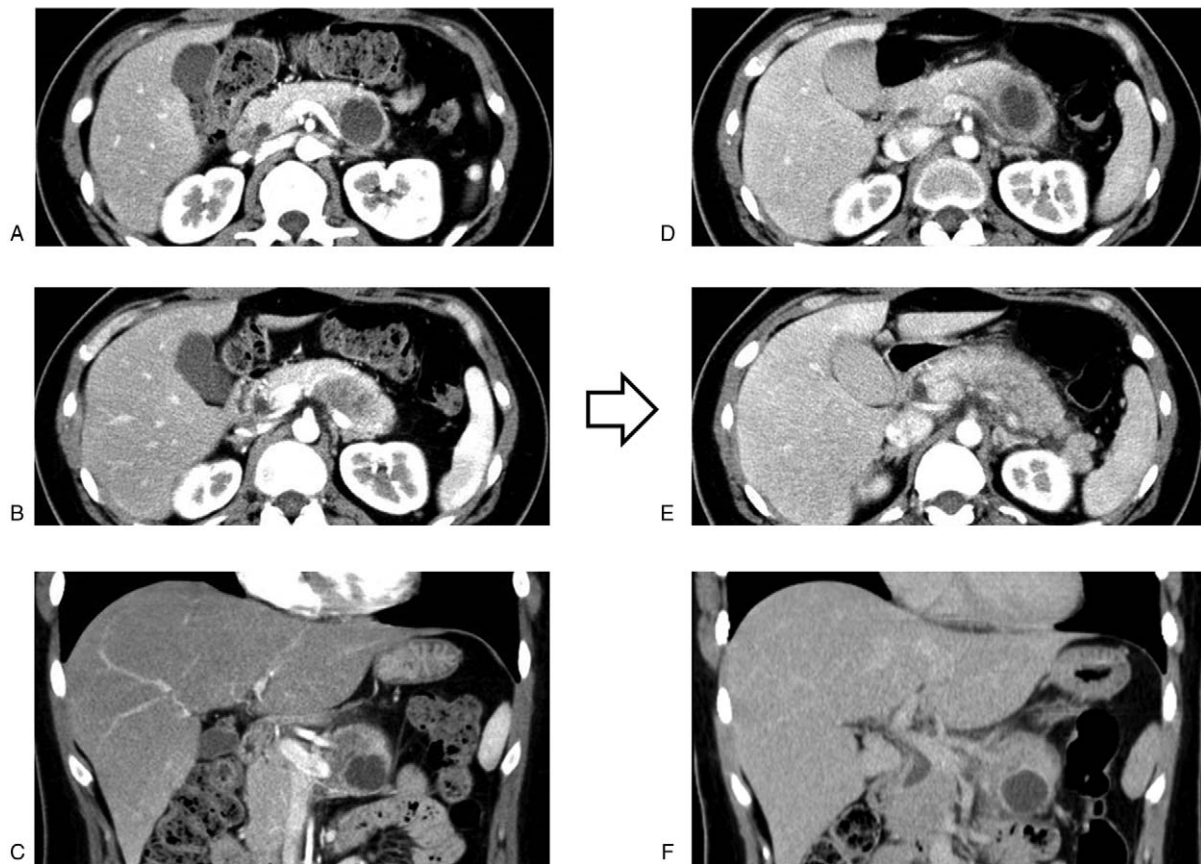


Figure 1. The initial abdominal contrast-enhanced computed tomography (CE-CT) revealed a 25-mm cystic lesion in the pancreatic body (A) and a low-density area on the right upper side of the cystic lesion (B) (C). CE-CT after hospitalization revealed a thickening of the wall (D) and the low-density area became unclear (E) (F).

was hospitalized for extensive follow-up, and complained about severe epigastric pain in the evening. Abdominal CT confirmed the acute pancreatitis diagnosis, and revealed that the wall of the cystic lesion was thickened, whereas the border between the cystic lesion and adjacent pancreatic parenchyma became unclear. In addition, the low-density area on the right upper side could not be distinguished (Fig. 1D–F). Heavily T2-weighted image (T2WI) of magnetic resonance imaging (MRI) revealed a heterogeneous high intensity area with an irregular surface and a surrounding thickened low intensity area (Fig. 2A). Magnetic resonance cholangiopancreatography revealed a slight dilation of the tail side of the cystic lesion pancreatic duct, whereas the communication between the cystic lesion and the main pancreatic duct was not confirmed (data unavailable). Endoscopic ultrasonography (EUS) imaging revealed a marked wall thickening and multiple elevated lesions inside the cystic lesion (Fig. 2D). The elevated lesions were estimated to be debris because the CT dynamic study reported no enhanced lesions inside (Fig. 1D and F). The patient received a conservative treatment and the clinical symptoms improved. Based on these findings, this lesion was diagnosed as a possible pancreatic pseudocyst associated with pancreatitis.

