Insulin Washout in Fine-Needle Aspiration Fluid for Preoperative Diagnosis of Suspicious Lesion in Patients with Insulinoma: A Case Report

Mustafa Can, Necmettin Erbakan University Meram Faculty of Medicine, Konya, Turkey

Address for Correspondence: Mustafa Can, Necmettin Erbakan University Meram Faculty of Medicine, Konya, Turkey

Phone: +90 332 223 60 00 E-mail: can1120can@gmail.com

Received: 08/03/2019 Accepted: 14/05/2019 Available online: 19/06/2019

Keywords: Insulinoma; hypoglycemia; endoscopic ultrasonography; washout method

Insulinomas, the most common neuroendocrine tumors of the pancreas, are usually solitary in nature. Yet, they may be difficult to localize. A 29-year-old female patient with neurologic complaints including drowsiness, meaningless speech and temporary dementia (not recognizing her relatives), was evaluated for hypoglycemia. According to the critical laboratories investigations, the patient was found to be having hyperinsulinemic hypoglycemia. After diagnosing insulinoma by biochemical tests, the tumor was localized using endoscopic ultrasonography and fine needle aspiration biopsy was performed on the insulin washout material to obtain a prompt confirmation. After localization of the tumor, subtotal pancreatectomy was performed. The patient’s symptoms were relieved and did not re-occur. Thus, this case report suggests that the insulin washout from fine needle aspiration biopsy can be successfully employed during endoscopic ultrasonography to obtain a hasty diagnosis since it delivers faster results and is a much more convenient approach than the pathological examinations. It promptly confirms the tumor site and may, therefore, be employed in cases of difficult tumor localization.

Abstract

Insulinomas, the most common neuroendocrine tumors of the pancreas, are usually solitary in nature. Yet, they may be difficult to localize. A 29-year-old female patient with neurologic complaints including drowsiness, meaningless speech and temporary dementia (not recognizing her relatives), was evaluated for hypoglycemia. According to the critical laboratories investigations, the patient was found to be having hyperinsulinemic hypoglycemia. After diagnosing insulinoma by biochemical tests, the tumor was localized using endoscopic ultrasonography and fine needle aspiration biopsy was performed on the insulin washout material to obtain a prompt confirmation. After localization of the tumor, subtotal pancreatectomy was performed. The patient’s symptoms were relieved and did not re-occur. Thus, this case report suggests that the insulin washout from fine needle aspiration biopsy can be successfully employed during endoscopic ultrasonography to obtain a hasty diagnosis since it delivers faster results and is a much more convenient approach than the pathological examinations. It promptly confirms the tumor site and may, therefore, be employed in cases of difficult tumor localization.

Introduction

Insulinomas form the most common neuroendocrine tumor of the pancreas. The annual incidence of these tumors has been reported to be about 1 to 4 people per one million people years (1). It is most common in individuals between the age group of 40 to 50 years and shows a slightly higher female predilection (2). Insulinomas are mostly solitary benign tumors, with only less than 10% of the cases being malignant. The great majority of insulinomas are sporadic,
with 10% occurring as multiple and as a component of Multiple Endocrine Neoplasia syndrome type 1 (MEN-1). The typical Whipple triad of insulinoma comprises hypoglycemia symptoms when the blood glucose level is less than 50 mg/dL and improvement of these symptoms with glucose intake. It is diagnosed by hyperinsulinemia and elevated C-peptide level at the time of hypoglycemia. The most reliable test used for its diagnosis is a prolonged supervised fasting test as a majority of patients develop hypoglycemia within the first 24 h of this test (3, 4).

Once hyperinsulinism is confirmed on the basis of biochemical tests, localization of the tumor becomes a challenging task as the known pre-operative imaging methods may pose difficulties. Here, the authors present a case of insulinoma wherein tumor localization was done using FNAB with insulin washout method via Endoscopic Ultrasonography (EUS) after confirmation of biochemical hyperinsulinism.

