

## Case Report

# Small Mucinous Cystic Neoplasm of the Pancreas Successfully Detected and Resected by a Laparoscopic Approach: Report of a Case

Kengo KANETAKA,<sup>1,2</sup> Yujo KAWASHITA,<sup>1</sup> Shinichiro ONO,<sup>1</sup> Toru IWATA,<sup>1</sup> Takashi KANEMATSU<sup>2</sup>

<sup>1</sup>Department of Surgery, Nagasaki Rousai Hospital, Sasebo, Japan

<sup>2</sup>Department of Surgery, Nagasaki University, Graduate School of Biomedical Sciences, Nagasaki, Japan

Incidentally detected small pancreatic cyst is a therapeutic challenge. As these lesions include a spectrum of pathologies ranging from benign lesions to malignant mucinous tumors, it is important to differentiate potential malignant mucinous cystic neoplasms (MCN) from others. However, a definitive diagnosis might be difficult, since computed tomography (CT) and magnetic resonance imaging (MRI) cannot depict the morphologic features characteristic of small MCN.

This report presents a case of a small pancreatic cyst incidentally detected during medical check-up for inguinal hernia. Although the preoperative diagnosis was uncertain with CT and MRI, the diagnosis of MCN was strongly suspected because the majority of MCN tend to often occur in elderly women and the most common locations are in the pancreatic tail. Laparoscopic ultrasonography (LUS) was employed to obtain a correct diagnosis, and it showed a 16 mm cyst with characteristic features indicating a diagnosis of MCN. The patient underwent a laparoscopic distal pancreatectomy and the diagnosis of MCN was confirmed histopathologically. In conclusion, LUS allowed a timely curative resection of a small MCN in this case.

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## Introduction

The widespread use of cross-sectional imaging modalities for multiple indications has allowed for the discovery of cystic lesions in the pancreas. In fact, up to 75% of these cystic lesions are incidentally found by such modalities in asymptomatic patients.<sup>1</sup>

The question to resolve is how to manage these lesions: surgical resection or observation, since they can be divided into two groups, i.e., inflammatory processes such as pseudocysts after pancreatitis, and cystic neoplasms such as serous cystadenoma and mucinous cystic neoplasm (MCN). Especially MCN encompass a broad spectrum of pathologies ranging from benign, borderline, to malignant.<sup>2</sup> Any tumor within this group has the potential to transform into an invasive carcinoma, thus it is important to identify the mucinous neoplasms from nonmucinous counterparts. However, these incidentally detected lesions are generally too small to show the characteristic morphologic features on computed tomography (CT) and magnetic resonance imaging (MRI), making a definitive

diagnosis difficult.

This report presents a case with a small pancreatic cyst incidentally detected during a medical check-up for an inguinal hernia operation. The diagnosis was uncertain, till the laparoscopic ultrasonography (LUS) was performed to suggest a diagnosis of MCN. A distal pancreatectomy was subsequently performed in order to preserve the spleen in laparoscopic manner.

## Case Report

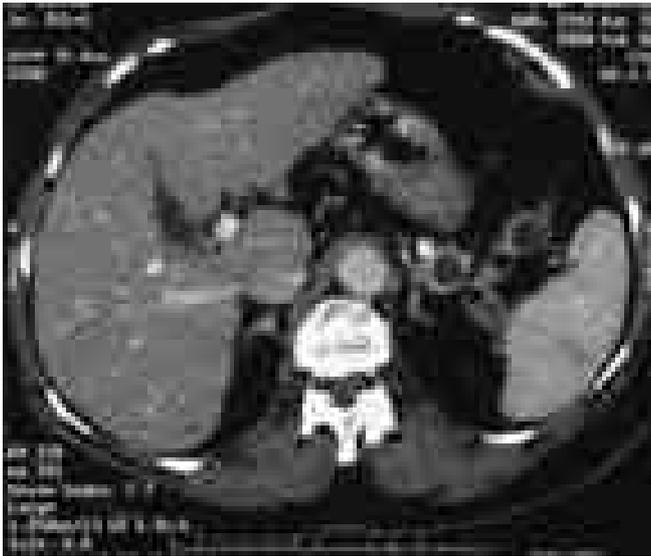
A 66-year-old female was admitted with a tentative diagnosis of a pancreatic cyst which was incidentally detected in a preoperative workup at another hospital with a diagnosis of a right inguinal hernia. She had no symptoms, no past history of pancreatitis and no remarkable physical signs other than a right groin lump. Her laboratory findings showed a slight elevation of transaminase, but amylase and other pancreatic enzymes were within normal range. The