Two and a half months later, the patient experienced another episode of pancreatitis. CT indicated the wall thinning of the cystic lesion (data unavailable), whereas MRI (heavily T2WI) and EUS revealed a luminal enlargement of the cystic lesion and a reduction in the solid components (Fig. 2B and E).

Although the patient abstained from drinking and followed a lipid-restricted diet, she experienced repeated abdominal pain. We checked her genetic background for hereditary pancreatitis markers. We confirmed a *SPINK1* genetic mutation (N34S heterozygous abnormality) through gene analysis. About 6 months after the initial examination, although MRI (heavily T2WI) indicated no remarkable change (Fig. 2C), EUS clearly revealed a cyst-in-cyst appearance of the cystic lesion, and the solid components were further reduced (Fig. 2F). Based on these findings, the cystic lesion was diagnosed as MCN. We performed laparoscopic distal pancreatectomy by preserving the spleen. The cut surfaces of the gross specimen revealed a cyst-in-cyst appearance with a thick fibrotic capsule (Fig. 3). Histopathologically, the cystic lesion was encapsulated by a thick fibrous wall (Fig. 4A) and was lined with a single layer of mucin-producing columnar cells without atypia. Underneath the cell lining, ovarian-type stromal tissue was identified (Fig. 4B). Immunohistochemically, the stromal tissue was positive for estrogen and progesterone receptors (Fig. 4C and D). These findings support a final diagnosis of mucinous cystadenoma. The inner surface of mucinous cystadenoma is focally ulcerated with infiltration of lymphocytes and neutrophils where the adjacent pancreatic parenchyma showed the feature of local pancreatitis (Fig. 4E). The patient revealed no symptoms till 1 year after the operation. The clinical course and time of image inspection are summarized in Figure 5.

