



# Excision of mucinous cystadenoma of pancreas is safe and effective: a case report

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**Background:** Pancreatic cysts are frequently detected incidentally, and a definitive preoperative diagnosis remains challenging. Benign cystic lesions have a very high cure rate unless malignant change supervenes. Simple excision of benign cysts of the pancreas is safe and effective.

**Case presentation:** We present a 31-year-old woman with a 3-year history of an enlarging symptomatic benign pancreatic mucinous cystadenoma, which was misdiagnosed radiologically as a pancreatic serous cystadenoma or a mesenteric cyst. This was managed safely by excision and resection with a distal pancreatectomy that was avoided.

**Conclusions:** Excision of benign mucinous cystadenoma of the pancreas is safe and effective, and surveillance for recurrence is not necessary.

**Keywords:** Pancreas, Cyst, Benign, Excision, Case report

Because of the widespread use of high-quality cross-sectional imaging, pancreatic cystic neoplasms are being diagnosed with increasing frequency<sup>[1,2]</sup>. This heterogenous group of tumors is important because of their high cure rate as well as frequent confusion with the commoner pancreatic pseudocyst<sup>[3]</sup>. Benign cystadenomas (serous or mucinous) and cystadenocarcinoma are the most common cystic tumors of the pancreas and account for 75% of cases. In total, 40%–50% of cystic tumors are mucinous and 30% are serous cystadenomas. Mucinous ductal ectasia, papillary cystic tumors, and cystic neuroendocrine tumors account for most of the rest. When they are lined by a non-mucin-secreting epithelium, which contains glycogen (serous cystadenoma) they are invariably benign. Some of the mucin-secreting multicystic tumors may be malignant and are termed cystadenocarcinomas<sup>[1,3]</sup>. According to the Fukuoka guidelines, mucinous cystic neoplasms (MCNs) of the pancreas can be divided into intraductal papillary mucinous neoplasms (IPMNs) and MCNs<sup>[4]</sup>. The aims of investigation are to confirm pancreatic origin, exclude pseudocyst, and determine the probability of malignancy. A total of 80% of mucinous cystadenomas are in the

distal pancreas and a resection would include a distal pancreatectomy<sup>[3,5]</sup>. With accumulating knowledge of the biological behavior of these neoplasms, there is currently a selective therapeutic approach with respect to the type of resection required<sup>[6–8]</sup>. We present a case of excision of a large, growing, and symptomatic pancreatic mucinous cystadenoma that avoided the potential morbidity of a distal pancreatectomy.

## Case presentation

A 27-year-old African woman who drank minimal alcohol although being a hotelier, was admitted electively for excision of an apparent mesenteric cyst. The epigastric mass had progressively increased in size within the past 3 years. It was associated with vague upper abdominal discomfort, postprandial fullness, and constipation. She had no past history of acute pancreatitis nor gallstone disease. There was no history of fever, jaundice, melena, or hematemesis. She did not have any history of weight loss or loss of appetite. On physical examination she appeared clinically well with normal vital signs. There was a palpable tense, nontender smooth ball-like epigastric mass of about 20 cm in its maximum diameter, extending to the left hypochondrium, and which did not move with respiration. The rest of the abdominal examination was unremarkable. A full blood count and serum biochemistry including serum amylase were within the normal limits. An ultrasound examination revealed a huge intra-abdominal cystic mass with an anechogenic content and multiple thin septae, extending from the epigastric region around the body of the pancreas to the splenic hilum suggestive of a cystic pancreatic neoplasm (serous cystadenoma). Computed tomography (CT) findings revealed a huge and well-defined cystic mass measuring 181 × 166 × 114 mm, arising from the mesenteric fat between the left kidney and spleen posteriorly and laterally, and the pancreas and stomach medially and superiorly. The cystic mass was not attached to any of the abdominal viscera but had a mass effect on the pancreas, stomach, bowel, aorta, left kidney, spleen, and splenic vessels. There was no abdominal-free fluid or

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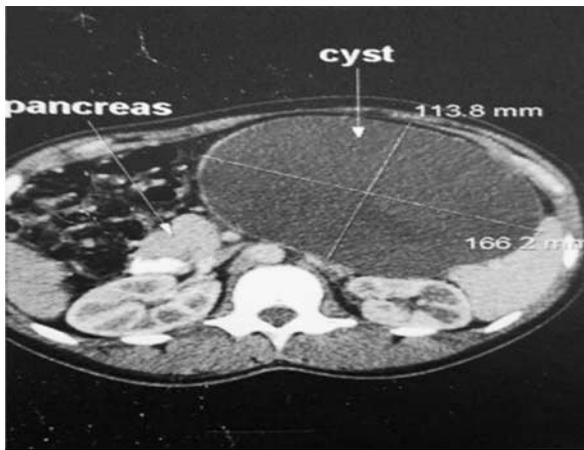
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**Figure 1.** Computed tomographic scan demonstrating pancreatic cystic mass.

