

Single Case

Treatment Outcome of Endoscopic Ultrasound Radiofrequency Ablation for Incidentaloma Pancreatic Neuroendocrine Tumor in Young Female Patient: A 2-year Follow-Up

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Keywords

Pancreatic neuroendocrine tumor · Surgical approach · Endoscopic ultrasound · Radiofrequency ablation

Abstract

Pancreatic neuroendocrine tumors (PNETs) or islet cell tumors are neuroendocrine neoplasms that arise from cells of the endocrine and nervous system within the pancreas. Patients with PNET sometimes do not show any symptoms, known as nonfunctioning (NF) sporadic PNET. It is still debatable regarding the best approach in the NF for small PNET. Currently, the surgical approach is considered the best; however, it is a highly invasive procedure, and it has a potentially high risk of complications as it requires a skilled and experienced operator. Herewith, we reported a 48-year-old female with incidentaloma of nonfunctioning PNET (NF-PNET) whose tumor has been successfully treated with endoscopic ultrasound guided radiofrequency ablation (EUSRA). There was no adverse event observed during and after the EUS procedure, and even 1 week after the procedure. One year later, abdominal magnetic resonance imaging (MRI) examination was carried out and size of the tumor was significantly getting smaller where it could hardly be seen anymore. After 2 years of

follow-up, the latest abdominal MRI study showed no solid part of the tumor could be seen anymore. In conclusion, EUSRA can be an alternative option for incidentaloma of NF-PNET management.

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Published by S. Karger AG, Basel

Introduction

Pancreatic neuroendocrine tumors (PNETs) or islet cell tumors are neuroendocrine neoplasms that arise from cells of the endocrine and nervous system within the pancreas. Incidence of PNETs is very rare, less than 1 in 100,000 individuals and less than 2% of all pancreatic neoplasms [1]. Patients with PNET sometimes do not show any symptoms, known as nonfunctioning (NF) sporadic PNET. However, in the long period, if the disease is not treated properly, it can be more progressive and spread to other organs [2].

It is still debatable regarding the best approach in the NF for small PNET. Currently, the surgical approach is considered the best. However, it is a highly invasive procedure and it has a potentially high risk of complications as it requires a skilled and experienced operator [3]. On the other hand, pharmacological treatment did not show satisfactory results in the patient's long-term outcome [4]. Recently, endoscopic ultrasound (EUS) has been considered as an invaluable technique in the diagnosis and management of PNET [5]. EUS-guided radiofrequency ablation (EUS-RA) is a procedure, which requires a unipolar probe deployed under ultrasound guidance to the center of the tumor. In several studies, it has been reported that the use of EUS-RA in pancreatic lesions was effective in controlling the disease [6–8]. Therefore, we would like to present a NF-PNET case with tumor size that is suitable for surgery, which has been successfully managed by EUS-guided radiofrequency ablation (EUSRA) treatment.

Case Presentation

A 48-year-old female was referred to the Liver-GI clinic after consultation with a medical oncologist due to incidentaloma pancreatic nodule found on abdominal magnetic resonance imaging (MRI) examination. Previously, the patient underwent general medical check-up, and additional abdominal MRI examination was requested by the patient due to a strong cancer history in the family, where her brother has passed away due to liver cancer and her mother has survived lymph node malignancy. The patient had neither symptoms nor comorbidities at that time. In addition, no family history of pancreatic malignancy was recorded. Vital signs were normal. Her body mass index was normal. No sign of icteric was seen on the sclera and skin. The physical examination was within normal limits. According to laboratory test results, amylase and lipase were within normal limit (amylase was 35 U/L and lipase was 40 U/L). The tumor markers, CEA and CA 19-9, were 0.8 ng/mL and 15.14 U/mL, respectively.

The abdominal MRI examination showed an oval, well-defined, rounded mass with a regularly lobulated surface, a dense impression with a very mild intra-mass necrotic component, slightly inhomogeneous post-contrast, especially in the periphery of the mass with small calcified patches, and an impression of the uncinate process of the pancreas with a size of approximately 3 cm × 2.7 cm × 2.9 cm. A solid mass with cystic components of 3 cm × 3.5 cm × 3.4 cm with strong homogeneity in the head and uncinate process of the pancreas was also observed. No visible boundaries of the lesion, while the duodenum was clearly visible and attached to the lesion, especially the superior mesenteric artery, portal vein, and

biliary system. The PET CT scan was not performed due to a lack of suspicion of the involvement of lymph nodes or other organs based on abdominal MRI and chest x-ray evaluation. The TNM staging was concluded as TisN0M0. Afterward, the patient underwent EUS guided fine needle aspiration biopsy for further evaluation. Pathology result revealed epithelial neoplasm with differential diagnosis of acinic cell neoplasm, neuroendocrine tumor (NET). Further immunohistochemistry examination confirmed the diagnosis of a NET.

The patient was offered to undergo surgery. However, the patient and her family refused as they were concerned about the risks of the procedure. Therefore, it was decided to do EUSRA. The EUS equipment used was an Olympus JF UCT 180 EUS scope which was connected to high-end Aloka US equipment. The bedside EUSRA procedure was performed in endoscopic room by using a 19-10E EUSRA needle. The generator was VIVA Combo (Taewoong), which was manufactured in South Korea. The procedure requires a unipolar probe to be deployed under ultrasound guidance to the center of the tumor. The procedure was completed within less than 1 h.

