

Insulinoma: a case report of a successful resective surgery

Luis Enrique Machicado Rivero* ^{1,2,a,b}

ABSTRACT

Insulinoma is a pancreatic neuroendocrine tumor that produces hyperinsulinism and causes a severe lowering of blood glucose levels with chronic symptoms such as fainting. It is more common in males and can occur at any age, either as solitary or multiple neoplasms, the latter known to be part of the multiple endocrine neoplasia, type 1 (MEN 1) group. Insulinomas are rare and require resective surgery, with symptoms resolution being the marker of recovery. This article describes a case of insulinoma in a 51-year-old woman with a clinically typical presentation and signs and symptoms of hyperinsulinism. Laboratory tests revealed increased insulin secretion, while magnetic resonance imaging showed features of insulinoma, where the pancreatic tumor could be seen. This case was treated by surgical resection of the pancreatic tumor during an exploratory laparotomy, using the enucleation technique, which is described in detail herein. There were no intraoperative or postoperative complications, i.e., the result was successful in terms of health recovery. This surgical technique is used at Hospital Nacional Arzobispo Loayza in Lima, Peru, when facing cases such as the one described. This type of neoplasm is very uncommon, so it should be considered highly suspicious and, in this case, the images were essential for choosing the surgical resection. Other cases of insulinoma have been treated surgically at the Hospital; moreover at least one case of nesidioblastosis could not receive an adequate treatment.

Keywords: Insulinoma; Hyperinsulinism; Pancreas; Neoplasms (Source: MeSH NLM).

INTRODUCTION

Insulinoma is the most frequent pancreatic endocrine tumor. About one to four cases per million have been reported every year ⁽¹⁾. It is more common in males and can occur at any age ⁽²⁾. It is usually benign and made up of a mass with a diameter of less than 2 cm. Insulinomas can also occur as multiple neoplasms (10 % of the cases), which are associated with the multiple endocrine neoplasia syndrome, type 1 (MEN 1). The symptoms are unspecific; therefore, treatment initiation usually delays. Patients frequently show signs of hypoglycemia because insulinomas secrete insulin ⁽³⁾. After clinical confirmation of hyperinsulinism, imaging staging—which is usually complicated—is carried out. The curative treatment for insulinoma is resective surgery, in spite of the fact that surgical localization is usually a diagnostic dilemma if there are not devices to perform an intraoperative ultrasound.

This case report describes the treatment for insulinoma at Hospital Nacional Arzobispo Loayza in Lima.

CLINICAL CASE

A 51-year-old female patient who went to Hospital Loayza in March 2012. She had been sick for two years, and her disease was characterized by fainting, particularly at night after dinner. There was not a history of pancreatic diseases in her family. When she was admitted to the hospital, she had hypoglycemia—with a blood sugar level of 50 mg/dl—and for this reason she underwent insulin testing, the result of which was 80 IU (range 25 IU higher). She was prescribed prolonged fasting, and hypoglycemia associated with hyperinsulinism was observed. In addition, the C-peptide level was elevated. An MRI scan was carried out (Figure 1), which revealed a nodular lesion in the anterior side of the pancreas with a diameter of approximately 2 cm. Hormones such as cortisol and thyroid hormone were measured to rule out MEN syndrome.

1 Hospital Nacional Arzobispo Loayza. Departamento de Cirugía General (General Surgery Service). Lima, Peru.

2 Universidad de San Martín de Porres, School of Human Medicine. Lima, Peru.

^a Attending physician; ^b Graduate tutor and professor.

*Corresponding author.



Figure 1. MRI scan of the patient: pancreatic lesion suggesting insulinoma

The patient underwent open surgery with a medium-sized supraumbilical incision, which allowed opening the omental bursa (Figure 2). The lesion could be observed directly; therefore, more intraoperative images were not required. Bimanual palpation of the pancreas was carried out applying an extended Kocher maneuver to assess the lesion depth.