retroperitoneal lymphadenopathy. The CT findings were consistent more with a resectable mesenteric cyst (Fig. 1). At operation a large tense cystic mass was adherent to the greater omentum, transverse mesocolon, the tail of the pancreas, and the spleen. The mass located in the lesser sac was mobilized off the greater omentum and transverse mesocolon, but perforated at the lateral point where dense adhesions occurred to the splenic hilum releasing about a liter of mucinous fluid. The collapsed cyst was mobilized off the tail of the pancreas and spleen up to the base in the posterior abdominal wall at which point it was excised (Figs. 2, 3). Hemorrhage from the cystic wall was brisk and continuous sutures were used for hemostasis. Following abdominal lavage with copious amount of normal saline, the upper midline incision was closed en masse with 1.0 nylon, and interrupted 3.0 nylon sutures for the skin. Postoperative recovery was unremarkable and she was discharged on the seventh postoperative day. Histology of the excised specimen revealed fibrovascular tissue lined by flat epithelium without atypia and with islands of pancreatic parenchymatous tissue. There was no



**Figure 2.** Macroscopic photograph of luminal aspect of pancreatic cystic tumor with septae and conspicuous irregular solid protuberances projecting into cystic cavities.

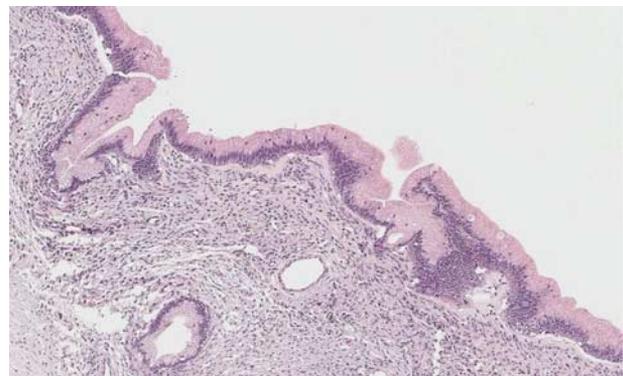


**Figure 3.** Macroscopic photograph of serosal aspect of multiloculated pancreatic cystic tumor.

malignancy seen and was consistent with a benign pancreatic cyst (Fig. 4). Follow-up after a year showed no evidence of recurrence.

## Discussion

MCNs of the pancreas represent one of the most common primary pancreatic cystic neoplasms, accounting for approximately half of these cases. MCNs are observed almost exclusively in women, and most commonly are located in the body/tail of the pancreas. In contrast to serous cystic neoplasms, MCNs have malignant potential<sup>[1,9]</sup>. This case demonstrated the challenge in a definitive preoperative diagnosis of a pancreatic cystic mass in a young woman with no previous history or risk factor for pancreatitis. In this case, however, the patient had a large, growing, and symptomatic cystic lesion for which surgical intervention was indicated without doubt. Intraoperatively, a large, multiloculated mucinous cystadenoma located in the distal pancreas was excised (Figs. 2, 3). The differential diagnosis would include IPMN,



**Figure 4.** Microscopic photograph of the tumor (mucinous cystadenoma of the pancreas). A cystic epithelial neoplasm, unilocular or multilocular, occurring almost exclusively in women. The cystic structure is lined by benign columnar mucinous epithelial cells and the subepithelial stroma is composed of bland-looking spindle cells mimicking ovarian stroma (H&E stain  $\times 10$ ).

