Pseudopapillary and Solid Tumor of Pancreas (PPSTP): Report of Seven Cases

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Case Series

Introduction

Described for the first time by Frantz in 1959 [1], pseudopapillary solid tumors of the pancreas (PPSTP) and have been defined since 1996 by the WHO as solids and papillaries [2]. They are particular by their clear predominance occurring in young women (30 years on average) and their good long-term prognosis [3]. Their positive diagnosis is often based on modern morphological examinations such as computed tomography and MRI. Surgery occupies a prominent place in their therapeutic management and all importance must be given to their diagnosis or at least their strong presumption in order to make curative surgical resection. We report seven cases all involve women, with an average age of 26.4 years (15-59 years). Radical surgery was performed in all cases with simple consequences in 5 patients and complicated in 2 others, including a pancreatic fistula and a pulmonary embolism. The histological study confirmed the diagnosis in all cases and the latter was supplemented by immunohistochemistry. In the long term, the seven patients are alive without recurrence at 100, 88, 78, 78, 74, 48 and 24 months. Conclusion: this form of pancreatic tumors has a good prognosis if well treated. The surgery is the best treatment. Clinician, radiologist, histologist and surgeon must know this disease.

Keywords: pseudopapillary tumor of pancreas – pancreatic tumor - favorable prognosis

Introduction

Described for the first time by Frantz in 1959 [1], pseudopapillary solid tumors of the pancreas (PPSTP) and have been defined since 1996 by the WHO as solids and papillaries [2]. They are particular by their clear predominance occurring in young women (30 years on average) and their good long-term prognosis [3]. Their positive diagnosis is often based on modern morphological examinations such as computed tomography and MRI. Surgery occupies a prominent place in their therapeutic management and all importance must be given to their diagnosis or at least their strong presumption in order to make curative surgical resection. The aim of the work is to report our experience on seven cases of pseudopapillary and solid tumor of pancreas (PPSTP) and followed in our service.

Casuistic

These are seven women with an average age of 26.4 years (15, 16, 31, 34, 36, 37 and 59 years). Two patients underwent a cholecystectomy two years and ten years previously. Another patient had her tumor diagnosed just after vaginal delivery and a second had two desired pregnancies with the diagnosis of tumor already made. Clinically, all of these patients were in good general condition. Atypical pain was noted in three patients, a palpable mass in three, vomiting in two others, and asthenia in the latter. For two patients, the discovery of the tumor was fortuitous. Biologically, amylasemia and lipaemia were normal in second case and first case respectively. The rate of Ca19.9 was high in one patient and normal for the rest. The rate of CEA was normal for all patients (Table n°1: characteristics of the patients). Morphological exploration by transcutaneous ultrasound showed for the fourth patients where it was performed a formation with a heterogeneous echostructure very limited. The computed tomography was in favor of a hypodense tumor, provided with a capsule and taking the product of contrast. MRI performed in two patients objectified a corporeo-caudal tumor with 150mm in large diameter (the largest in this series) showed adhesion to the left mesocolon. Two Whipple procedure,
two left splenopancreatectomy, including one enlarged to the colon and three pancreatctomies and left without splenectomy were performed (Table n°3: Intraoperative aspects). The operative suites were simple in five patients. One patient presented a dried up pancreatic fistula under medical treatment after 15 days and another presented a pulmonary embolism treated with anticoagulants for six months. The histological study was in favor of PPSTP in seven patients. These tumors had a capsule in all cases. These capsules, intact in five patients, were ruptured in two others. In the latter two patients, infiltration of the pancreas adjacent to the tumor was demonstrated. Histologically, papillary or pseudopapillary architecture was also present in all cases. The cells are round; the nuclei have little pronounced abnormalities and rare to absent mitosis. No perineural sheathing or vascular emboli were noted (concept specified in 5 cases). No lymph node infiltration was noted (Lymph nodes analyzed in three cases) (Table n°4: Histological aspects.). An immunohistological study was carried out, confirming the diagnosis made using standard histology (Table n°5: immunohistochemical aspects). In the long term, the seven patients are alive without recurrence at 100, 88, 78, 74, 48 and 26 months.