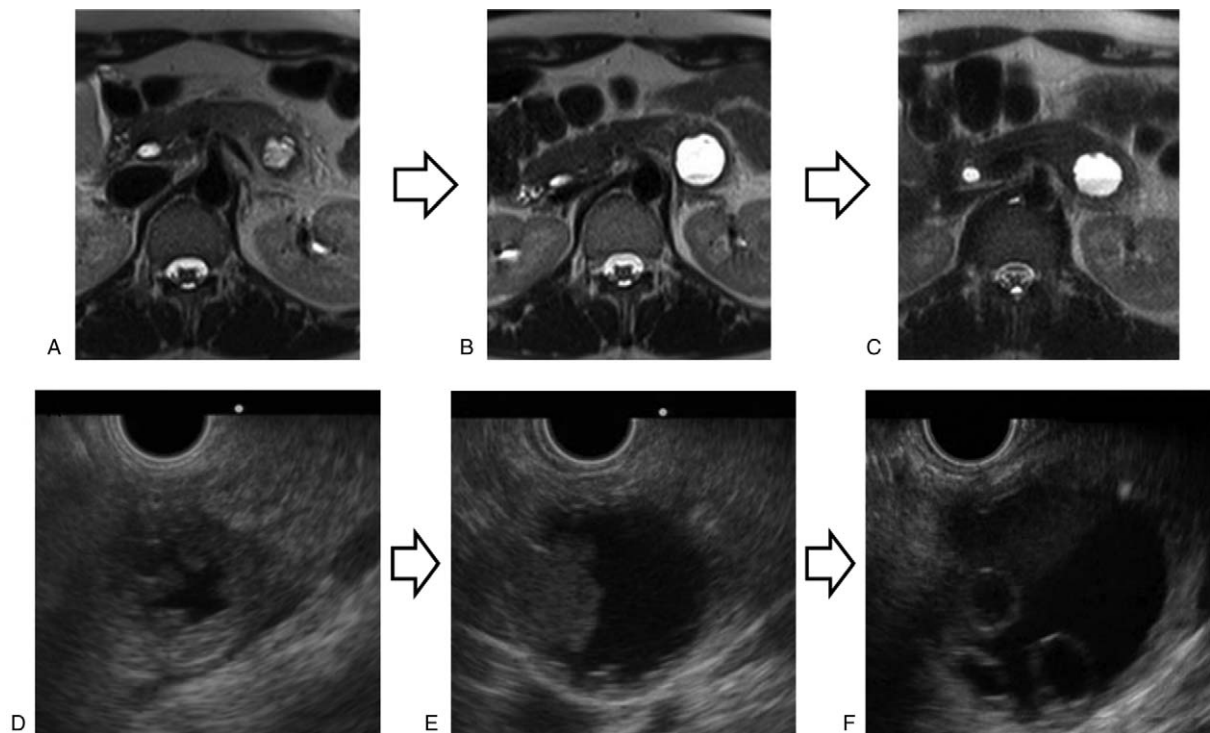


Figure 2. Sequential changes of magnetic resonance imaging images (heavily T2-weighted sequences) (A–C) and endoscopic ultrasonography (EUS) images (D–F). Luminal enlargement with wall thinning and decrement of debris were observed over time. Eventually, EUS revealed a cyst-in-cyst appearance.

3. Discussion and conclusion

Patients with MCN present vague abdominal symptoms such as epigastric pain, mass, a sense of abdominal fullness, nausea, or vomiting.^[2] In addition, nonspecific symptoms are associated with MCN. Yamao et al^[6] reported that 51.4% of MCN cases were asymptomatic, and 6.5% of MCN presented with acute pancreatitis. In our case, the patient experienced repeated abdominal pain and acute pancreatitis. Cystic lesions involving the main pancreatic duct are prone to cause pancreatitis.^[7] Although the communication between the cystic lesion and the

pancreatic duct was unclear in our case, the pancreatic duct tail side of the cystic lesion was dilated. When pancreatic duct compression occurs, it can initiate pancreatitis. Alternatively, the SPINK1 genetic mutation, confirmed in this patient, could also have promoted pancreatitis. SPINK1 mutations were reported to confer strong genetic susceptibility to the developing chronic pancreatitis.^[8] There could potentially be a relationship between the menstruation period and the onset of pancreatitis because the ovarian-type stroma of MCN might influence the adjacent pancreatic parenchyma; however, pancreatitis occurred

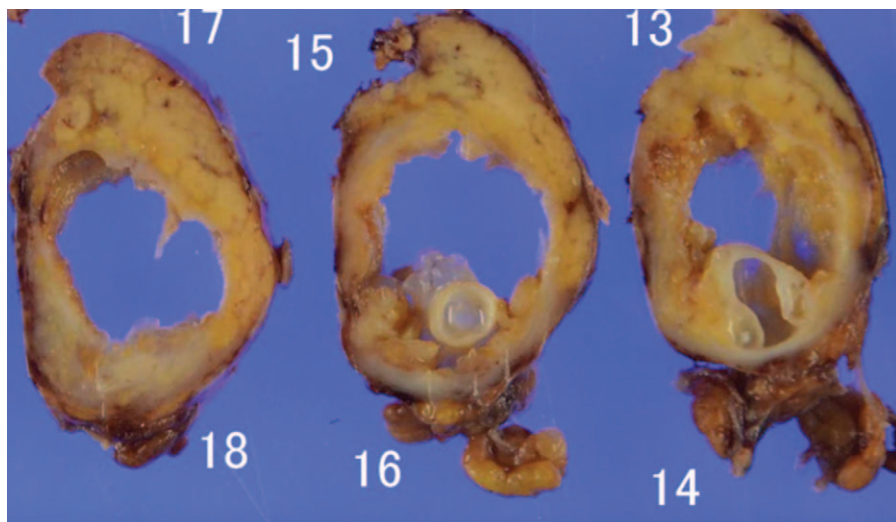


Figure 3. Cut surfaces of the gross specimen revealed a cyst-in-cyst appearance with a thick fibrotic capsule.

