Pitfalls in Conventional Imaging and the Diagnostic Use of Endoscopic Ultrasound of Pancreatic Neuroendocrine Tumors

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Insulinomas, although rare, are the most common functional pancreatic neuroendocrine tumors (PNET). These tumors are thought to derive from beta cells which ectopically produce insulin. Symptoms are generally related to the hypersecretory pathway. Ectopic production of insulin results in hypoglycemic episodes. The hallmark of insulinoma is a rise in serum insulin levels with no rise in C-peptide, which is a byproduct of insulin synthesis. Hence, the diagnosis of insulinoma is made biochemically. Conventional imaging with computed tomography or trans-abdominal ultrasound is generally not recommended unless biochemical abnormalities are suggestive. However, once localized, surgical resection is regarded as the therapy as choice as curative rates following removal approach 90%. There have been multiple surgical approaches described in the literature for resection of insulinomas and pancreatic lesions. Choice of approach generally falls upon pre-operative imaging for precise localization and degree of respectability (i.e., vascular involvement). In the following report, we demonstrate how endoscopic ultrasound with fine needle biopsy (EUS-FNB) can assist in both the diagnosis of a PNET and choice of surgical intervention.

A 53-year-old Hispanic female with an 8-year history of recurrent episodes of hypoglycemia, presented to the emergency room after being found obtunded. Finger-stick blood glucose was noted to be 58mg/dL, and her symptoms and clinical state improved. She underwent further work-up with a 72 hour fasting analysis. However, due to her low serum blood sugars, this was discontinued. Her labs prior to discontinuation were significant. Her serum plasma glucose of 48mg/dL, thus indicating a hypersecretory pathway. Sulfonylurea screen and insulin antibodies were negative. An abdominal computed tomography (CT) scan with intravenous contrast was unremarkable. Additional imaging with abdominal magnetic resonance imaging (MRI) revealed a lobulated contour of the pancreatic head with the possibility of an isointense mass (Figure 1). Thus, EUS was utilized for further investigation exposing a 23mm x 24mm isoechoic pancreatic head mass with irregular borders without vascular involvement (Figure 2). FNB of the mass was positive for a pancreatic neoplasm without evidence of malignancy. Following her procedure, her glucose levels normalized and she was discharged.

Figure 1: MRI adenocarcinoma with fatty contrast revealing a lobulated contour of the pancreatic head suggestive of an isointense mass.

Figure 2: Endoscopic Ultrasound revealing an isoechoic pancreatic head mass with irregular borders.

Figure 3: Cytohistological analysis of fine needle biopsy obtained during EUS of pancreatic head mass noting uniform cohesive aggregates of uniform epithelial cells with comedonecrosis.

In our report, it can be appreciated how EUS with FNB helped both support the diagnosis by presenting a pre-operative histological diagnosis while offering radiological data to assist with surgical resection. Furthermore, EUS with FNB has improved detection rates with classic findings of a round homogeneous, hypoechoic, mass with distinct margins – Atypical findings in our case.

Curative treatment is achieved with surgical intervention of localized tumors. Pending location, procedures may include typical resections with pancreaticoduodenectomy or distal pancreatectomy vs. atypical procedures with enucleation, partial pancreatectomy, or middle pancreatectomy.

If mass is not well capsulated, >4cm in diameter, involves or is near the pancreatic duct, or if multiple lesions are present, radical resection may be warranted.

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