Pancreatic solid-cystic papillary tumor: clinical aspects, radiological findings and surgical treatment in a series of five patients

Tumor papilar sólido-cístico do pâncreas: aspectos clínico-radiológicos e resultados cirúrgicos em cinco pacientes operados

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ABSTRACT

Objective: To describe five cases of solid-cystic papillary tumor of the pancreas regarding clinical and radiological findings, together with surgical treatment. Methods: The authors presented five patients with pancreatic solid-cystic papillary tumors. All patients were treated by the General Surgery Service of the Teaching Hospital, Faculdade de Medicina do ABC – Santo André - São Paulo. There were four female and one male patients, age range of 15-36 years. The study period spanned from January 2000 to November 2006. The main aspects concerning clinical, epidemiological and radiological findings were investigated. Results: All tumors were resectable. The surgical procedures performed were: two cephalic gastroduodenopancreatectomies, one subtotal pancreatectomy plus splenectomy, one distal pancreatectomy plus splenectomy and one total gastroduodenopancreatectomy plus splenectomy. The mortality rate was nil, whereas postoperative morbidity rate was 20%. All patients survived tumor resection and presented no recurrence (the follow-up period ranged from 6 to 54 months). Conclusion: The solid-cystic papillary tumors of the pancreas are neoplasms with a good prognosis. Both clinical-epidemiological and radiological findings are important for correct diagnosis.

Keywords: Pancreatic neoplasms/surgery; Carcinoma, papillary/surgery; Pancreaticoduodenectomy; Pancreas/pathology

INTRODUCTION

Solid-cystic papillary tumor (SCPT) of the pancreas is an uncommon neoplasm. It was first observed in 1927, in a 19-year-old woman. Nevertheless, it was Frantz who described it for first time in 1959. He reported four cases...
that had been misdiagnosed as non-functioning islet cell tumors, and described this tumor as a new entity and called “papillary tumor of the pancreas”\(^{(1)}\).

These tumors have been designated using several names: papillary epithelial neoplasm, papillary cystic neoplasm, solid and papillary epithelial neoplasm, solid and cystic acinar tumor, papillary and solid neoplasm, papillary cystic carcinoma, solid and cystic papillary tumor, solid pseudopapillary tumor or carcinoma\(^{(2)}\). In 1996, they were definitively called solid-pseudopapillary tumor of the pancreas by consensus of the World Healthy Organization\(^{(3,4)}\). However, the term “solid-cystic papillary tumor” best describes the macroscopic appearance of this tumor - a solid tumor with central hemorrhagic and cystic areas. Histologically, a variegated pattern of solid, pseudopapillary and cystic growth is common\(^{(2)}\).

SCPTs are exceptionally rare malignant tumors of the pancreas. They only constitute about 5% of cystic pancreatic tumors and 1%-2% of exocrine pancreatic tumors\(^{(2,5-6)}\). However in recent years, these tumors have been identified with increasing frequency due to better awareness of their existence, wider availability of immunohistochemical stains and retrospective studies in which cases had not been identified previously\(^{(6)}\).

To date, several series of SCPTs have been report in Brazil\(^{(7-9)}\). Among these, Cunha et al.\(^{(8)}\) reported the largest series with 14 cases. Even in a heavily populated country such as Brazil, there have been few series published. Therefore, the authors described five cases of the SCPTs treated by a single surgical team. The study period was January 2000 to November 2006. A brief review of the literature was carried out, regarding principally clinical-epidemiological and radiological findings. Surgical management was also revisited.

**METHODS**

A total of five patients were included in this study: one man and four women, age range of 15 to 36 years. Four patients were white and one black. All patients were followed-up by the General Surgery Service, at the Teaching Hospital, Faculdade de Medicina do ABC, Santo André, Brazil.

All patients had their disease documented by clinical and radiological methods, confirmed by pathological analysis. All patients underwent surgical treatment for their pancreatic neoplasm. The hospital Ethics Committee approved this study.

The tumor localization was body-tail (n = 2), head (n = 2) and multicentric (n = 1). Symptoms and clinical signs presented were abdominal pain (n = 4), back pain (n = 2), abdominal mass (n = 3), abdominal pain plus hemorrhagic shock (n = 1).

The radiological findings at computerized tomography were as follows: a smooth well-defined pancreas tumor with cystic areas in two cases (figures 1-2), a smooth well-defined pancreas tumor with cystic areas with sparse calcifications in two cases (figure 1) and one case presented a rounded and well-defined solid lesion in both head and body-tail (multicentric lesion) (figure 3). The diameter of the tumors varied from 5 to 21 centimeters. Solid and cystic papillary neoplasm was the main presumptive diagnosis in four cases. One patient was diagnosed during a laparotomy for abdominal trauma.

