Cystic degeneration of ductal adenocarcinoma of the pancreatic tail

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ABSTRACT

We present a 54-year-old Chinese man with a tumour at the pancreatic tail associated with a presumed cystic splenic lesion. Histological examination showed a pancreatic ductal adenocarcinoma with extensive cystic degeneration and invasion of the spleen, a rare imaging presentation for such a tumour.

Keywords: ductal adenocarcinoma, pancreatic ductal adenocarcinoma, pancreatic tumour, pancreatic cyst degeneration, splenic cystic lesion

Singapore Med J 2009;50(3):e91-e93

INTRODUCTION

Pancreatic ductal adenocarcinoma is the most common pancreatic malignancy, and is typically a solid tumour. In cases where there is an associated cystic component, these are usually either pseudocysts or retention cysts.[1] Extensive central tumour necrosis resulting in a large cystic component is unusual and may be misdiagnosed as other cystic neoplasms of the pancreas. We present the clinical, operative and pathological findings of such a case and discuss the differential diagnoses of cystic pancreatic masses as well as the management of pancreatic ductal adenocarcinoma.

CASE REPORT

A 54-year-old Chinese man presented with severe abdominal pain lasting for one day. There was no other gastrointestinal or urinary symptom and no previous medical history, in particular, that of pancreatitis or trauma. A family history of an uncle with pancreatic cancer was obtained. Palpation elicited mild periumbilical tenderness and a suspicious, firm, smooth mass in the left hypochondrium. Bowel sounds were present and a digital rectal examination was unremarkable. The abdominal radiograph confirmed a mass in that region causing elevation of the left hemidiaphragm, as well as displacement of the gastric bubble and splenic flexure. Subsequent computed tomography (CT) of the abdomen revealed a tumour at the pancreatic tail in continuity with a large septated cyst that appeared to be splenic in origin. Free perisplenic and perihepatic fluid raised the suspicion of simple reactive or malignant ascites, or even cyst rupture (Figs. 1a & b). Probable differential diagnoses included a pancreatic mucinous cystadenocarcinoma or cystic necrosis within a pancreatic ductal adenocarcinoma. Urgent laparotomy was performed the next day due to intractable pain. Intraoperatively, there was massive cystic splenic enlargement down to the level of the umbilicus. The cyst contained large amounts of an "anchovy sauce-like" material. A suspicious mass was noted along one aspect of the cyst adjacent to the pancreatic tail, and was subsequently confirmed at the intraoperative frozen section to be an adenocarcinoma. There were dense inflammatory adhesions to the pancreatic tail, stomach, transverse colon, left kidney and abdominal wall. Consequently, the distal pancreas, spleen and a cuff of the stomach were resected.

Gross examination of the resected specimen showed an opened cyst with a friable lining and a thickened, fibrotic wall (Fig. 1c). Cut sections revealed an ill-defined, hard, tan-yellow tumour, measuring 4 cm in maximum dimension at the tail of the pancreas, invading into the spleen via a narrow tract, and in continuity with the cyst. Histological examination of the tumour showed a moderately differentiated ductal adenocarcinoma. The spleen was compressed and invaded by the cystic component of the tumour, whose wall was lined by malignant columnar epithelium similar in histology to the tumour in the distal pancreas (Fig. 1d). No ovarian-type stroma was observed in the sections of the cyst wall sampled for histology to suggest a mucinous cystadenoma/cystadenocarcinoma. No invasion into the stomach was seen, and the pancreatic resection margin was free of dysplasia or tumour. Tumour marker levels for carbohydrate antigen 19-9 (CA 19-9) and carcinoembryonic antigen (CEA) were available only the subsequent day. They were markedly elevated, being 9,363 U/ml for CA 19-9 (normal 0–37.0 U/ml) and 26.7 µg/L for CEA (normal 0–3.5 µg/L). The patient was discharged on the fifth postoperative day and a referral was made to the medical oncologist for radiochemotherapy. However, he declined follow-up treatment, with the unfortunate development of tumour recurrence, and eventually succumbed to the disease one year later.