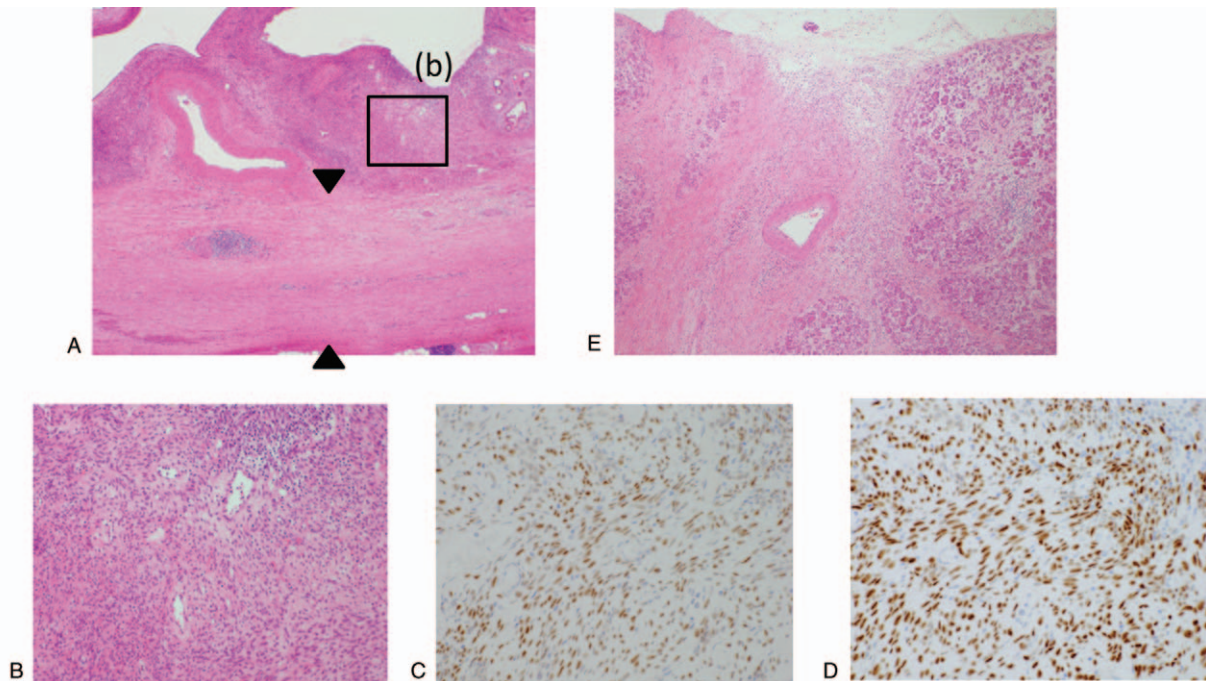


Figure 4. Histopathological findings. (A) The cystic lesion presented with a thick fibrotic capsule (arrow head). (B) The tissue underneath the cell lining was identified as ovarian-type stromal tissue. Immunohistochemically, the stromal tissue was positive for estrogen (C), and progesterone receptors (D). (E) The local pancreatitis with inflammatory cell infiltrates and fibrin deposition. The upper side of pancreatic parenchyma is the lumen of the cyst. The fibrotic capsule is missing in this part.