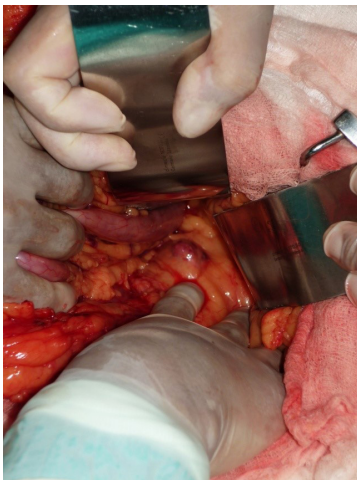


Figura 2. Nodular lesion of approximately 2 cm

The punch biopsy technique was applied to remove the lesion, then silk suture was used (Figure 3) as anchorage, and the nodular lesion was removed with a monopolar electrocautery (Figure 4). The result was absolute hemostasis (Figure 5). Finally, the omental bursa was closed, and the cavity was then closed using a single layer closure without drains.

The surgeon removed a 2 cm tumor (Figure 6), which was sent to the laboratory, and the anatomopathological diagnosis was insulinoma. The glucose level normalized, and the patient did not show hyperinsulinism during the postoperative period or subsequent controls; therefore, she was discharged: on the sixth day without complications.

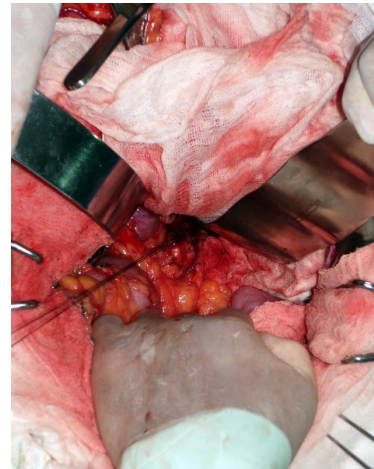


Figure 3. Application of silk sutures as anchorage for the neoplasm

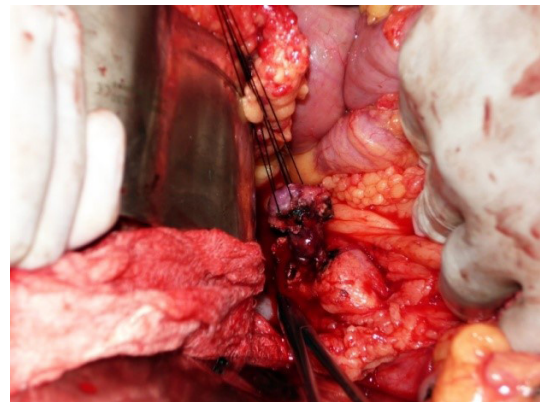


Figure 4. Removal of insulinoma with punch biopsy technique and unipolar electrocautery in spray mode

The patient was followed-up for four years following the surgery. There was no evidence of symptoms of hyperinsulinism, and radiologic examinations did not show recurrence.



Figure 5. Absolute hemostasis following the neoplasm resection

DISCUSSION

Insulinomas are very rare tumors that have an unspecific clinical presentation. When reviewing different autopsies, the rate of silent insulinomas observed was 0.8 to 10 %⁽⁴⁻⁷⁾. When there are symptoms, patients usually have confusion, behavioral changes, visual disturbances, weakness, vertigo, syncope, fatigue, obtundation, seizures, among others^(8,9). Insulinomas are responsible for 70 to 75 % of the cases of hyperinsulinism⁽¹⁰⁻¹²⁾. An MRI scan has proven very useful in tumor localization in 47 % of cases, with a mean sensitivity of 45 %^(13,14).

This case shows clinical signs and symptoms that clearly suggest insulinoma. The diagnostic tests were appropriate, and the possibility of multiple endocrine neoplasia was ruled out. It is very rare to find this type of tumors by imaging; however, in this case the neoplasm could be identified very clearly (Figure 1). This improves the conditions for resective surgery, which when associated with appropriate surgical maneuvers such as an adequate bimanual palpation and wide enucleation, may predict good prognosis.

