

Is Intraoperative Radiofrequency Ablation a Therapeutic Alternative for Solitary Pancreatic Insulinoma of Difficult Position? A Clinical Case Report

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Abstract: *Insulinomas are most common functioning neuroendocrine tumors of the pancreas. The great majority (>90%) of insulinomas are benign and can be surgically cured. We describe a patient with benign insulinoma with symptoms of neuroglycopenia with raised serum insulin and C peptide levels. Preoperative computerized tomogram scan (CT) had confirmed an insulinoma in the uncinata process close to superior mesenteric vein (SMV). Initial plan of enucleation of the mass had been changed to successful use of radiofrequency ablation (RFA), after considering possible high morbidity of Whipple's procedure and enucleation had not being a possible option, technically. During the 16-week follow-up, the patient had found to be cured as episodes of hypoglycemia had been absent and a control CT, 4 weeks after RFA, did not reveal any residual tumor.*

Keywords: Insulinoma, Pancreatic neuroendocrine tumor, Radiofrequency Ablation.

1. Introduction

Insulinoma represent the most common type of functioning pancreatic neuroendocrine tumor^[1], with an incidence of 1 - 10 per million per year^[2-4]. It may occur sporadically or in association with the hereditary multiple endocrine neoplasia type 1 (MEN1) syndrome. It has the most favorable prognosis as majorities (90%) of the insulinomas are benign^[5]. They are characteristically small tumors (82% being <2cm and 47% <1cm in size) which secrete insulin leading to symptoms of fasting hypoglycemia^[6]. Definitive treatment for an insulinoma is operative resection. Most sporadic cases are amenable to enucleation, regardless of their location. RFA had been described as treatment option for metastatic insulinoma^[7].

The following report describes the successful use of RFA for an insulinoma localized in the uncinata process of pancreas, deep to main pancreatic duct and with very soft pancreatic parenchyma.

2. Case Summary

A 28 years old farmer from central India had been suffering from recurrent attacks of sweating, listlessness, uneasiness, giddiness and headache for last 6 months, while in the fasting state and relieved with food. He also had attacks of unconsciousness. Initially he had been treated as a case of seizure disorder. He had continued to experience the same symptoms and tried to control symptoms with extra meal and gained 9 kgs of weight. He had been subjected to monitor fasting for 24 hrs. His lowest blood sugar level measured was 47 mg/dl, with a high serum insulin 39.6 mIU/ml (normal 1.4 - 14 mIU/ml) and serum C peptide level 9.1 ng/ml (normal 0.9 - 4.3ng/ml).

A contrast enhanced CT scan abdomen had been suggestive of a hyper dense lesion (1.4 cm x 1.8 cm) in the uncinata process of pancreas. Further work up for familial Multiple endocrine neoplasia I had ruled out any lesion in parathyroid and pituitary gland. Finally he had been diagnosed as a case of sporadic functioning pancreatic insulinoma. He was planned for enucleation, as the lesion was likely benign and small.

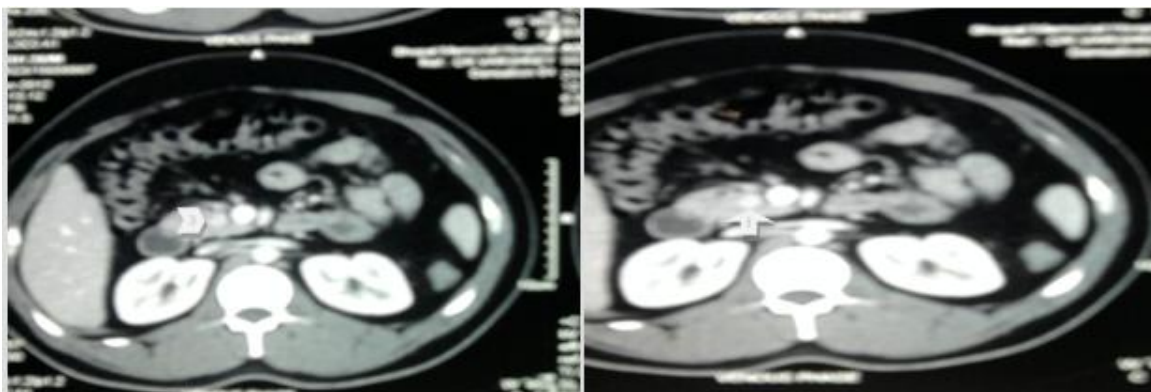


Figure 1: Multislice CT during arterial phase of contrast bolus injection showed a well defined enhancing lesion size of 1.4x1.8 cm (arrowhead) seen in relation to head of pancreas in the uncinata process