cystadenocarcinoma, other cystic tumors including cysts of congenital, vascular, peripancreatic, and miscellaneous etiology. Occasionally CT scanning cannot differentiate cystic neoplasms from pseudocysts before surgical exploration<sup>[2]</sup>. Thus, the importance of utilizing a combination of the preoperative clinical, biochemical, and radiologic features in diagnosis. Clinically, cystic neoplasms are commoner in women with no preceding factors. By contrast a pancreatic pseudocyst either follows an episode of acute pancreatitis or occurs in a patient with chronic pancreatitis, most of whom are men who abuse alcohol, have a long history of pancreatic pain and/or symptoms of pancreatic insufficiency. Cystic tumors are frequently large and can reach up to 25 cm in diameter. Most patients present with vague symptoms of mild upper abdominal pain or discomfort. Other symptoms include weight loss, a palpable mass, postprandial fullness, nausea, and vomiting<sup>[10]</sup>. Serum amylase is frequently elevated in patients with pseudocysts, whereas it is usually normal in those with cystic tumors. Ultrasonographic findings of the presence of multiple cysts and internal septations are highly suggestive of tumor<sup>[11]</sup>. A large unilocular cyst with no prior history of pancreatitis, in an otherwise normal pancreas is most likely to be a mucinous pancreatic neoplasm. The risk of misdiagnosis for pseudocyst increases if the cystic tumor communicates through the pancreatic duct, and is greater with mucinous cystadenocarcinoma (15%) than with mucinous cystadenoma (9%). Endoscopic ultrasonography findings of nonenhancing mural nodules in the dilated main pancreatic duct is characteristic of malignant tumor<sup>[12]</sup>. Preoperative endoscopic cyst fluid analysis (tumor markers: CEA, CA19.9, mucin-containing or malignant cells, amylase), or intraoperative frozen-section biopsy of the cyst wall may discriminate between tumor and pseudocyst<sup>[5,11,13]</sup>. Ultrasonography, CT, magnetic resonance imaging, and endoscopic ultrasound will identify most tumors with a significant invasive component, but preoperative and intraoperative assessment of the dysplasia grades of MCNs and IPMNs can be difficult<sup>[14]</sup>. At operation most cystic tumors are seen to be discrete lesions, with adjacent normal pancreas and a loose attachment to neighboring structures as in this case. In sharp contrast pseudocysts are thick-walled inflammatory masses, which are usually adherent to the omentum and/or adjacent viscera, and, the remaining pancreas is markedly indurated<sup>[15]</sup>. A frozen-section biopsy taken from the wall of the lesion would confirm the presence of an epithelial lining and clinch the diagnosis of a cystic neoplasm<sup>[6,11]</sup>.

The treatment of benign pancreatic cystic lesions is controversial. As cystic tumors are all potentially malignant and preoperative investigations could not always distinguish cystadenoma from cystadenocarcinoma, it is suggested that mucinous cystic tumors be resected<sup>[5]</sup>. Because MCNs occur in the body and tail of the pancreas distal pancreatectomy has been conventionally performed. However, parenchymal-sparing enucleation or pancreatic segmental resection is indeed safe for cystic pancreatic neoplasms<sup>[4,7]</sup>. Limited resections or even focal non-anatomic resections (excision, enucleation, uncinectomy) may be considered for MCN or branch duct-intraductal papillary mucinous neoplasia (BD-IPMN) without clinical, radiologic, cytopathologic, or serologic suspicion of malignancy<sup>[16,17]</sup>. Enucleation is usually the standard operation for small benign cystic neoplasms as it reduces operative time, blood loss without increasing postoperative complications or length of hospital stay<sup>[6-8,18]</sup>. Focal nonanatomic resection should be carried out whenever possible and oncologically feasible as in this case to

prevent the complications of major pancreatic resection<sup>[8]</sup>. However, nonanatomic resections may be associated with rare, but possible, leakage of mucin followed by pseudomyxoma peritonei<sup>[19,20]</sup>, and, also have a higher incidence of pancreatic fistulae and risk of recurrence from potentially residual neoplasm.

If there is any doubt as to the nature of the cystic lesion at operation as in this case, it should be excised. It is better to excise a pseudocyst or mesenteric cyst than leave behind or drain a cystic neoplasm<sup>[2,3]</sup>. Because invasive carcinoma can be focal the entire specimen must be extensively examined histologically<sup>[21]</sup>. When the final pathology reveals invasion or positive margin for high-grade dysplasia undetected on frozen sections, a reoperation should be performed in surgically fit patients<sup>[4]</sup>. These benign pancreatic cystic lesions have a very high cure rate unless malignant change supervenes when a 50%, 5-year survival after resection of mucinous cystadenocarcinoma is attained<sup>[5]</sup>. Usually, benign MCN do not recur and therefore surveillance is not necessary<sup>[4]</sup>. Surveillance after resection of benign IPMNs is currently under debate as the prognosis of invasive IPMN is better than that of pancreatic ductal adenocarcinoma (PDAC). However, in cases of stage II/III invasive IPMN, the prognosis is similar to that of PDAC<sup>[22-24]</sup> and the follow-up strategy should be similar to that for PDAC<sup>[4]</sup>.

## Conclusions

Excision of benign mucinous cystadenoma of the pancreas is safe and effective. Surveillance for recurrence is not necessary. Newer biomarkers that could identify those high-risk cysts such as IPMNs with potential for progression to malignancy would be important.

## Ethical approval

The need for ethics approval and consent to participate was waived.

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## Author contribution

E.P.W.: was the main author and surgeon; D.E.: contributed to the literature search; T.C.N.: contributed in literature search; M.N.N.: contribute ideas. All authors read and approved the final manuscript.

## Conflict of interest disclosure

The authors declare that they have no financial conflict of interest with regard to the content of this report.

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