### Table n°1: Clinical and biological data.

| Variable          | Cas 1 | Cas 2 | Cas 3 | Cas 4 | Cas 5 | Cas 6 | Cas 7 |
|-------------------|-------|-------|-------|-------|-------|-------|-------|
| Age               | 31    | 36    | 15    | 16    | 34    | 59    | 37    |
| Sex               | F     | F     | F     | F     | F     | F     | F     |
| Antecedent        | 1     | Synchronous pregnancy | CX | NR | NR | 2 synchronous pregnancy | Diabetes | CX |
| Condition         | Well  | Well  | Well  | Well  | Well  | Well  | Well  |
| Pain              | No    | Yes   | No    | No    | Yes   | No    | No    |
| Palpable mass     | No    | No    | Epigastrium | Left hypo-chondrium | No | Left Hypo-chondrium | No |
| Asthenia          | Yes   | No    | No    | No    | No    | No    | No    |
| Vomiting          | Yes   | No    | No    | Yes   | No    | No    | No    |
| Fortuitous discovery | No | No | No | No | Yes | No | Yes |
| Tumor site        | Corporeal and caudal | Tail | Head | Body | Head | Corporeal and caudal | Corporeal and caudal |
| Amylasemia        | Normal | - | - | Normal | - | - | - |
| Lipasemia         | Normal | - | Normal | - | Normal | - | Normal |
| Ca 19.9           | Normal | Normal | Normal | Normal | Normal | Normal | High | Normal |
| CEA               | Normal | Normal | Normal | Normal | Normal | Normal | Normal |

CX: Cholecystectomy  
Ca 19.9: Carbohydrate antigen 19.9  
CEA: Carcino-embryonic antigen  
NR: Nothing to Report

### Table n°2: Radiological aspects.

| Exam      | Case | Dimensions | Aspect          | Capsule | Contrast enhancement | Limits          | Preoperative diagnosis                                      |
|-----------|------|------------|-----------------|---------|----------------------|-----------------|------------------------------------------------------------|
| US        | 1    | 40x23      | Heterogeneous   | Yes     | -                   | NetNM          | Pancreatic tumor                                           |
|           | 2    | NM         |                  | NM      | -                   | -              |                                                           |
|           | 3    | 94x80      | Heterogeneous   | NS      | -                   | Net            | Hepatic tumor                                              |
|           | 4    | 107x87     | Heterogeneous   | Yes     | -                   | Net            | Mixed tumor                                                |
|           | 5    | 110x78     | Heterogeneous   | NS      | -                   | NM             | Mixed tumor                                                |
|           | 6    | -          | NM              | -       | -                   | -              |                                                           |
|           | 7    | -          | NM              | -       | -                   | -              |                                                           |
| CT Scan   | 1    | 42x27      | Hypodense       | Yes     | Yes                 | Net            | Benign Tumor                                              |
|           | 2    | 78x70      | Hypodense       | Yes     | Yes                 | Net            | Benign tumor                                              |
|           | 3    | 112x106    | Hypodense       | Yes     | Yes                 | Net            | PPSTP                                                     |
|           | 4    | 101x91     | Hypodense       | Yes     | Yes                 | Net            | Tumor not specified                                       |
|           | 5    | 120x95     | Hypodense       | Yes     | Yes                 | Net            | PPSTP                                                     |
|           | 6    | 70x60      | Hypodense       | Yes     | Ye                  | Net            | Mucinous cystadenoma                                       |
|           | 7    | 65X62      | Hypodense       | Yes     | Yes                 | Net            | PPSTP ou neuroendocrine tumor                              |
| MRI       | 1    | NM         |                  | NM      | NM                  | NM             |                                                           |
|           | 2    | NM         |                  | NM      | NM                  | NM             |                                                           |
|           | 3    | NM         |                  | NM      | NM                  | NM             |                                                           |
|           | 4    | NM         |                  | NM      | NM                  | NM             |                                                           |
|           | 5    | Tissue T1  | Yes              | Yes     | -                   | -              | Stromal tumor                                              |
|           | 6    | Kystique   | Yes              | Yes     | -                   | -              | Mucinous or serous tumor                                   |
| EUS       | 4    | Necrotic center tumor | NS | - | - | - | NS |
| FNA       | 3    | Carcinoma  |                 |         |                      |                |                                                           |

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US: Transcutaneous ultrasound - CT scan; Computed tomography scan- MRI: magnetic resonance imaging – EUS: Endoscopic ultrasound – PPSTP: pseudopapillary and solid tumor of pancreas. NM: Not made- NS: not specified- FNA: fine needle aspiration