Volume 10 Issue 11, November 2022

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At the operation the head of the pancreas was mobilized by Kocherization. The nodule could not be palpated bimanually, but an intraoperative USG had localized the lesion at the uncinate process just right lateral to the superior mesenteric vein. Decision was taken against enucleation as there was possibility of injuring the MPD. The alternate option was Whipple's pancreatoduodenectomy which was also ruled out due to soft texture of pancreatic parenchyma and morbidity of the Whipple's procedure for a benign lesion.

Ultrasound guided RFA ablation was planned and tumor was ablated at 120°C for 3 minutes. Post RFA his blood sugar was stable between 110 - 170 mg/dl. There was a minor pancreatic leak with high drain fluid amylase (300 - 500 IU/L) which gradually cleared by day 11 on conservative treatment.

3. Discussion

This case illustrated the alternative but effective therapeutic option for a benign insulinoma at a location precluding enucleation. Localization of insulinomas had been very challenging^[8]. Transabdominal ultrasonography (USG) had a very low sensitivity but endoscopic ultrasonography (EUS), though invasive had substantially improved the efficacy of preoperative pancreatic imaging. Multidetector CT (computerized tomogram) had been shown to be highly sensitive for detecting small insulinomas. In our case, insulinoma also showed up nicely on CECT (contrast enhanced computerized tomogram). In a recent study it had found that CT abdomen and EUS combined had a high sensitivity than either modality done separately^[9]. Magnetic resonance imaging (MRI) abdomen had been considered second line modality in the evaluation of insulinomas because of its expense and limited availability. About 30% insulinoma have type II somatostatin receptor which shows upon somatostatin receptor scintigraphy.

The definitive treatment for insulinoma had been resection. Before surgery, one should rule out any familial syndrome like MEN1. Most sporadic pancreatic insulinomas had been amenable to enucleation, regardless of their location. Extensive surgery like pancreatic resection had been necessary in case of multiple or malignant tumors. Multimodal therapies like surgical debulking, chemoembolization, radiofrequency thermo ablation and liver transplantation had been described for large malignant insulinomas with hepatic metastases^[10]. RFA ablation has been an effective means of heating tissue, which above 45°C, denatures protein and damage cell membranes by melting the lipid component^[11]. The development of multiprobe arrays has allowed larger lesion to be treated in a single session. In our case, we had placed a multipronged needle which ablated the lesion at a temperature of 120°C for 3 minutes. Due to difficult location enucleation was not been possible technically and Whipple's pancreatoduodenectomy had been considered too morbid for such a small benign lesion. Hence RFA ablation had been planned and executed.

Till now RFA had shown as an excellent modality to ablate advanced pancreatic malignancy or metastases to pancreas from other primary. Studies had showed the efficacy of RFA

in patients with advanced pancreatic malignancy without major complications^[12, 13]. Limmeret al^[14] had reported a case, in which he successfully used RFA for ablating a benign insulinoma. In that case, the patient was elderly lady with multiple comorbid diseases, and had been suffering from benign insulinoma. Finally CT guided percutaneous RFA was performed to ablate the insulinoma. After RFA the patient had complete control of hypoglycemia. In our opinion, for unfit patients with insulinoma, RFA had been offered a safe modality for treatment. Though initial result had been encouraging, long term studies are needed to establish long term results of RFA.

4. Conclusion

Radio frequency ablation is an effective and safe option for the treatment of pancreatic insulinoma. Until more data about efficacy and are available, the procedure should be reserved for the treatment of patients who are not candidates for surgical therapy and in whom symptoms cannot be controlled by the medical therapy.

Declaration

There is no conflict of interest. Due permission has been taken from the patient for publication of the research work.

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