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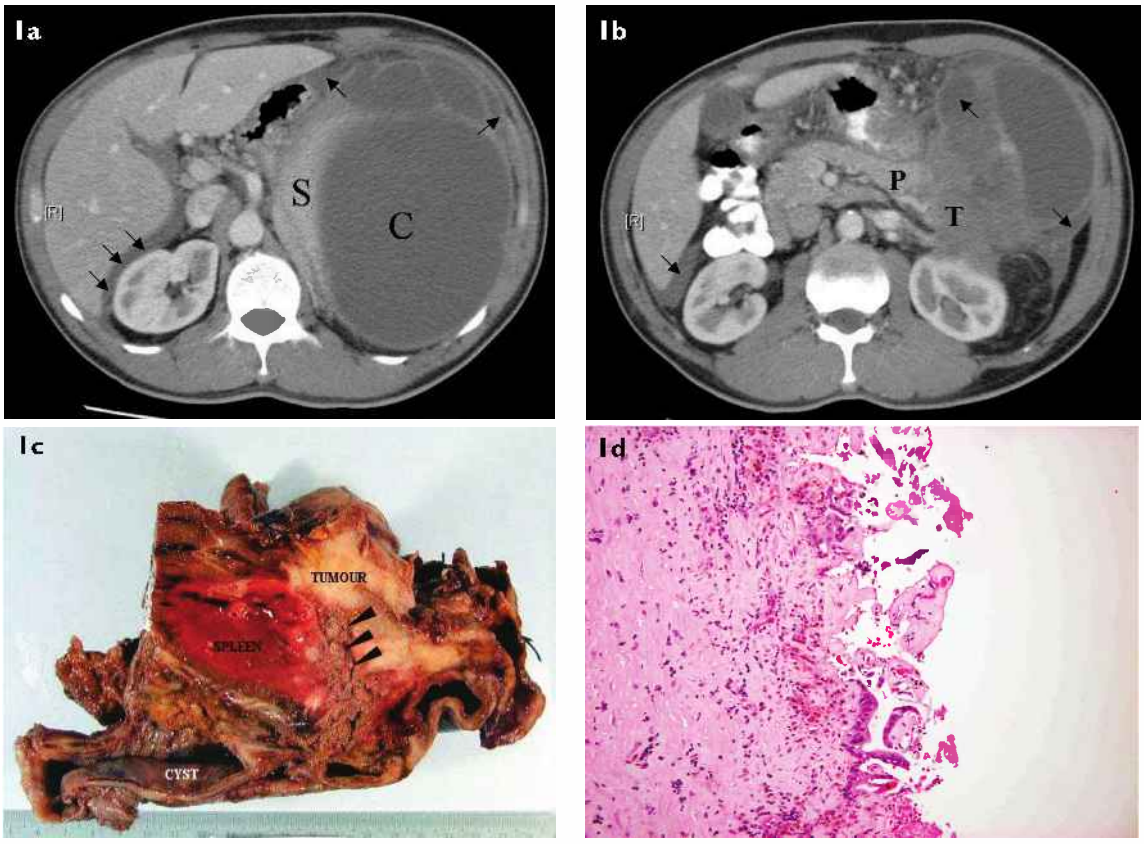

Fig. 1 A 54-year-old man with sudden onset of severe abdominal pain. (a) Contrast-enhanced axial CT image of the upper abdomen shows a 16.7 cm × 14.9 cm septated cyst (C) with compression of the adjacent splenic parenchyma (S) medially, resulting in the appearance of a "claw sign", suggesting splenic origin. Free perihepatic and perisplenic fluid are noted (arrows), which may be simple reactive or malignant ascites, or even cyst rupture. (b) Axial CT image taken at another level shows a solid enhancing component (T) at the medial aspect of a large cyst, inseparable from the spleen and in continuity with the tumour at the tail of the pancreas (P). Free perihepatic and perisplenic fluid are again noted (arrows). (c) Annotated cut section of the specimen shows the tumour at the pancreatic tail invading through the spleen and communicating with the cyst, via a narrow tract (arrowheads). (d) Photomicrograph shows a malignant columnar epithelium lining cyst wall, similar in histology to the tumour at the pancreatic tail (Haematoxylin & eosin, × 200).