There was no adverse event observed during and after the EUS procedure, and even 1 week after the procedure. Due to the patient's reluctance to undergo a detailed imaging evaluation during COVID-19 pandemic, a bedside transabdominal ultrasound examination was carried out 12 weeks after the procedure, and it showed that there was no change in the size of the tumor. One year later, abdominal MRI examination was carried out and the size of the tumor, especially at the solid part, was significantly getting smaller and can hardly be seen anymore. After 2 years of follow-up, the latest abdominal MRI study showed that the solid part of the tumor can no longer be seen anymore. The cystic part of the tumor did not show significant shrinkage as it can still be part of the necrosis process on the solid part, where the image will show more hypoechoic area.

Discussions

To our knowledge, there has been no study looking at the role or impact of EUSRA in NF-PNET management, where the tumor size is suitable for surgery. There is also no head-to-head study yet between this procedure and the surgical treatment approach for PNETs. In this case study, we reported technical success as well as a good clinical outcome for a young female patient with NF-PNET.

There are several options in pharmacological treatment of PNETs, where their purpose is either for symptom control or tumor growth prevention, such as somatostatin analogs, molecular targeted therapies, and cytotoxic chemotherapy. However, aside from the uncertainty of treatment period, there are also possible side effects, which include abdominal discomfort (diarrhea or constipation). Because of that, many patients dropped off the treatment. There is no consensus yet regarding the best chemotherapy regimen and there are various possible agents for treatment of patients with symptomatic and/or progressive PNETs. While the role of external beam radiotherapy for PNETs is limited, peptide receptor radionuclide therapy may have an important role in the management of these tumors [9]. However, in the case of NF-PNET without any metastasis, a surgical approach is the best choice for controlling the disease. The best option for managing PNET is surgical resection treatment [10]. It can vary from enucleation, distal pancreatectomy, Whipple resection, or pancreaticoduodenectomy, to total pancreatectomy. It is a complex surgery, commonly performed for malignant tumors of the pancreatic head, ampulla, and distal bile duct, and may be performed for benign tumors as well as trauma of the pancreatic head and duodenum but rarely for chronic pancreatitis. Major postoperative complications from this procedure include pancreatic leak or fistula, intra-abdominal abscess, bile leak, postoperative hemorrhage

requiring blood transfusion, delayed gastric emptying, and complications related to the surgical site, such as infection and wound dehiscence [11].

In this case, we successfully presented an NF-PNET case where the patient refused surgical treatment. EUSRA was performed by placing an RFA probe, inserted through an EUS needle, under EUS color Doppler guidance, into a target pancreatic lesion, delivering various energy outputs directly related to the size of the lesion for various amounts of time or until an electrical impedance of >500 Ohms is detected, suggesting that coagulative necrosis has occurred within the lesion [5]. Dhaliwal et al. [12] showed that EUSRA can successfully treat pancreatic malignancies in patients who refuse surveillance or decline surgery due to its invasiveness, individuals who are not surgical candidates because of comorbidities, and young patients with PNETs associated with multiple endocrine neoplasia type 1 where pancreas-sparing options are preferable. This study has also been supported by another systematic review which demonstrated the safety and efficacy of EUS-RFA in both functional and nonfunctional small pNETs [13].

We would like to show that after 2 years of follow-up, a significant tumor necrosis process was observed, although we are still monitoring this patient until now. There has been no consensus yet regarding the duration of long-term follow-up for the EUSRA procedure in pancreatic malignancy, as the result might vary based on the type of pancreatic malignancy. Barthet et al. [14] conducted a prospective multicenter study which included 30 patients and performed 1-year follow-up on 14 subjects with PNETs in the mean size of 13.1 mm. After 1-year follow-up, 12 subjects had their tumors completely disappear (86% tumor resolution). As for the reported adverse events, 2 patients developed acute pancreatitis with early infection and perforation of adjacent jejunum [14]. The maximum follow-up period in this study was 3 years.

In conclusion, EUSRA can be an alternative option for NF-PNET management. However, further studies with larger sample size and long follow-up period are needed to give a clinical recommendation.

Acknowledgments

The authors would like to express special thanks to Prof. Ho Khek Yu and Prof. Dong Wan Seo, who have given the EUSRA concept in managing pancreatic malignancy.

Statement of Ethics

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1975 (revised in 2008). This retrospective case report review of patient data did not require ethical approval in accordance with the local policy. The patient was already given complete information about the data publication. The written informed consent was obtained from the patient for publication of the details of her “medical case and any accompanying images.”

Conflict of Interest Statement

The authors of this manuscript (Cosmas Rinaldi Adithya Lesmana, Mutiara Lirendra, Sri Inggriani, Aru W. Sudoyo, and Laurentius Lesmana) have no conflicts of interest and declare no relationship with any companies whose products or services may be or will be related to the subject matter of the article.

Funding Sources

No funding received.

Author Contributions

Cosmas Rinaldi Adithya Lesmana performed the EUS procedures; Cosmas Rinaldi Adithya Lesmana and Mutiara Lirendra collected the data and wrote the manuscript; Sri Inggriani evaluated the imaging results; Aru W. Sudoyo involved in patient's management; Laurentius Lesmana involved in patient's management discussion and supervised the EUSRA procedure. All the authors significantly contributed to this case report. All the authors read and approved the final manuscript.

Data Availability Statement

All data generated during this study are included in this article. Further enquiries can be directed to the corresponding author.

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