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Cystic lesions of the pancreas: an appraisal of an aggressive resectional policy adopted at a single institution during 15 years

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Abstract

Background: Although an aggressive resectional approach toward pancreatic cysts has been advocated in the past, many clinicians now deem this therapeutic strategy impractical given the rapidly increasing incidence of incidentally detected pancreatic cystic lesions. The aim of this study was to review the aggressive resectional policy toward pancreatic cysts adopted at our institution during the past 15 years.
Methods: One hundred nine consecutive patients who underwent surgical resection of a cystic lesion of the pancreas during a 15-year period were retrospectively reviewed. To determine subsets of patients at lower risk of having a malignant cyst, the clinicopathologic features (in particular, the malignant potential) of these patients were compared as a function of 3 variables, ie, presence of symptoms, patient age, and cyst size, using univariate analyses. Results were expressed as median and range and $P < .05$ was considered statistically significant.
Results: Forty-three (39%) of 109 patients were asymptomatic. Incidental cysts were smaller (28 [10 to 240] vs 59 [10 to 200] mm, $P < .001$) and were found in older patients (55.0 [18 to 77] vs 45.5 [14 to 82] years, $P = .003$). Overall, 14% of asymptomatic cysts, versus 35% of symptomatic cysts, were malignant ($P = .016$). Incidental cysts were also less likely to be premalignant or malignant compared with symptomatic cysts (47% vs 70%, $P = .015$). Twenty (18%) patients were elderly (73.0 [70 to 82] years old). Elderly patients had a more equal sex distribution (45% vs 76% female, $P = .005$) and had smaller cysts (26 [10 to 200] vs 55 [10 to 240] mm, $P = .003$) that involved the head of the pancreas more frequently (8 [40%] vs 17 [19%], $P = .045$) compared with their younger counterparts. The cohort of elderly patients also had a higher median American Society of Anesthesiologists score (2 [1 to 3] vs 1 [1 to 3], $P < .001$), and a higher proportion had undergone a "more" major procedure (Whipple's or total pancreatectomy) (55% vs 18%, $P < .001$). Not unexpectedly, surgical morbidity in the elderly was significantly higher (10 [50%] vs 24 [27%], $P = .045$). The operative mortality in both groups was not significantly different (1 [5%] vs 1 [1%], $P = .324$). The proportion of premalignant or malignant lesions in elderly patients was also similar to that in younger patients (11 [55%] vs 55 [62%], $P = .574$). The size of a cyst in asymptomatic patients had no correlation with its potential for malignancy.
Conclusions: Reliance on preoperative characteristics alone such as the presence of symptoms, cyst size, and patient age are not sufficiently reliable in determining the malignant potential and thus management approach toward pancreatic cysts.

Keywords: Pancreatic cyst; Pancreatic cystic neoplasm; Pancreatic cystic lesion; Pancreas; Pancreatic cystic tumor; Intraductal papillary mucinous neoplasm; Serous cystic neoplasm; Mucinous cystic neoplasm

The incidence of pancreatic cysts has been reported to be rapidly increasing with the routine use of cross-sectional imaging [1–3]. Similarly, we have experienced a dramatic increase in the number of pancreatic cysts managed at our

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institution during the last few years. When we initially reported our surgical experience with cystic lesions of the pancreas in 1998 [4], we had encountered 18 such patients during an 8-year period (1988 to 1996). However, during the past 8 years (1997 to 2004), the number of pancreatic cysts resected at our institution has increased by >5-fold (92 cystic lesions resected).

The treatment strategy of pancreatic cystic lesions adopted at our institution is that of an aggressive resectional approach. This "aggressive" policy toward pancreatic cysts was based on our initial experience, during which we encountered difficulties with accurate preoperative diagnosis, high incidence of potentially malignant tumors in our population, and good outcome with resection [4]. Others have also advocated this approach [5,6]. However, given the rapidly increasing incidence of incidentally detected pancreatic cystic lesions, many clinicians now deem this therapeutic strategy impractical [7,8]. Thus, with the results of these latest studies in mind, we reviewed our institutional practice of an aggressive surgical approach for all pancreatic cysts.