Case Report

A 29-year-old female patient, with a blood glucose level of 50 mg/dL, reported to the neurology polyclinic with complaints including drowsiness, meaningless speech and temporary dementia (unable to recognize her relatives). The patient’s symptoms improved soon after administration of oral carbohydrates and no neurological pathology was detected. Subsequently, similar complaints repeated several times during the same day, and the patient was referred to the endocrinology polyclinic. The patient was admitted to the endocrinology department for further examination of the etiology of hypoglycemia. The patient’s past medical history was nil, she was not on any medications and gave no history of illicit drug use. Physical examination revealed that all the vital functions were normal. Systemic examination of the patient was normal. At the time of admission, routine laboratory test results were as follows: serum glucose- 60 mg/dL, TSH-1.37 µU/mL, HbA1c-5%, cortisol- 18 µg/dL. Complete blood count, liver function tests, and kidney function tests were all normal. The patient was subjected to a prolonged supervised fasting test. At the 6th hour of the test, blood glucose was observed to be 50 mg/dL and at the same time, the C-peptide and insulin levels were 2.66 ng/mL and 25.7 µIU/mL, respectively. The insulin/glucose ratio was 0.51. Anterior pituitary hormones, calcium, PTH and gastrin levels were examined to rule out MEN-1 syndrome and were found to be normal.

No pancreatic mass was detected by abdominal magnetic resonance imaging (MRI). EUS revealed a hyperechoic homogeneous lesion, measuring 17×10 mm with unclear boundaries, present between the pancreatic body and the tail. Fine-needle aspiration of this lesion was performed under EUS guidance and insulin wash-out was performed on the biopsy material. The insulin level in washout material was observed to be 254 µIU/mL. FNAB revealed pathologic findings that were consistent with those of a pancreatic neuroendocrine tumor (insulinoma). Immunohistochemical staining was positive for pancytokerin, cd56 and chromogranin. Immunohistochemical staining for insulin was, likewise, positive. All these findings confirmed the neuroendocrine nature of the lesion. The proliferation index Ki-67 was positive in 1-2% of the tumor cells. The patient underwent subtotal pancreatectomy. The pathology result was reported as follows: pancreatic neuroendocrine tumor, functional (insulinoma), chromogranin (+), insulin (+), Ki 67 index was 4%. In the postoperative follow-up, the patient’s blood glucose levels were found to be normal with no hypoglycemia.

Informed consent from the patient was taken prior to the treatment procedures.

Discussion

Surgery appears to be the only potential method of curing patients with insulinomas (5). Therefore, radiological localization of the lesion after clinical and biochemical diagnosis of insulinoma holds great importance. Insulinomas are usually solitary lesions, measuring less than 2 cm, thereby making its localization difficult (5). Insulinomas demonstrate their characteristic features in both CT and MRI, with a reported sensitivity of 33-64% and 40-90%, respectively, for CT and MRI (6, 7). In the present case, the lesion could not be visualized in MRI and subsequently, the EUS method was employed. EUS is reported to have excellent sensitivity (85-95%) (8, 9). In the study of
Kann et al., 10 insulinoma patients underwent FNAB with EUS and the diagnostic accuracy of FNAB was observed to be 70% (10). In the present case, after localization of the lesion with EUS, insulin wash-out from FNAB was performed at the same session. The insulin level, in the wash-out sample, was found to be 254 µIU/mL, thus prompting that localization of the tumor with EUS can be confirmed by insulin washout. Earlier studies have shown that the correct combination of pre-operative localization methods for insulinomas helps choose a pancreas-sparing approach such as enucleation in the treatment plan (11, 12). The authors deliberate that better results can be obtained with the combined use of FNAB and insulin wash-out technique during EUS. Furthermore, the detection of insulin levels in the washout sample is sufficiently faster than that in the pathological result, which may make the washout method a much more convenient procedure. Further studies involving a large number of patients must be performed in this field so that a cut-off value for the insulin washout method may be presented. Thereafter, insulin washout may become a method that can be applied in cases where the tumor localization is difficult.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Melia Karaköse, Hüseyin Ataseven; Design: Melia Karaköse, Hüseyin Ataseven; Control/Supervision: Feridun Karakurt; Data Collection and/or Processing: Muhammet Kocabaş; Analysis and/or Interpretation: Mustafa Kulaksızoğlu; Literature Review: Muhammet Kocabaş; Writing the Article: Melia Karaköse, Muhammet Kocabaş, Mustafa Can; Critical Review: Melia Karaköse, Mustafa Can; References and Fundings: Mustafa Can; Materials: İlker Cordan.

References

2. Zhao YP, Zhan HX, Zhang TP, Cong L, Dai MH, Liao Q, Cai LX. Surgical management of patients with insulinomas: result of 292 cases in a single institution. J Surg Oncol. 2011;103:169-174. [Crossref] [PubMed]