VIDEO CASE REPORT

Immediate and durable therapeutic response after EUS-guided radiofrequency ablation of a pancreatic insulinoma

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EUS-guided radiofrequency ablation (RFA) is an endoscopic procedure and emerging therapeutic option for the treatment of pancreatic tumors.[1-3] It has been described in recent years for local therapy of pancreatic adenocarcinoma and neuroendocrine tumors in patients for whom operative management is deemed unsuitable.[1,4,5] Hyperthermic ablation using radiofrequency waves at 500 kHz is used to induce irreversible cellular injury and necrosis of the target lesion.[6,7] Precise delivery of thermal energy is critical to spare the normal surrounding pancreatic tissue from injury. There is a modest but growing body of literature regarding the use of this technique in pancreatic neuroendocrine tumors,[3,7,8] and our case demonstrates the feasibility of achieving immediate and durable response.

A 66-year-old woman with morbid obesity and type 2 diabetes was referred for management of a pancreatic insulinoma after multiple episodes of hypoglycemia. Biochemical markers were diagnostic of an insulinoma, with a fasting C-peptide level of 4 (reference: 0.8-3.5) and serum insulin of 27 mIU/L (reference: <25 mIU/L) in the setting of a fasting glucose level of 44 mg/dL (reference: 65-95 mg/dL). CT imaging revealed an early arterial phase-enhancing lesion measuring 1.8 × 0.9 × 1.3 cm in the pancreatic head (Fig. 1). After a multidisciplinary discussion, the patient was deemed a high-risk surgical candidate because of her comorbidities, and it was therefore decided to offer EUS-guided RFA of the tumor.

The patient was admitted to the hospital for glucose monitoring before the procedure. Outpatient diazoxide, which was used to maintain her blood glucose, was discontinued before the procedure (T½ 24-36 hours). Informed consent was obtained, and the following day the patient underwent diagnostic and therapeutic EUS. From the duodenal bulb, a well-defined, hypoechoic, bilobed tumor was noted in the head of the pancreas. Fine-needle biopsy using a 22-gauge fine-needle biopsy needle was performed, and a visible core tissue was submitted for pathology review.

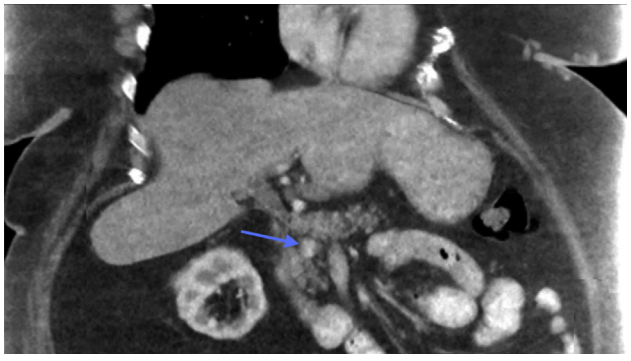

Figure 1. CT image of arterial enhancing lesion in the pancreatic head.

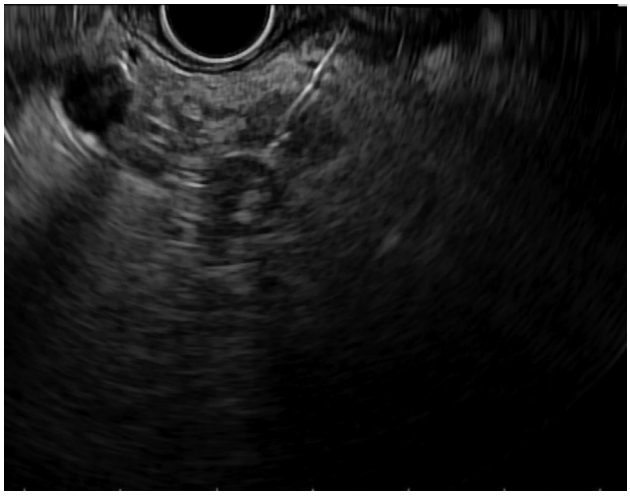

Figure 2. Pretreatment EUS image of radiofrequency ablation needle inserted into tumor.