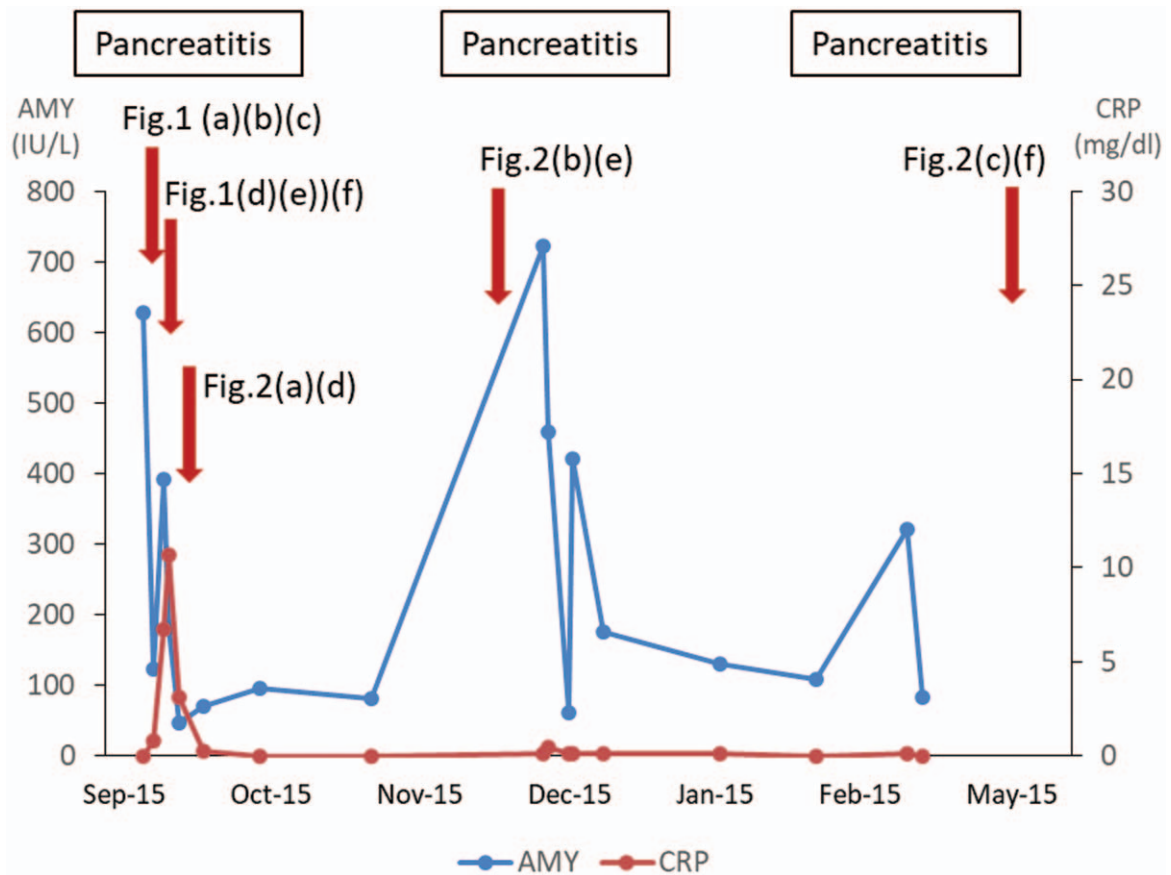


Figure 5. Clinical course representation with the repeated pancreatitis experienced by the patient.

irrespective of the menstruation period in our patient. We conclude that acute pancreatitis was initiated by the pancreatic duct compression owing to MCN in our patient because no pancreatitis occurred after resection of the MCN.

In general, MCNs display a gross appearance of an orange, in contrast to the grape-like appearance of the intraductal mucinous papillary neoplasms. The cyst-in-cyst appearance is defined as a typical internal structure of MCNs that reveals a cyst with internal septation.^[5] MCNs do not necessarily present the characteristic radiological findings, making it difficult to establish a definite preoperative diagnosis. In addition, the overall diagnostic accuracy of CT and MRI investigations of pancreatic cystic lesions ranges from 20% to 80%.^[2] In our case, the initial CE-CT revealed a 25-mm simple cyst with a low-density area on the right upper side of the cyst. The cystic lesion appearance changed drastically over time and the repeated pancreatitis suggested that the cystic lesion was simply an inflammatory pseudocyst. The low-density area with delayed enhancement on the right upper side of the cystic lesion from the initial CE-CT became unclear with time and made the diagnosis difficult. This area seemed to result from a temporary blood circulation disorder.

EUS provides more detailed imaging than CT and MRI, and is valuable in the diagnosis and assessment of pancreatic cystic neoplasms.^[9] The EUS findings also revealed significant changes overtime. In particular, the inner part of the cystic lesion revealed intriguing morphological changes: debris like components decreased and eventually revealed the cyst-in-cyst appearance characteristic of the MCNs. These EUS findings led to the diagnosis of MCN.

MCNs have a malignant potential, and surgical resection is usually recommended.^[5] Therefore, the case reports following up MCNs evolution are rare and are limited to the ones that reveal a change of size and appearance of the cyst before the typical findings of MCN are detected.^[10–15] Most cases have a relatively slow progression for several years. Hayashi et al reported a case of MCN with short-term morphological changes owing to hemorrhage. The size of the lesion enlarged and the fibrotic wall became thickened in 3 months.^[14] Some cases of MCN revealed a contraction during the follow-up,^[12,13,15] presumably because of communication with the pancreatic duct, the partial collapse of the wall, and the decrease of cellular mucin production. Although it was assumed that MCNs rarely indicate a communication with the ductal system, Yamao et al^[6] reported that 18.1% of MCNs had a communication between the cyst and the pancreatic ductal system. In our case, the communication between the cystic lesion and the pancreatic duct was unclear; however, the cystic lesion revealed marked morphological changes associated with repeated pancreatitis over time. We speculated that the part of the cystic wall had collapsed following a blood circulation disorder or a pancreatic parenchymal inflammation, leading to increase in wall thickness and accumulation of debris inside the cyst; these morphological changes reversed to the former state as time passed.

In conclusion, we reported a case of MCN that revealed short-term morphological changes associated with recurrent

pancreatitis. A combination of the imaging modalities was required for the final diagnosis.

Author contributions

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