DISCUSSION

The pancreas is both an exocrine and endocrine gland. The former function predominates and tumours of the exocrine pancreas account for the majority of pancreatic malignancies. 90% of pancreatic tumours are ductal adenocarcinomas; extensive cystic degeneration is uncommon, and may be seen when such tumours increase in size.[2] The majority of these tend to be large and poorly-differentiated tumours, with a single large cavity lined by tumour cells and containing haemorrhagic debris.[1] In our case, cystic degeneration may have been facilitated by the considerable size of the splenic component of the tumour being separated by a narrow isthmus. The extent of cystic degeneration in this case is also distinctly unusual, and the pressure effect exerted by the cystic component with compression and invasion of the spleen most probably accounted for the clinical and imaging impression of a cystic lesion of splenic origin. Cystic degeneration may occasionally occur in other typically solid pancreatic tumours, such as a cystic non-functioning neuroendocrine tumour. Only a small percentage (1.5%–4%) of these tumours undergo cystic degeneration, due to their abundant vascular supply.[3]

Pancreatic pseudocysts, which occur in association with pancreatitis, are the commonest of cystic pancreatic lesions.[3,4] Chronic pancreatitis may coexist with an underlying pancreatic cancer, either as a risk factor for malignancy or as a consequence of chronic inflammation accompanying the tumour.[5] Hence, pancreatic adenocarcinoma coexisting with or complicated by a pseudocyst is a differential diagnosis in our case, but there was no past history or evidence of pancreatitis at presentation. Cystic pancreatic neoplasms are the next most common group of cystic lesions of the pancreas and are not as rare as originally thought. The more common subtypes, accounting for 90% of this category, are mucinous cystic neoplasms (MCN), intraductal papillary mucinous neoplasms (IPMN) and serous cystic neoplasms (SCN).[4] Most cystic neoplasms are potentially premalignant or malignant and cystic neoplasm mimicking a splenic cyst has been reported. SCNs are usually benign microcystic adenomas with a low incidence of malignant transformation, although Shintaku et al reported a case and cited another documented case where a serous cystadenocarcinoma was found to have invaded the spleen.[6] MCNs represent a broader spectrum,

ranging from benign cystadenomas with the potential for malignant transformation to cystadenocarcinomas with metastatic potential. Six cases of MCN presenting as a splenic cyst have been reported in the literature and two of these presented with spontaneous rupture of the spleen.[7]

Small (< 3 cm) asymptomatic cysts of the pancreas without a solid component may be followed radiographically, but any cystic pancreatic mass with a solid component should be considered premalignant and suspicious for malignancy.[8] The optimal management of a pancreatic cyst should be individualised based on the risk-benefit ratio of surgery which is influenced by certain factors, such as the patient's potential life expectancy, surgical risk and malignant potential of the cyst.[4] Serum amylase and tumour markers like CA 19-9 and CEA have been utilised with variable results.[8,9] Endoscopic ultrasonography (EUS) allows for high resolution images of the pancreatic cyst, but morphological features alone often do not reliably differentiate a benign from a malignant cystic neoplasm. Fine needle aspiration (FNA) of the cyst fluid via EUS has increased the sensitivity and accuracy of differentiating cystic pancreatic lesions.[4,10] Fluid is tested for viscosity, analysed for mucin and amylase as well as tumour markers, in particular, CEA. Amylase-rich aspirate suggests ductal communication, indicating a pseudocyst or IPMN. The presence of extracellular mucin in the fluid (> 192 ng/ml) most likely indicates a mucinous cystic lesion (MCN or IPMN). Due to the difficulty in obtaining sufficient cells in the FNA, cytological examination may yield a false negative. Earlier concerns arising from the potential spillage of malignant cells have been proven to be unfounded and this plays an important role in the workup of these lesions.[4] However, EUS-FNA is contraindicated when surgery is planned[10] or when the lesion is located in the pancreatic body or tail, potentiating needle-tract seeding.

Adenocarcinomas arising from the pancreatic body and tail are more locally aggressive and carry a poorer prognosis compared to those at the head.[11] Although the general consensus is that resection results in a better survival rate, quoted as up to 30% at three years, the majority (more than 90%) of patients have unresectable tumours due to local spread or distant metastases.[12,13] The latter group may benefit from radiochemotherapy, a modality that may sometimes downstage a locally-advanced unresectable lesion to one that is amenable to resection.[13] Palliative treatment is advocated when there are distant metastases. In conclusion, pancreatic adenocarcinoma with extensive cystic necrosis forming a large cyst that splays the spleen with splenic invasion, mimicking a pancreatic tail tumour with a splenic cyst, is a very unusual presentation. This case serves to illustrate that, apart from the more common pseudocysts and true cystic pancreatic neoplasms, cystic change in otherwise typically solid pancreatic malignancies should be considered in the differential diagnosis of a cystic pancreatic lesion.

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