CASE REPORT

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A Case of Pancreatic Schwannoma Diagnosed Preoperatively by Endoscopic Ultrasonography-Guided Fine Needle Aspiration and Treated with Laparoscopic Surgery

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Abstract

Background: Pancreatic tumors are often difficult to diagnose in atypical cases, and a pancreatic schwannoma is very rare. We present a case of pancreatic schwannoma with calcification diagnosed preoperatively by endoscopic ultrasonography (EUS)-guided fine needle aspiration (FNA) and treated with laparoscopic distal pancreatectomy.

Presentation: A 72-year-old-woman was admitted to our hospital due to a 6 × 4.5 cm large tumor in the pancreatic tail. Imaging modalities revealed that the tumor was hypovascular and gradually enhanced with calcification, but was without cystic lesions. EUS revealed the tumor had a clear boundary with a low echoic mass. EUS-FNA was performed and spindle-shaped cells that were immunopositive for S-100 and negative for c-kit, CD34, and desmin were detected, resulting in a diagnosis of schwannoma. Laparoscopic distal pancreatectomy with splenectomy was safely performed without recurrence for a year.

Conclusions: Schwannoma is very rare; however, characteristics of the tumor, such as calcification, can help the diagnosis and, if possible, EUS-FNA should be performed for an appropriate treatment decision.

Keywords: schwannoma; calcification; endoscopic ultrasonography-guided fine needle aspiration; S-100, laparoscopic surgery

Introduction and Background

Pancreatic tumor is often difficult to diagnose in atypical cases. Pancreatic schwannoma is a very rare tumor; <50 cases of pancreatic schwannoma have been described in the English literature for the past 30 years.¹ Here we present a case of pancreatic schwannoma with calcification and without cystic lesions that was diagnosed preoperatively by endoscopic ultrasonography (EUS)-guided fine needle aspiration (FNA) and treated with laparoscopic surgery.

Presentation of Case

A 72-year-old-woman was admitted to our hospital with a 6 × 4.5 cm huge tumor in which an artery was

penetrating in the pancreatic tail (Fig. 1A, white arrows). She had a history of hypertension, spinal canal stenosis, and inappropriate antidiuretic hormone syndrome. She had no abdominal symptoms; however, survey for malignancy helped detect the tumor incidentally. Laboratory data revealed a low white blood cell count of 2440/μL (normal range [NR]: 3300–8600) and low sodium level (133 mEq/dL, NR: 138–145). The following tumor markers were all within the respective NRs: carcinoembryonic antigen (4.1 ng/mL, NR: ≤5.8); carbohydrate antigen 19–9 (12 U/mL, NR: ≤37); duke pancreatic antigen type 2 (<25 U/mL, NR: ≤150); and s-pancreas antigen-1 (8.5 U/mL, NR: ≤30). Contrast-enhanced computed tomography revealed calcification

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FIG. 1. CT and MRI. **(A)** CT revealed a 6-cm hypovascular tumor in the pancreatic tail, indicated by *white arrow*. **(B, C)** Calcification was detected at the edge of the tumor. *Yellow circles* indicate calcification. **(D, E)** MRI showed hypointensity of the tumor on T1-weighted images **(D)**, and hyperintensity on T2-weighted images **(E)**; tumor indicated by *white arrows*. CT, computed tomography; MRI, magnetic resonance imaging.

at the edge of the tumor (Fig. 1B, C), no cystic lesion, and gradual enhancement. Magnetic resonance imaging revealed hypointensity of the tumor on T1-weighted images (Fig. 1D) and hyperintensity on T2-weighted images (Fig. 1E). EUS revealed the tumor had a clear boundary with a low echoic mass. We suspected that it was a neuroendocrine tumor, acinar cell carcinoma, solitary-pseudopapillary neoplasm, schwannoma, or anaplastic ductal carcinoma based on the calcification, gradual enhancement, and expansive growth. Therefore, EUS-FNA was performed (Fig. 2A), and spindle-shaped cells (Fig. 2B, C) that were immunopositive for S-100 (Fig. 2D) and negative for c-kit, CD34, and desmin were detected. Therefore, the final diagnosis was schwannoma. Laparoscopic distal pancreatectomy with splenectomy was performed and the patient is currently well without recurrence for 1 year.

