An 81-year-old female presented with symptomatic and persistent hypoglycemia despite administration of intravenous (IV) glucose. Laboratory testing after a prolonged fast revealed elevated pro-insulin, insulin and c-peptide levels, consistent with insulinoma. Helical computed tomography (CT) showed a hyperdense lesion in the body of the pancreas, which was redemonstrated on linear-array endoscopic ultrasound (EUS). Cytology obtained by EUS-guided fine needle aspiration (FNA) was consistent with a pancreatic epithelial neoplasm. Due to poor surgical candidacy, she underwent EUS-guided alcohol ablation with subsequent normalization of serum insulin. To our knowledge, this is the first case of alcohol ablation of a solitary insulinoma performed in a single treatment session with no complications reported in the United States.
Symptomatic Pancreatic Insulinoma Successfully Treated with Alcohol Ablation

Following alcohol ablation, her serum insulin (7 uIU/mL) and c-peptide (3 ng/mL) levels normalized. IV glucose was discontinued on post-ablation day two. She was discharged on post-ablation day seven without further hypoglycemic episodes. To date, clinical follow up for more than 14 months with our facility as well as a local endocrinologist has shown euglycemia without symptom recurrence.

Discussion

Insulinomas are the most common functional pancreatic endocrine tumor. Neuroglycopenic symptoms are
caused by excess secretion of endogenous insulin leading to hypoglycemia. The episodic nature of symptoms can often lead to delayed diagnosis. The gold standard for biochemical diagnosis is the prolonged fast, which can detect up to 99% of insulinomas. Low serum glucose levels with elevated serum insulin, pro-insulin and c-peptide levels are seen. Non-invasive localization with CT or ultrasonography often fail to capture insulinomas <1 cm in size. EUS-FNA is an invasive technique but has high diagnostic accuracy and allows for pathologic analysis of aspirated materials.

Surgical enucleation or resection is currently considered the gold standard for treatment of insulinomas and has a high success rate. In certain patient populations, however, there is considerable risk of morbidity and mortality associated with surgical management. Patients may be deemed poor surgical candidates due to advanced age, poor general condition, multiple prior abdominal surgeries or increased risk of post-operative complications. Additionally, patients may be precluded from surgery if the lesion requires extensive resection or is recurrent or malignant. In this subset of patients, as well as those refusing surgery, an alternative treatment option is necessary. Medical therapy and altered dietary habits may provide symptomatic relief but are often limited by non-compliance and side effects. Minimally invasive procedures such as EUS-guided alcohol ablation, CT-guided radiofrequency ablation, and arterial embolization have recently been reported as successful in non-surgical candidates.

Currently, there have only been a few cases of EUS-guided ablation of insulinomas reported. Ablation technique varied in instrumentation, concentration of alcohol used and number of treatment sessions necessary for symptomatic relief. The extent of post-procedural complications were also variable per case. There are five case reports submitted from Europe and one case series from China. Two of the cases describe post-procedural complications ranging from pain and mildly elevated serum lipase to hematoma and ulceration of the duodenal wall. In the United States, Levy et al. described the largest case series of eight patients who underwent EUS or intraoperative ultrasound-guided ethanol ablation of a sporadic or multiple endocrine neoplasia 1-associated insulinoma. Of the five patients who underwent EUS-guided ablation, all required multiple treatment sessions, and three of five required a subsequent course of anti-hypoglycemic agents to achieve marked clinical improvement.

We describe a unique case of EUS-guided alcohol ablation of a solitary insulinoma performed in a single treatment session without complications. Therapy provided significant clinical benefit with normalization of laboratory values. Complete remission of symptoms was achieved without the need for additional treatment sessions or adjunctive pharmacotherapy. Although surgical resection is currently considered the gold standard for treatment of insulinomas, EUS-guided ablation with alcohol may become a safe and minimally invasive alternative in patients with a high risk of post-operative complications.

References