Table n°3: Peroperative aspects, gestures et operating suites

| Case | Dimensions cm | Surface | Limits | Gesture | Immediat follow-up | Long-term follow-up |
|------|---------------|---------|--------|---------|-------------------|---------------------|
| 1    | 7             | Smoth   | Soft tumor and well-limited | LP       | Uneventfull       | AWD 100mois        |
| 2    | 8             | Smoth   | Tumor Well-limited          | LSP      | Pancreatic fistula | AWD 88months       |
| 3    | 15            | Smoth   | Tumor well-limited          | Whipple  | Uneventfull       | VSR 78months       |
| 4    | 8             | Smoth   | Tumor well-limited          | PG       | Uneventfull       | AWD 78months       |
| 5    | 10            | Smoth   | Tumor well-limited          | Whipple + ceasarean | Uneventfull       | AWD 74months       |
| 6    | 15            | Smoth   | Tumor well-limited with adhesion to the colon and mesocolon | LSP +C | Pulmonary embolism | AWD 48months       |
| 7    | 7             | Smoth   | Firm tumor and well-limited | LP       | Uneventfull       | AWD 26months       |

*LP: Left pancreatectomy – Left splenopancreatectomy - C: colectomy – AWD: alive without desease*

Table n° 4: Histologic data.

| Variable | Case 1            | Case 2            | Case 3             | Case 4             | Case 5              | Case 6              | Case 7              |
|----------|-------------------|-------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Cells    | Uniforms rounded  | Uniforms rounded  | Cubo-cylindrical   | Uniforms rounded   | monomorphic        | Rounded            | monomorphic        |
| Architecture | Pseudopapillary   | Papillary and    | Pseudo-papillary   | Pseudo-            | Pseudo-            | Papillary and      | Papillary and      |
|          | and trabecular+   | trabecular+      | + rosettes         | papillary and      | Papillary and      | cibro-epimembral   | trabecular         |
|          | pseudo-rosette    | pseudo-rosette+   | pseudo-epimembral  | trabecular         | cibro-epimembral   | pseudo-            | papillary and      |
|          |                   | pseudo-           |                    |                    | pseudo-            | cibro-epimembral   | cibro-epimembral   | trabecular         |
| Nucleus  | Rounded           | Little            | Rounded            | Rounded            | Rounded            | Rounded            | Rounded            |
| Mitosis  | Few               | Few               | Absent             | Few                | Few                | Few                | Absent             |
| Nuclear atypia | -                | -                 | Minimal            | -                  | Minimal            | Absent             | Absent             |
| Node     | NX                | N0                | N0                 | NX                 | NX                 | N0                 | NX                 |
| Nervous sheaths | Absent        | Absent            | Absent             | Absent             | Absent             | Absent             | Absent             |
| Vascular emboli | Absent        | Absent            | Absent             | Absent             | Absent             | Absent             | Absent             |
| Neighboring pancreas | Healthy | Infiltrated | Healthy            | Infiltrated        | Healthy            | Healthy            | Healthy            |
| Capsule  | Intact            | Broken            | Intact (Thick      | Intact (Fibrous    | Broken (Fibrous    | Intact             | Intact             |
|          |                   | (Fibrolamellar    | fibrous and       | and thin)          | (Fibrous and      |                    |                    |
|          |                   | defeated to       | locally laminated) |                    | thick)             |                    |                    |
| Peritoneal cytology | Suspecte | -                 | -                 | -                  | -                  | -                  | Benign             |
| Resection | R0               | R0                | R0                 | R0                 | R0                 | R0                 | R0                 |

*NX: Nodal status not unknown*

Table n°5: Immunohistochemical analysis

| Parameter | Case 1 | Case 2 | Case 3 | Case 4 | Case 5 | Case 6 | Case 7 |
|-----------|--------|--------|--------|--------|--------|--------|--------|
| Progesterone receptors | +      | NM     | NM     | NM     | +      | +      |        |
| Oestrogen receptors    | NM     | NM     | NM     | -      | NM     | NM     | NM     |
| Ki67                   | 10%    | NM     | NM     | NM     | 10%    | NM     | NM     |
| Vimentine              | +      | +      | NM     | +      | +      | +      | +      |
| NSE                    | -      | +      | NM     | +      | NM     | +      | NM     |
| Antisympatophysine     | NM     | -      | NM     | NM     | NM     |NM     | NM     |
| EMA                    | NM     | NM     | NM     | -      | NN     | NM     | NM     |
| Chromogranine          | NM     | NM     | NM     | NM     | -      | -      |        |
| Beta catenhine         | NM     | NM     | NM     | NM     | NM     | +      | NM     |
| AE1                    | NM     | NM     | NM     | NM     | +      | NM     |        |
| AE3                    | NM     | NM     | NM     | NM     | +      | NM     |        |
| Cytokeratine           | NM     | NM     | NM     | -      | NM     | NM     | NM     |