Discussion

Schwannomas are neurogenic neoplasms derived from Schwann cells of the peripheral nerve sheaths. Schwannoma is often detected in the head and neck, extremities, mediastinum, and retroperitoneum; however, it is

very rare in the pancreas.² Schwannoma often contains a solid component with areas of degenerative changes such as a cyst, calcification, hemorrhage, and hyalinization.³ In this case, calcification at the edge of the tumor was detected; therefore, when calcification is detected in the tumor, a diagnosis of schwannoma should be considered. Precise preoperative diagnosis of a pancreatic schwannoma is challenging because the clinical symptoms and radiological characteristics of schwannomas are non-specific. Schwannomas have characteristic spindle cells with myxoid stroma, and are immunopositive for S-100 (differential diagnosis; Table 1).^{1,2,5-8} The majority of schwannomas are benign; however, malignant cases that often have cystic formation and/or large tumor size (5 of 47 cases; 10.6%) are sometimes reported.² An appropriate diagnosis regarding the potential for malignancy has to be performed before a treatment decision can be made. In our case, the tumor was relatively huge and hypovascular, thus we cannot exclude the malignant potential of the tumor; however, EUS-FNA definitively diagnosed the schwannoma and estimated the malignant potential, after which a minimally invasive laparoscopic distal pancreatectomy with splenectomy was performed without

FIG. 2. EUS-FNA and histological analysis. **(A)** EUS-FNA was performed against the clear boundary of the low echoic mass. **(B–D)** Spindle-shaped cells were detected by hematoxylin-eosin staining **(B:** original magnification $\times 40$, and **C:** original magnification $\times 200$); these cells were positive for S-100 **(D:** original magnification $\times 200$). EUS-FNA, endoscopic ultrasonography-guided fine needle aspiration; HE, hematoxylin and eosin stain.

recurrence. If the biopsy revealed that the primary tumor was a malignant schwannoma or any other malignant tumor, we selected laparotomy as the surgical procedure. EUS-FNA can often obtain only very small specimens, and there have been some reports stating that only a small proportion of histologically proven schwannomas can be diagnosed correctly using EUS-FNA, which imposes a massive limitation.⁴ However, in this case, EUS-

FNA did provide an accurate diagnosis, resulting in an appropriate treatment. Development of a new EUS-FNA device would be possible to achieve more accurate diagnosis.

Conclusion

Schwannoma is a very rare tumor; however, characteristics identified in imaging studies, such as calcification, hemorrhage, and hyalinization, can help make

Table 1. Differential Diagnosis of Schwannoma

	Schwannoma	NET	ACC	SPN
Imaging technique				
Enhanced CT	Well-defined hypovascular tumor with delayed enhancement	Well-defined hypovascular tumor	Well-defined iso-hypovascular tumor	Well-defined hypovascular tumor
MRI	T1 low/T2 high	T1 low/T2 high	T1 low/T2 iso-high	T1/T2: low-high-mix
Pathology	Spindle-shaped cells with myxoid stroma	Trabecular/pseudorosette structure	Acinar structure	Pseudopapillary structure
IHC				
Positive makers	S-100, vimentin	CD56, chromogranin A, synaptophysin	Trypsin, BCL10	β -catenin, vimentin

NET, neuroendocrine tumor; ACC, acinar cell carcinoma; SPN, solitary-pseudopapillary neoplasm; CT, computed tomography; IHC, immunohistochemistry; MRI, magnetic resonance imaging.

an accurate diagnosis. Furthermore, the potential for malignancy needs to be estimated to provide appropriate treatment. Therefore, if possible, EUS-FNA should be performed before a treatment decision is made.

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Author Disclosure Statement

No competing financial interests exist.

Author Contributions

All authors are doctors in charge and all authors contributed in the writing of this article.

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Abbreviations Used

CT = computed tomography
EUS = endoscopic ultrasonography
FNA = fine needle aspiration
MRI = magnetic resonance imaging

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