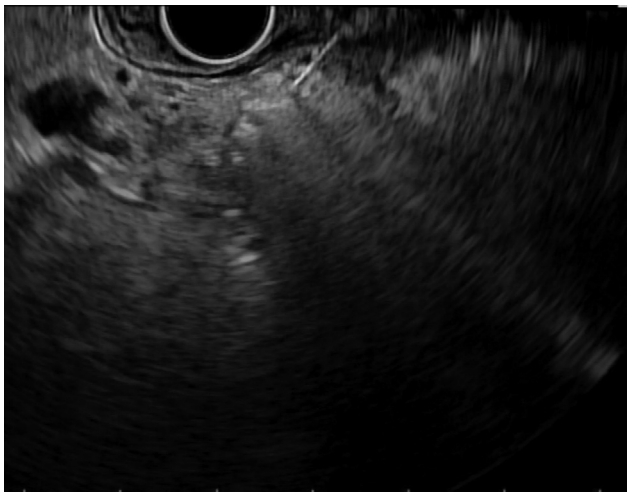

Figure 3. Posttreatment EUS image showing compete tumor ablation.

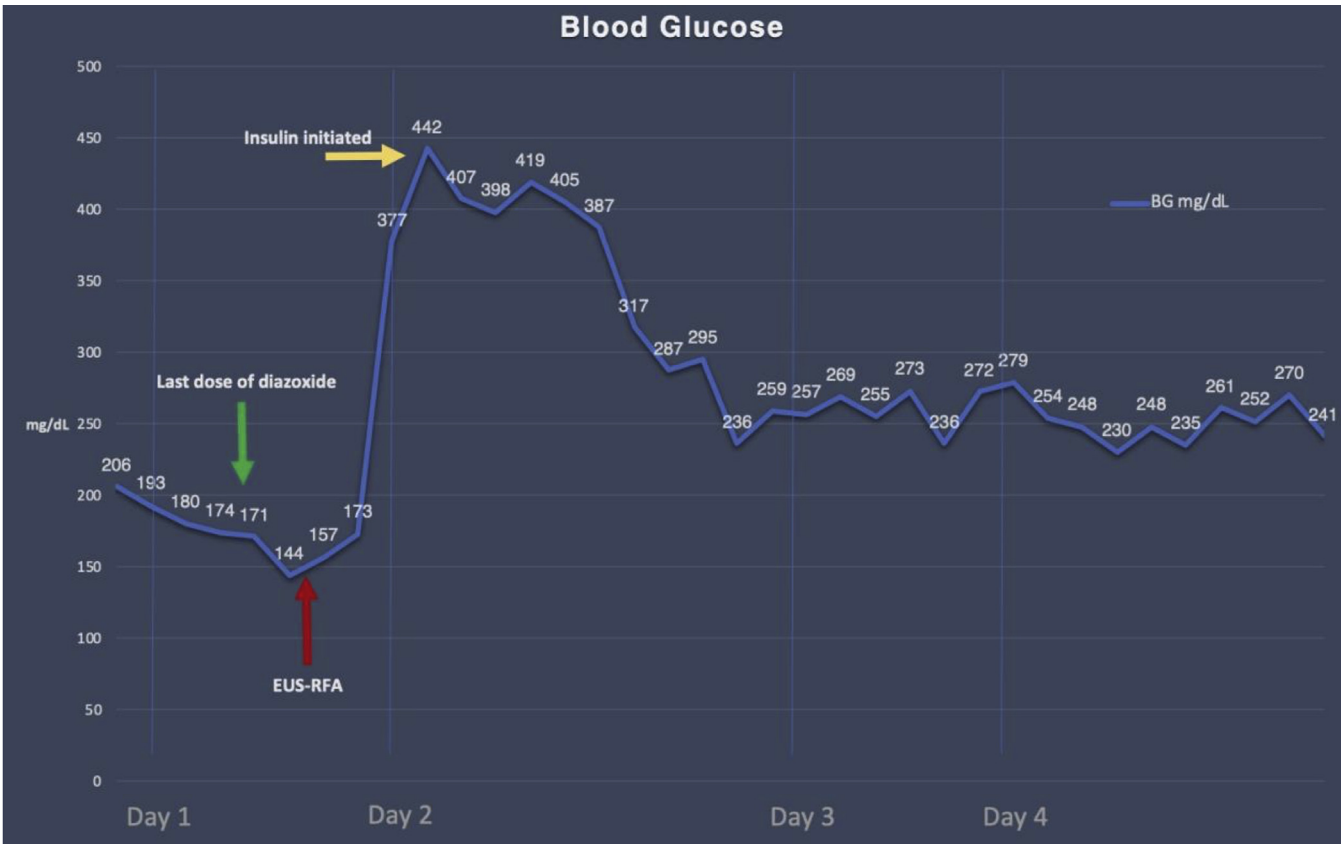

Figure 4. Blood glucose trends before and after radiofrequency ablation treatment.