Patients and Methods

From January 1990 to December 2004, all patients who underwent surgical resection of a cystic lesion of the pancreas at the Department of Surgery, Singapore General Hospital, were retrospectively reviewed. During this 15-year period, an aggressive resectional policy toward pancreatic cysts was adopted, and all surgically fit patients referred to the department were offered operative treatment. The only exceptions were patients with pancreatic pseudocysts or those who were deemed unfit for or who refused surgery. One hundred nine consecutive patients underwent surgical resection, and some of these have been reported previously [3,4,9,10]. During this 15-year period, 31 patients with pancreatic pseudocysts were managed surgically. However, none of these patients underwent surgical resection of the cysts, and therefore they were excluded from the present study.

The patients' clinical, radiologic, and pathologic records were collected from the case files. Cystic lesions were considered malignant if carcinoma or carcinoma in situ was present [3]. All "benign" intraductal papillary mucinous neoplasms (IPMNs), mucinous cystic neoplasms (MCNs), solid pseudopapillary neoplasms, and cystic pancreatic endocrine neoplasms (PENs) were deemed premalignant lesions. The benign cysts comprised the serous cystic neoplasms (SCNs), lymphangiomas, congenital cysts, and other nonneoplastic cysts. All results were presented as median (range) or number (percentage) of patients. To determine a subset of patients who could possibly be managed conservatively, the clinicopathologic features and malignant potential of the pancreatic cysts were analyzed. In particular, we were interested in key preoperative risk factors. We reviewed the literature and identified 3 potential key variables: presence of symptoms, patient age, and cyst size [1,3,8,11,12]. We subsequently subdivided and compared the pancreatic cysts according to these variables. The patients were divided into groups according to presence of symptoms (incidental vs symptomatic), age (elderly [≥70 years old] vs young and middle-age patients), and cyst size (≤2 vs >2 cm). Clinicopathologic features were compared using univariate analyses. Furthermore, to define a management strategy for pancreatic cysts, we subdivided this cohort of patients according to these 3 variables into the following sequence: presence of symptoms, patient age, and cyst size. The prevalence of benign, premalignant, and malignant cysts was then determined for each subgroup.

All statistical analyses were conducted using chi-square, Fisher's exact, and Mann-Whitney U tests, as appropriate, using the computer program Statistical Package for Social Sciences for Windows, version 10.0 (SPSS, Chicago, IL). The tests were 2-sided, and $P < .05$ was considered statistically significant.

Results

The clinicopathologic features of the 109 patients are listed in Table 1. Forty-three patients (39%) were symptomatic, and pancreatic cysts were found predominantly in women (71%). The predominant symptoms and signs in the 66 symptomatic patients were abdominal pain or dyspepsia (n = 50), palpable abdominal mass (n = 31), weight loss (n = 15), back pain (n = 12), jaundice (n = 4), and pancreatitis (n = 3). The patients had median symptom duration of 2 months (range 1 day to 29 years). The main radiologic investigations for the identification of pancreatic cysts were transabdominal ultrasonography (US) (n = 51), computed axial tomography (CAT) (n = 103), and magnetic resonance imaging–magnetic resonance cholangiopancreatography (MRI–MRCP) (n = 33). Endoscopic retrograde cholangiopancreatography was performed in only 5 patients, and none of the patients underwent endoscopic ultrasonography (EUS) or fine-needle aspiration (FNA) of cyst fluid. The majority of incidental pancreatic cysts were detected during radiologic investigations for other indications such as follow-up or staging of other cancers or during routine health screening. Only 22% of patients received a correct preoperative diagnosis, whereas 27% received an incorrect diagnosis. A further 51% received the diagnosis of an "indeterminate" pancreatic cyst.

The most common pathologic diagnosis was SCN (31%) followed by IPMN (19%) and MCN (19%). There were 8 nonneoplastic cysts, including 3 congenital, 2 retention, 1 mucinous nonneoplastic (a controversial pathologic entity reported previously) [10], 1 pancreatic abscess, and 1 duplication. All patients had complete surgical removal of their cysts. Five patients (4 with an IPMN and 1 with an MCN) underwent total pancreatectomy. The patient with MCN had