Tumoral markers (CEA, CA 19-9) were at normal levels in four patients. The tumoral markers were not dosed in the patient submitted to laparotomy due to abdominal trauma. Patients’ characteristics (clinical, radiological, surgical findings) are shown in chart 1.
RESULTS

All patients were submitted to surgical resection of their tumors. The surgical procedures were: two cephalic gastroduodenopancreatectomy, one distal pancreatectomy plus splenectomy, one subtotal pancreatectomy plus splenectomy and one total gastroduodenopancreatectomy plus splenectomy (figure 4). The operative time varied between 180 and 435 minutes. Two patients received transfusions. The hospital stay ranged from five to fourteen days. There was no postoperative mortality. Two postoperative complications were observed. The patient submitted to total gastroduodenopancreatectomy plus splenectomy developed both endocrine and exocrine insufficiencies that were controlled by insulin and pancreatic oral enzyme use respectively. All patients survived without recurrence signs (clinical or radiological). The follow-up period varied between 6 and 54 months (chart 1).

The macroscopic analysis showed well-delimited and encapsulated tumors with gray-red color. A solid and cystic mass with necrotic-hemorrhagic areas was observed in four patients (figure 4). All resections were R0 (free margins). All patients presented positive histological findings for solid-cystic papillary tumor in the resected specimen. The immunohistochemical stains are shown in chart 2.

<table>
<thead>
<tr>
<th>Characteristic (with unit)</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
<th>Case 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Age (years)</td>
<td>16</td>
<td>21</td>
<td>15</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>Race</td>
<td>White</td>
<td>White</td>
<td>Black</td>
<td>White</td>
<td>White</td>
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<tr>
<td>Symptoms</td>
<td>Abdominal pain + mass</td>
<td>Abdominal pain + mass</td>
<td>Back pain</td>
<td>Back pain</td>
<td>Abdominal pain + mass</td>
</tr>
<tr>
<td>Radiological findings</td>
<td>Solid-cystic calcifications</td>
<td>Solid-cystic calcifications</td>
<td>Solid lesions</td>
<td>Solid lesions</td>
<td>Solid lesions</td>
</tr>
<tr>
<td>Maximum diameter (cm)</td>
<td>8</td>
<td>21</td>
<td>15</td>
<td>5</td>
<td>10 and 5</td>
</tr>
<tr>
<td>Tumor location</td>
<td>Head</td>
<td>Body-tail</td>
<td>Body-tail</td>
<td>Head</td>
<td>M</td>
</tr>
<tr>
<td>Surgical treatment</td>
<td>Cephalic-GDP</td>
<td>DPS</td>
<td>STPS</td>
<td>Cephalic-GDP</td>
<td>TGDPS</td>
</tr>
<tr>
<td>Duration of operation (minutes)</td>
<td>420</td>
<td>180</td>
<td>245</td>
<td>438</td>
<td>435</td>
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<td>Postoperative complications</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>DM + EI</td>
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<tr>
<td>Transfusion (ml)</td>
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<td>-</td>
<td>-</td>
<td>900</td>
<td>600</td>
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<tr>
<td>Hospital stay (days)</td>
<td>10</td>
<td>5</td>
<td>7</td>
<td>8</td>
<td>14</td>
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<tr>
<td>Survival time (months)</td>
<td>54</td>
<td>20</td>
<td>15</td>
<td>24</td>
<td>6</td>
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</tbody>
</table>

GDP - gastroduodenopancreatectomy, DPS - distal pancreatectomy plus splenectomy, STPS - subtotal pancreatectomy plus splenectomy, TGDPS - total gastroduodenopancreatectomy plus splenectomy, M-multicentric, DM - diabetes mellitus, EI - exocrine insufficiency.

Chart 2. Immunohistochemical stain results

<table>
<thead>
<tr>
<th>Immunohistochemical panel</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
<th>Case 4</th>
<th>Case 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chromogranin</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Vimentin</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>AE1/AE3</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Alpha-chymotrypsin</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Neuron-specific endolase</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Progesterone receptors</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>
DISSCUSSION

SCPTs are rare neoplasms of the pancreas and represent only 2.5% of all pancreatic tumors (6). Since they were first described, nearly 718 cases have been reported, but over recent years an increasing frequency has been observed due to better histological knowledge (10-12). The peak incidence rates are during the second and third decades of life. These tumors presented female gender preference. The origin of SCPTs has not yet been clarified and some controversy exists over their origin. Many investigators favor the theory that these tumors originate from multipotent primordial cells while others suggest an extra-pancreatic origin from genital ridge angle-related cells. Several reports discuss their origin in detail but the line of cellular differentiation remains uncertain (13-17).

