Role Of Fine-needle Aspiration In The Surgical Management Of Pancreatic Neuroendocrine Tumors
Utility and Limitations in Light of the New WHO Classification
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Background

• Cross-sectional imaging, endoscopic ultrasound and fine-needle aspiration (FNA) are important in the pre-operative evaluation of pancreatic disease.
• While the majority of pancreatic tumors are ductal adenocarcinomas, other neoplasms also occur.

Pancreatic neuroendocrine tumors (PancNETs) are a particularly interesting group of neoplasms since they can present clinically with neuroendocrine manifestations or remain silent until their presence is heralded by mass effect.
• They can be single and sporadic or can be a component of several syndromes.
• The biological behavior of PancNETs is unpredictable especially in the absence of biopsogen of metastases. Thus the management is controversial.
• However, there is now a growing consensus that the new World Health Organization (WHO) classification has significantly contributed to the prognostic stratification of these patients.
• Concurrently, there have been advances in surgical techniques for benign or low-grade pancreatic tumors.
• These procedures include minimally invasive and parenchyma-sparing operations such as laparoscopy and enucleation.

Objective

• Hensin, on the report on the utility and limitations of FNA in the pre-operative evaluation and management of PancreNETs in light of those mentioned developments.

Materials and Methods

• A retrospective analysis between 2002 and 2012 yielded 25 cases of PancNETs that were localized and staged by medical imaging and diagnosed by FNA, and 17 surgical pathology resections with prior FNA (Table 1).
• All 25 cases were evaluated and graded using the 2010 WHO grading of PancNETs.
• The 17 surgical pathology resections were stained for neuroendocrine markers (synaptophysin, chromogranin A, and CD56).
• A cell block or representative tissue block was also stained for Ki67
• Ki67 was determined by 2 of the authors by photographing hot spots at x20 magnification and counting at least 2000 cells.

Results

• Of the 25 patients, 13 were men, 12 were women. Age range was 37-82 years, mean of 51 years.
• Percutaneous FNA performed on 12 patients, EUS on the other 13 (Table 2).
• All 25 PancNETs were evaluated and graded using the 2010 WHO grading of PancNETs. All 25 PancNET cases and 17 resection cases were stained for neuroendocrine markers (synaptophysin, chromogranin A, and CD56).
• A cell block or representative tissue block was also stained for Ki67.
• Ki67 was determined by 2 of the authors by photographing hot spots at x20 magnification and counting at least 2000 cells.

Table 1

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<th>Case 10 in Table 1: axial and coronal enhanced computed tomography of the abdomen reveals an arterial enhancing lesion in the pancreas (hematoxylin-eosin, original magnification x63).</th>
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<td>Figure 1</td>
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<td>Figure 2: A 62-year-old woman (case 16) with pancreatic tail mass (1.3 x 1.2 cm) seen from the inside using a 7.5 MHz GF-U144A-ALS echoscope (Olympus, Toronto, Canada).</td>
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Discussion

• In this study, we showed that FNA can be used to accurately to diagnose PanCNET in 40% of cases.
• FNA compares favorably with core biopsies because the latter are technically more difficult, especially with smaller lesions, and also more limited in their capacity to sample the tumor.
• Only 3 cases during the time frame of this study were complicated by patient discomfort or hemorrhage, all of which during the era of the percutaneous approach.
• The establishment of a correct diagnosis using FNA, combined with localization and staging through imaging, provides important information in the preoperative evaluation and management.
• The WHO grading of PancNETs is based on number of mitotic counts per unit area, and stratification of these patients.
• One of the drawbacks of FNA, is that the tumor cells are mostly in the form of single cells or small dispersed groups of cells, which puts some limitations in assessing tumor grade.

Table 2

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<th>Case 1.5 in Table 1: a retroperitoneal enhancing lesion in the pancreas on imaging (hematoxylin-eosin, original magnification x63).</th>
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<td>Figure 3</td>
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<td>Figure 4: Papanicolaou stain showing loosely cohesive overlapping aggregates of cells. The nuclei have a high power chromatin pattern and inconspicuous nuclei (original magnification x40).</td>
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<td>Figure 5: Cell block section depicting strong brown-staining cells for chromogranin A. Most of the pale unstained cells in the background are normal duct cells (original magnification x40).</td>
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<td>Figure 6: Cell block preparation showing the tumor that was grade 3 on the resection specimen. Mitoses (arrows) were more readily identified than in the other cases (hematoxylin-eosin, original magnification x40).</td>
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In conclusion, although immunocytochemistry has now become an indispensable tool in routine cytopathology for diagnosis, prognostication, and targeted therapies, there are also areas that warrant caution. This retrospective study describes the utility of FNA as a diagnostic adjunct to medical imaging in the preoperative evaluation and management of patients with PanCNETs but at the same time shows the limitations of this technique with regard to grading PancNETs.