**Address correspondence:** Kengo Kanetaka, M.D., Ph.D., Department of Surgery, Nagasaki University Graduate School of Biomedical Sciences, 1-7-1 Sakamoto, Nagasaki 852-8501 JAPAN

TEL: +81-(0)95-819-7316, FAX: +81-(0)95-819-7319, E-mail: kkanetaka@kce.biglobe.ne.jp

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level of the tumor markers, carcinoembryonic antigen and carbohydrate antigen 19-9 were 1.82 ng/ml (<5 ng/ml) and 17.61 U/ml (<35 U/ml), respectively. Abdominal CT revealed a 16-mm unilocular simple cyst in the pancreatic tail (Figure 1). No dilatation of the main pancreatic duct or calcification of parenchyma was detected. Abdominal MRI was employed, without any additional diagnostic information.



**Figure 1.** CT shows a thin-wall cystic lesion measuring less than 2 cm. Internal septation or nodularity in the cyst was not detected.

The nature of the pancreatic cyst was uncertain on these modalities; however, we suspected a diagnosis of a neoplastic cyst, rather than a pseudocyst because of the absence of parenchymal calcifications, ductal dilatation of the pancreas, and no history of pancreatitis. The most suspected diagnosis was MCN because the majority of MCN tends to often occur in elderly women and the most common locations are in the pancreatic tail. This has a malignant potential regardless of its size, therefore, the differentiation between pseudocyst and MCN was needed for appropriate treatment. However, endoscopic ultrasonography (EUS) was not indicated because of the potential risks of this method. As a result, we planned to perform herniorrhaphy in a laparoscopic manner in order to conduct simultaneous LUS. The patient was fully informed about this disease, and she preferred to undergo a subsequent distal pancreatectomy rather than have a long-term intensive follow-up if the cyst would be identified to be a mucinous neoplastic growth.

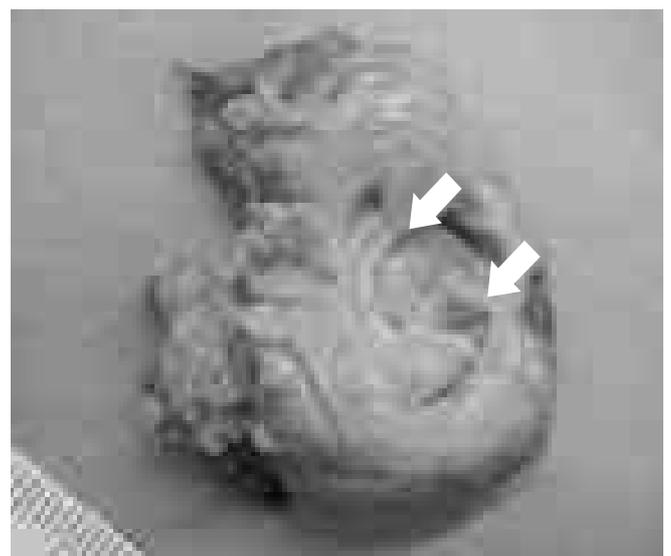
Under general anesthesia, the patient was placed in the right hemilateral position. After the insertion of 4 ports for herniorrhaphy, the gastrocolic ligament was divided; therein the anterior surface of the pancreas was exposed. No pancreatic cyst was evident on laparoscopic inspection. LUS showed a well-circumscribed cyst measuring 16 mm in diameter, with septal formation, and a fine speckled internal echo in the tip of the pancreatic tail, however, no malignant specific features such as wall thickness, calcification, or solid components were seen (Figure 2). These findings were



**Figure 2.** LUS findings of a cystic lesion in the tail of pancreas. LUS clearly shows a cyst of 16 mm in diameter with septal formation and fine speckled internal echo.