SCPTs have been reported on the body, tail or head of the pancreas (4-17), however, multicentric lesions are very rare - in the literature review we found only one case reported (11). Given their low frequency, these tumors present a difficult diagnosis. The differential diagnosis includes metastatic tumors (renal cancer, melanoma), pancreatic endocrine tumors with cystic areas, cystic pancreatic neoplasms (cystadenoma, cystadenocarcinoma), lymphoepithelial cysts and pseudocysts secondary to pancreatitis (7-9).

SCPTs are considered low malignant potential tumors. They are usually encapsulated, and seldom invade neighboring structures. They are slow growing tumors. Lymphatic spread is rarely observed and hematogenous metastases are anecdotal with a few cases described. When metastases are present, the liver is the most common site of distant disease (10-13).

Due to their slow growth, SCPTs can become large and bulky tumors at diagnosis. The most common symptoms are pain (abdominal, back), dyspepsia or even an abdominal mass (5,7-8,10-11). These tumors become symptomatic when they attain large dimensions. The mean diameter to present symptoms has been around 6.1 cm (more than 75% are greater than 5 cm in diameter). Asymptomatic cases were only reported in 15.5% of cases (9). In the present series, all patients presented symptoms, while three patients with large tumors presented abdominal pain and palpable mass. Bulky pancreatic SCPTs have also been reported in previous articles (10,12,14).

Diagnosis is made by radiological methods, including abdominal ultrasound, spiral computerized tomography and nuclear magnetic resonance. The principal findings are a heterogeneous, rounded and well-encapsulated mass with solid and cystic areas. Occasionally, they present internal septations or calcifications (11,14,16). A pure solid-looking mass can also be observed. In the present series, four patients presented radiological findings that suggested a SCPT, as solid tumors with central cystic area. For complementary diagnosis, the endoscopic ultrasound can be utilized, which is described to corroborate the excellent loco-regional control. More recently in some cases, fine-needle aspiration biopsy (FNAB) or cytology have been used for accurate diagnosis and are especially relevant in difficult cases (11-12). In a literature review this method presented only 52 positive cases for SCPT (11). The present series of patients presented radiological aspects of SCPTs, and therefore surgical resection was always indicated. In accordance with almost all previous reports, the tumoral markers were at normal levels (3-5). These tests are poor markers for diagnosis since they are rarely elevated. Occasionally, slight elevations of CA19-9 can be seen (6,10,15).

The macroscopic analysis of these tumors revealed solid and yellowish areas with cystic, frequently necrotic and hemorrhagic zones. Histologically, SCPT is generally characterized by solid areas which alternate with a pseudopapillary pattern, and cystic spaces resulting from gradual degenerative changes within the solid neoplasm (2,6).

The immunohistochemical pattern of SCPTs is very distinctive. Neoplastic cells are consistently positive to vimentin, alpha-1-antitrypsin and alpha-1-antichymotrypsin stains. Sometimes they express focal positivity for neuron-specific enolase, synaptophysin and progesterone receptors (15-16). More recently, a strong positivity for CD10 and CD56 has been reported (14). In the present series, all patients presented positivity to both vimentin and alpha-1-antichymotrypsin. Three patients were positive to progesterone receptors.

SCPT treatment remains largely surgical. Chemotherapy and radiation therapy have been reported to be ineffective in treating these tumors (2,5,10,12,15). Hepatic metastasis are sometimes present, then hepatic resection with curative intent should be indicated (12,15). Since SCPTs have an excellent prognosis and are highly curable, all efforts must be made to excise them. The surgical management depends on the pancreas tumor localization. Body or tail lesions have been treated by spleen-preserving distal pancreatectomy or even distal pancreatectomy with splenectomy. The central pancreatectomy seems adequate for small lesions which are located in the isthmus of the pancreas (17-18). The pylorus-preserving pancreateoduodenectomy or Whipple’s procedure should be indicated for cephalic tumors. Regional lymphadenectomy is not indicated, except if there are bulky or suspect comprising nodes (2,5,10). If hepatic metastasis is present, only hepatic resection (hepatectomy or enucleation) can offer long-term disease.
control disease or even cure\textsuperscript{(2,13,15)}. Since the multicentric lesion is uncommon, total pancreatectomy is rarely indicated and has a high morbidity\textsuperscript{(11)}. In the present series, one patient presented two large tumors (head and body-tail) and subsequently a total pancreatectomy was performed.

CONCLUSION

A diagnosis of SCPT should be considered in young females with a bulky rounded and well-defined pancreatic tumor. SCPTs of the pancreas should be treated surgically: conservative or radical pancreatic resections in localized tumors or aggressive treatment with complete resection of both primary tumor and metastatic lesions, in non-localized cases. Surgical treatment can offer a cure or even good loco-regional control since SCPTs are low-malignant potential tumors.

REFERENCES