*NM: Not made.*
Discussion

TSPPP is particular in that it occurs in young women around their thirties. They represent between 1.5 to 2.5% of all pancreatic tumors [4]. In our experience, this rate is 2.5%. The average age of our series of 32.6 years is similar to that of the literature [5]. The signs most often encountered in patients are mild abdominal pain (often epigastric or left hypochondrium) and palpable mass (epigastric and left hypochondrium. This symptomatology is not specific or suggestive. We have to insist on the fact of the minimal intensity of the painful symptomatology of this disease. It is opposed to the pain of adenocarcinoma of the pancreas both for the cephalic localization (obstructive jaundice) and corporo-caudal (intense pains and characteristics of the pancreas). Other clinical signs can be reported as vomiting, anorexia, abdominal discomfort, nausea, jaundice, fever and weight loss [6]. The diagnosis of the
tumor by chance or fortuitous way is not uncommon possibility. It was reported by all publications as in our series (cases 5 and 7) [7]. To be complete, PPSTP can be diagnosed at the stage of complications such as rupture [8] and portal hypertension [9]. Modern imaging using computed tomography, MRI, transcutaneous ultrasound and endosonography. The elements that come back during these exams are the solid or tissue nature with areas of necrosis, hemorrhage, the presence of a capsule with a clear delimitation, the contrast enhancement for a tumor of large dimensions in a patient in good condition. This tumor must be retained if a full tissue mass found is well limited, large, encapsulated, solid and cystic with foci of hemorrhage, which are highlighted by a high signal in T1 accompanied by a slight and peripheral contrast at the injection of contrast medium [10].

It must be said that MRI is superior to CT because it better shows the hemorrhagic components. A purely cystic aspect has been reported in the literature [11]. The images found in our series are identical to those in literature. On the biological level, note that markers such as Ca19.9 and ACE are of no use except to orient themselves towards another etiology (Frank and important elevation for example of Ca19.9 and CEA in case of pancreatic adenocarcinoma). Intraoperatively, the tumor showed in the 7 patients the same aspect (well-limited tumor, with smooth surface, encapsulated). In only one patient, strong adhesion to the colon and mesocolon was noted. As with neuroendocrine tumors and stromal tumors, PPSTP increases in size without infiltrating the surrounding organs in the overwhelming majority of cases. For us, this is an element that should make them talk about preoperatively and intraoperatively. In rare cases, venous infiltration has been reported in the literature [12], such as the presence of liver metastases [13] or peritoneal carcinosis [14]. Histological analysis of the operating room showed in our series the absence of perineurial sheathing, vascular emboli and lymph node infiltration. This is what is reported in the overwhelming majority of cases in the literature. In fact, Siva P et al. [10] propose the following elements as aggressive: T3 or more, perineurial sheaths, vascular emboli, lymph node infiltration and metastatic development. It is important that the question of malignancy is asked at the time of diagnosis of PPSTP to adapt the surgical procedure because it must be the most conservative type of enucleation or pancreatic resection without splenectomy and without lymphadenectomy, especially for tumors located at left.

This surgical resection is and must be of the R0 type (which is possible for the majority of cases). In our series, this was possible in the seven patients, even if the neighboring pancreas was infiltrated in two of them. Our patients are alive without recurrence with an average survival of 70.3 months (26 - 100 months) and 64% survival at 5 years. A recurrence such as liver metastases, peritoneal carcinosis, or locorregional may occur [16]. Even in recurrence, surgery with curative resection must be attempted because survival after new R0 type resection is interesting [17]. Conclusion: The PPSTP is an entity to know and recognize. It should be mentioned when a young woman around the age of 30 has a mixed and well-limited pancreatic tumor process. This process can have an important dimension, is palpable, and does not cause the complications or the usual symptomatology of pancreatic cancer (jaundice and intense pain). Modern imaging with transcutaneous ultrasound, CT scan, MRI can evoke the diagnosis. Surgical resection type R0 is the treatment of choice. This surgery should be as far as possible a limited pancreatic resection, without sacrifice of the spleen and without lymphadenectomy for the tumors located on the left. For cephalic localization, Whipple resection is the method of choice when the tumor is large, but limited surgery may be attempted for tumors of 30 mm and less.

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