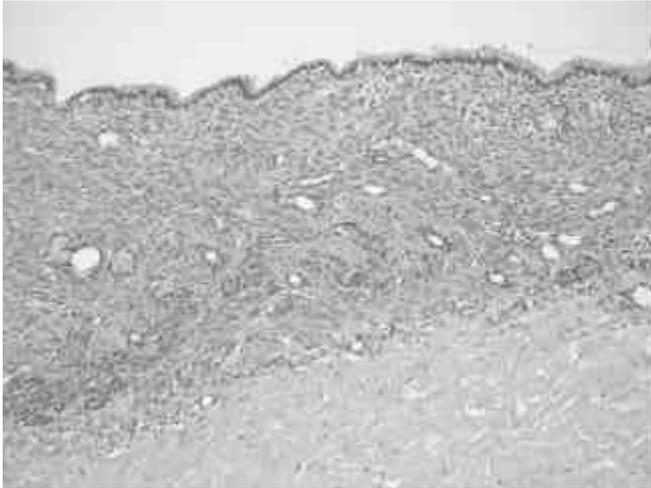
consistent with a diagnosis of MCN, so as a total biopsy, a distal pancreatectomy with preservation of the spleen was carried out laparoscopically.

After the insertion of 2 additional ports, the opening of gastrocolic ligament was enlarged to expose the entire pancreas. The short gastric vessels were carefully spared to maintain the splenic blood supply. The inferior border of the pancreas was dissected, and the body and tail were separated from the retroperitoneum. The splenic artery and vein were carefully dissected and preserved. Finally, the pancreas was transected 1 cm proximal to the tumor with the endoscopic stapling device. The resected specimen was wrapped in a plastic bag and removed through the infraumbilical port (Figure 3). The



**Figure 3.** Gross pathology of resected specimen showed thin septations surrounding mucin-filled cystic cavities.

color and viability of the spleen was confirmed. Subsequently, laparoscopic herniorrhaphy was performed with a transabdominal procedure. The duration of the operation was 350 minutes. The intraoperative blood loss was under 250 g. The histological examination revealed mucinous cystic adenoma and no atypia was found. Ovarian type stroma was also noted in the interstitium (Figure 4). The post operative course was uneventful. Oral intake began on 2<sup>nd</sup> day and the patient was discharged from the hospital on 14<sup>th</sup> postoperative day.



**Figure 4.** Histological features of the wall of the resected MCN. Ovarian-type stroma composed of spindle cell bundles located immediately beneath the neoplastic columnar epithelium.

## Discussion

Small pancreatic cysts incidentally detected on CT often force surgeons to determine the optimal management, resection or observation. Spinelli et al. reported that pancreatic cysts are seen in 1.2% of 24,000 patient CT scans.<sup>3</sup> On the other hand, Kimura et al. found pancreatic cysts which measured at least 0.4 cm in size in 73 of 300 autopsy series.<sup>4</sup> Although this high incidence comes from the inclusion of very small cysts discovered only in autopsy studies, this discrepancy might imply that as the resolution of cross-sectional imaging modalities such as CT and MRI are improved, the frequency of the detection of incidental small cystic lesions in the pancreas will increase. In fact, in a recent review of MRI examinations, pancreatic cysts, 82% of which were smaller than 1cm in diameter, were detected in 20% of patients.<sup>5</sup>

Since these cystic lesions comprise a variety of pathologies including pseudocysts after pancreatitis, benign tumors like serous cystadenoma, and borderline or malignant tumors like MCN,<sup>2</sup> it is important to obtain the clues to differentiate neoplastic from non-neoplastic lesions, especially potential malignant MCN. Recent advances in cross-sectional diagnostic modalities have now made it possible to depict the characteristic appearance of pancreatic cysts. These features includes lobular shaped masses with calcification

generally arranged in a central stellate pattern in serous cystadenoma, and a well-circumscribed round cyst containing with thick septations and rim calcifications in MCN.<sup>6</sup> However, small lesions tend to limit radiographic characterization for the differential diagnosis.

The natural history of small asymptomatic pancreatic cysts is unknown, but many studies have indicated nonsurgical management for selected patients with these lesions. Most previous studies have focused on the potentially malignant nature of mucinous neoplasms. Fernandez-del Castillo et al. reported on 212 patients with pancreatic cystic lesions measuring 2 cm or smaller. Most of their patients underwent surgery, thus resulting in a histopathological diagnosis. Although the incidence of malignancy was low (1 of 28, 3 %), a mucinous lesion was discovered in over half of their resected patients. Because of the malignant potential of these tumors, they recommended intensive imaging follow-up in patients with small mucinous cysts.<sup>1</sup> A prospective study of 221 patients by Walsh et al., reported the successful differentiation of mucinous cysts from nonmucinous counterparts using radiography and EUS-guided aspiration.<sup>7</sup> In their study, a surgical resection was advised if medically fit patients had symptoms or cysts that were suspected to have a mucinous nature. With this approach, patients with incidental asymptomatic cysts could thus be followed without a delayed resection for any missed mucinous neoplasms at a mean follow-up period of 24 months.<sup>7</sup>

