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

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Pitfalls in Conventional Imaging and the Diagnostic use of Endoscopic Ultrasound of Pancreatic Neuroendrocrine Tumors

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INTRODUCTION

Insulinomas, although rare, are the most common functional pancreatic neuroendocrine tumors (PNET).[1] These tumors are thought to derive from beta cells which ectopically produce insulin. Symptoms are generally related to the overproduction of insulin resulting in hypoglycemic episodes. The hallmark of this syndrome is the failure of suppression of endogenous insulin section during periods of low serum blood sugars (often during fasting states).[2] Thus, the diagnosis is often made biochemically. Conventional imaging with computed tomography or trans-abdominal ultrasound is generally not recommended unless biochemical abnormalities are suggestive.[3] However once localized, surgical resection is regarded as the therapy as choice as curative rates following removal approach 90%.[4] There have been multiple surgical approaches described in the literature for resection of insulinomas and pancreatic lesions.[4] 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 (EUS) with fine needle biopsy (FNB) can assist in both the diagnosis of a PNET and choice of surgical intervention.

CASE REPORT

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 continuous glucose administration was required to keep her blood sugars stable. Shortly after her blood glucose stabilized, her symptoms and clinical state improved. She underwent further work-up with a 72 hour fasting analysis. However, due to poor compliance with frequent blood draws, this was discontinued. Her labs prior to discontinuation were significant and revealed an elevated insulin level of 38pmol/L, elevated C-peptide of 7.9ng/mL, and a low beta-hydroxybutyrate (BHOB) of 0.09mmol/L in the setting of 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) was performed revealing 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 with neuroendocrine features (Figure 3). Following localization with pathological support, surgical resection via pancreaticoduodenectomy (Whipple procedure) was performed. Pathologic analysis of the resected mass confirmed a PNET without evidence of malignancy. Following her procedure, her glucose levels normalized and she was discharged.

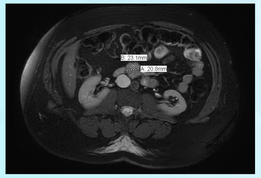

Figure 1: MRI Abdomen with IV contrast revealing a lobulated contour of the pancreatic head suggestive of an isointense mass.

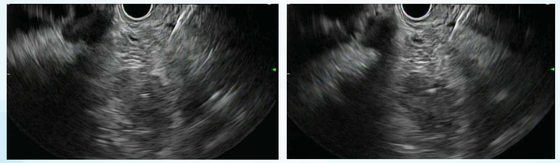

Figure 2: Endoscopic Ultrasound revealing an isoechoic pancreatic head mass with irregular borders.

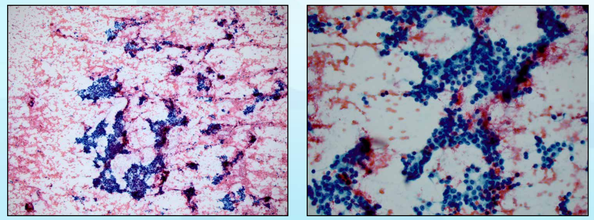

Figure 3: Cytohistological analysis of fine needle biopsy obtained during EUS of pancreatic head mass noting uniform cohesive aggregates of uniform epithelial cells with eccentric nuclei.

DISCUSSION

- Insulinomas although rare, are the most common type of functional pancreatic neuroendocrine tumor
- Diagnosis is typically made biochemically with intermittent recordings of the plasma levels of insulin, C-peptide, BHOB, and glucose during a fasting state (typically 72 hours)
- Abdominal CT, magnetic resonance imaging, and ultrasound can detect most insulinomas[5] however a negative scan prompts further investigation with more invasive diagnostic modalities
- EUS with FNB has improved detection rates with classic findings of a round homogeneous, hypoechoic, mass with distinct margins[7]
  - Atypical findings in our case
- Curative treatment is achieved with surgical intervention of localized tumors[8]
- Pending location, procedures may include typical resections with pancreaticoduodenectomy or distal pancreatectomy vs. atypical procedures with enucleation, partial pancreatectomy, or middle pancreatectomy[4,8]
- 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[7]
- 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

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