The partial success of insulinoma resection in Hospital Arzobispo Loayza can be mentioned, among other experiences. Moreover, there has been at least one case of nesidioblastosis⁽¹⁵⁾, for which the proper treatment could not be administered to the patient.

Author contributions: The author of this article performed the collection, analysis and writing of the article.

Funding sources: This article was funded by the author.

Conflicts of interest: The author declares no conflicts of interest.

BIBLIOGRAPHIC REFERENCES

- Okabayashi T, Shima Y, Sumiyoshi T, Kozuki A, Ito S, Ogawa Y, et al. Diagnosis and management of insulinoma. *World J Gastroenterol*. 2013;19(6):829-37.
- Bousslama K, Maghrebi H, Bedioui H, Bousslama K. L'insulinome pancréatique: approche diagnostique et modalités thérapeutiques. *J Afr Hépatol Gastroentérol*. 2014;8:11-5.
- Patel S, Narwari M, Parekh D, Shah V. Insulinoma: case report and review of diagnostic and treatment modalities. *J Assoc Physicians India*. 2013;61(6):423-6.
- Shin JJ, Gorden P, Libutti SK. Insulinoma: pathophysiology, localization and management. *Future Oncol*. 2010;6(2):229-37.
- Service FJ, McMahon MM, O'Brien PC, Ballard DJ. Functioning insulinoma incidence, recurrence, and long-term survival of patients: a 60-year study. *Mayo Clin Proc*. 1991;66(7):711-9.
- Halfdanarson TR, Rabe KG, Rubin J, Petersen GM. Pancreatic neuroendocrine tumors (PNETs): incidence, prognosis and recent trend toward improved survival. *Ann Oncol*. 2008;19(10):1727-33.
- Sada A, Glasgow AE, Vella A, Thompson GB, McKenzie TJ, Habermann EB. Malignant insulinoma: a rare form of neuroendocrine tumor. *World J Surg*. 2020;44(7):2288-94.
- Abboud B, Boujaoude J. Occult sporadic insulinoma: localization and surgical strategy. *World J Gastroenterol*. 2008;14(5):657-65.
- Cryer PE. Symptoms of hypoglycemia, thresholds for their occurrence, and hypoglycemia unawareness. *Endocrinol Metab Clin North Am*. 1999;28(3):495-500.
- Rostambeigi N, Thompson GB. What should be done in an operating room when an insulinoma cannot be found? *ClinEndocrinol (Oxf)*. 2009;70(4):512-5.
- Gramática L, Herrera MF, Mercado-Luna A, Sierra M, Verasay G, Brunner. Videolaparoscopic resection of insulinomas: experience in two institutions. *World J Surg*. 2002;26(10):1297-300.
- Christ E, Iacovazzo D, Korbonits M, Perren A. Insulinomatosis: new aspects. *Endocr Relat Cancer*. 2023;30(6):e220327.
- Hirshberg B, Libutti SK, Alexander HR, Bartlett DL, Cochran C, Livi A, et al. Blind distal pancreatectomy for occult insulinoma, an inadvisable procedure. *J Am Coll Surg*. 2002;194(6):761-4.
- Pellegrino F, Granata V, Fusco R, Grassi F, Tafuto S, Perrucci L, et al. Diagnostic management of gastroenteropancreatic neuroendocrine neoplasms: technique optimization and tips and tricks for radiologists. *Tomography*. 2023;9(1):217-46.
- Dravecka I, Lazurova I. Nesidioblastosis in adults. *Neoplasma*. 2014;61(3):252-6.

Corresponding author:

Luis Enrique Machicado Rivero

Address: Avenida Grau 481 - Miraflores. Lima, Perú.


Telephone: +51 995 665 736

E-mail: drmachicado75@gmail.com

Reception date: June 22, 2023

Evaluation date: July 10, 2023

Approval date: July 20, 2023

© The journal. A publication of Universidad de San Martín de Porres, Peru.  Creative Commons License. Open access article published under the terms of Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0>).

ORCID iD

Luis Enrique Machicado Rivero

 <https://orcid.org/0009-0005-9400-4620>