EUS is a diagnostic tool for cystic lesions in the pancreas. Koito et al. reported that even in tumors measuring less than 2 cm, the EUS accuracy ranges between 82% and 91%.<sup>8</sup> On the other hand, despite high resolution images of EUS, Walsh et al. reported that in their series of 87 patients with suspected pancreatic cysts, EUS imaging did not yield any additional diagnostic information than that obtained by noninvasive modalities such as CT and MRI.<sup>9</sup> The same difficulty has also been demonstrated in several studies including one by Brugge et al., who investigated the differentiation of mucinous from nonmucinous cystic neoplasms using EUS either alone or in combination with fine needle aspiration in 112 histologically confirmed patients. They concluded that EUS imaging alone even through the use of strict morphologic criteria was insensitive and nonspecific (the sensitivity and specificity were 56% and 45%, respectively).<sup>10</sup>

LUS has been adopted as a complimentary technique to laparoscopy for pancreatic malignancies, in which LUS is used to detect vascular invasion as well as liver metastasis and nodal metastasis.<sup>11-13</sup> In addition, high resonance of direct contact LUS allows the discrimination of the internal architecture of a cystic lesion more clearly than CT and MRI. Schachter et al. introduced LUS for surgical decision making in patients with pancreatic cysts. They were able to detect novel, additional features such as solid components or additional small cysts in 8 of 15 examined patients, which could not be detected through conventional cross-imaging modalities.<sup>14</sup>

In our patient, LUS depicted a small well-circumscribed cyst with internal architecture such as septal formation, and a fine speckled internal echo. These findings highly suggested a diagnosis of a MCN,<sup>14</sup> which has the potential to transform into an

invasive carcinoma regardless of its size, though other malignant-specific characteristics, such as a solid component and irregular thickened wall<sup>15</sup> could not be detected. Because of the difficulty of distinguishing mucinous cystic carcinoma from its benign counterpart and the predicted long life expectancy of the patient, a distal pancreatectomy with conservation of the spleen was performed. We selected neither a cytology nor cyst fluid analysis following fine needle aspiration, which has the potential to spill tumor cells into the abdominal cavity.

Various approaches have been developed for spleen preservation during a distal pancreatectomy. Kimura et al. performed a distal pancreatectomy with the spleen conservation after careful removal and preservation of the splenic vessels from the pancreas.<sup>16</sup> Although their procedure is somewhat tedious and time-consuming, it ensures the blood supply to the spleen, and reduces the risk of splenic necrosis and abscess formation. Fernande-Cruz et al. introduced this procedure into the laparoscopic field. They accentuated the advantage of a magnified laparoscopic view which facilitates the separation of the splenic vessels from the pancreas and identification of the small branches. Advanced laparoscopic instruments could thus make it easy and safe to manage these vessels.<sup>17</sup>

The need to conduct an LUS examination of all pancreatic cysts that remain undetermined based on a multidisciplinary diagnostic approach, including EUS, remains controversial. While the primary resection of small pancreatic cysts has been advocated,<sup>18,19</sup> this aggressive approach may be unacceptable because the majority of these lesions are asymptomatic, and there are also risks associated with the possibility of exposing patients with benign lesions to surgical morbidity and mortality. Schachter et al. advocated that LUS under general anesthesia should be used for differential diagnosis of pancreatic cysts,<sup>20</sup> however, their method is still invasive and prohibitively expensive. Therefore, LUS should be performed in medically fit patients who are highly suspected to have malignant cystic lesions on CT and MRI examinations.

In our case, CT and MRI did not show any characteristic features, however we strongly suspected a diagnosis of MCN because the majority of MCN tend to occur often in elderly women and the most common locations are in the pancreatic tail. Our patient was therefore scheduled to undergo herniorrhaphy under general anesthesia, and therefore we could perform LUS simultaneously. This enabled us to perform a timely curative resection for a small MCN in this case.

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