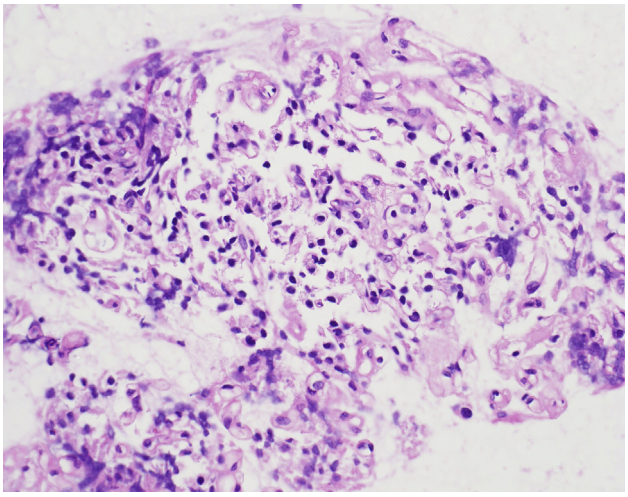

Figure 5. Fine-needle biopsy cell block with loosely cohesive clusters of small cells with bland and uniform nuclei.

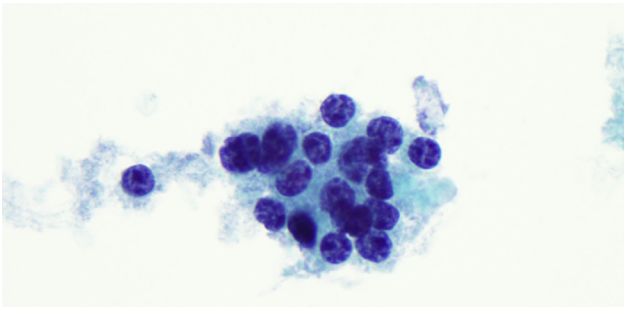

Figure 6. Cells demonstrating round nuclei, with visibly course, stippled, and evenly distributed chromatin pattern and relatively scant cytoplasm. High magnification.

The needle was exchanged for the EUS-RFA electrode system (STARmed; Koyang, South Korea). We used a 19-gauge RFA needle with a 7-mm radiopaque exposed electrode tip attached to a radiofrequency generator with an internal cooling system. The RFA system has a 7F diameter; it requires a working channel of at least 2.4 mm and is compatible with a therapeutic linear echoendoscope. Under ultrasound guidance, the tumor was again punctured. Energy was applied at 20 W for 15 seconds. Special care was taken to ensure the hyperechoic treatment effect did not extend beyond the tumor margin. RFA applications were repeated until the entire tumor area showed hyperechoic bubbles suggestive of thermal injury (Figs. 2 and 3).

After the procedure, the patient was pain free and was observed for 72 hours. Within 12 hours of the ablation, there was a dramatic increase in random and fasting glucose values, which required initiation of insulin therapy (Fig. 4). Eight months after the procedure the patient remains well and without further symptoms; as a result,

coordinating follow-up imaging has been a challenge. Pathology review confirmed a low-grade neuroendocrine tumor with a Ki-67 of less than 1% (Figs. 5 and 6).

This case supports that EUS-guided RFA can be a safe and effective local therapy for functional pancreatic insulinoma.[9,10] Video 1 (available online at www.VideoGIE.org) provides additional guidance for physicians who are pursuing this alternative treatment for patients for whom surgical management is not feasible. This also demonstrates the necessity of postprocedural blood glucose monitoring and anticipation of profound changes in blood glucose. Although very long-term efficacy studies of pancreatic neuroendocrine tumors are lacking, this is a promising endoscopic therapy.

DISCLOSURE

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Abbreviation: RFA, radiofrequency ablation.

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