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Surgical Treatment of Insulinoma – Case Report

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Abstract
Background
Among the rare functional pancreatic neuroendocrine tumors, insulinoma is the most common. The tumor is on most cases an intraparenchymal solitary mass. The pathophysiological finding of insulinoma is hypoglycaemia, often severe, manifested with non-specific symptoms, which makes the diagnosis difficult. Hypoglycaemia in insulinoma is organic and confirmed with elevated levels of serum insulin after a prolonged fasting test. Localization of the tumor is the next diagnostic challenge. A combination of tomographic imaging techniques such as MRI and CT scan, endoscopic ultrasonogram and nuclear medicine has improved the preoperative evaluation. The mainstay treatment of insulinoma is surgery, which has evolved from blind pancreatectomy to surgical excision by enucleation.
Case presentation
The 44 years old female patient was transferred to the Endocrinology Department of "Mother Theresa" University Hospital Tirana, Albania for examining the cause of hypoglycaemia. Following a MRCP with contrast, an insulinoma at the level of the body of pancreas was noted. Its dimensions reach 11mm. The joint staff consult recommended a surgical treatment. Reviewing omental bursa, we find a formation at the level of the body of pancreas.The margins of the pancreas are carefully dissected and simultaneously the pancreatic capsula at the formation level is prepared step by step, ensuring hemostasis and continuity of the ductus of Wirsung. The extirpation of insulinoma is achieved, without damaging the pancreatic duct, as such a complication would require another treatment modality.
Discussion
The preoperative evaluation of insulinoma patients is a crucial aspect of the successful treatment. Patients should be thoroughly questioned for the lifestyle habits and diet; also, complete hormonal panel and tests should be performed for organic hypoglycaemia. Next step on the correct diagnosis is the imaging and tumor location. It is advised to perform triphasic abdominal Computed Tomography. With the development of Endoscopic Ultrasound, it has cemented its role as a sensitive and reliable examination, capable of fine needle aspiration when indicated. Other procedures include Magnetic Resonance Imaging (MRCP), PET/CT and somatostatin receptor scintigraphy.
The surgical approach is dependent on the location of the tumor and its distance to the Wirsung ductus. Some procedures include caudal pancreatectomy, resection of the uncinate process, central pancreatectomy. Enucleation is advised wherever possible to preserve parenchyma.
Conclusion
When the tumor has been evidenced, the next step for the surgeons to decide the best surgical procedure (excision and parynchyma sparing, or pancreatectomy). The open surgical approach is currently advised as there is no clear consensus on the benefits of the minimal invasive laparoscopic route.
On this specific case the abdominal computed tomography was unable to identify the location of the tumor. Other diagnostic options are thus indicated. Following MRCP, the localization in the body of pancreas of insulinoma was confirmed. During the surgery the continuity of Wirsung ductus was preserved, and a complete enucleation of the tumor performed.
Keywords: General Surgery, Pancreatic Cancer, Pancreas Tumor, Insulinoma, Pancreatic Resection.
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1. Introduction

Among the rare functional pancreatic neuroendocrine tumors, insulinoma is the most common. The tumor is on most cases an intraparenchymal solitary mass. The pathophysiological finding of insulinoma is hypoglycaemia, often severe, manifested with non-specific symptoms, which makes the diagnosis difficult. Hypoglycaemia in insulinoma is organic and confirmed with elevated levels of serum insulin after a prolonged fasting test.

Localization of the tumor is the next diagnostic challenge. A combination of tomographic imaging techniques such as MRI and CT scan, endoscopic ultrasonogram and nuclear medicine has improved the preoperative evaluation. The mainstay treatment of insulinoma is surgery, which has evolved from blind pancreatectomy to surgical excision by enucleation, also by laparoscopic approach.

Due to the anatomy and physiology of the pancreas, surgical procedures are often related to significant morbidity.

2. Case presentation

2.1 History of present illness

The 44 years old female patient was hospitalized in a Regional Hospital on a grave hypoglycaemic state. Following a short treatment, she was transferred to the Endocrinology Department of "Mother Theresa" University Hospital Tirana, Albania for further examinations.

Among other tests, she was evaluated with an abdominal CT where no lesions were found in pancreas. Following a MRCP with contrast, an insulinoma at the level of the body of pancreas was noted. Its dimensions reach 11mm. The joint staff consult recommended a surgical treatment.

The patient is resuscitated and prepared for surgery.

2.2 Details of the surgical procedure

The operation begins with a median laparotomy and access to the peritoneum. Reviewing the abdominal cavity, we find a normal aspect of the organs. The omental bursa is accessed, where we find a formation at the level of the body of pancreas.

The margins of the pancreas are carefully dissected and simultaneously the pancreatic capsula at the formation level is prepared step by step, ensuring hemostasis and continuity of the ductus of Wirsung. The extirpation of insulinoma is achieved, without damaging the pancreatic duct, as such a complication would require another treatment modality.

The procedure ends successfully.

2.3 Post-operative period

The patient was transfered in the intensive care unit where she was monitored for the following day. Worth mentioning is the fact that gylcaemic levels were normalized this day. She was discharged in an improved state on the 5th postoperative day. The pathology report confirms the histological aspect of insulinoma.

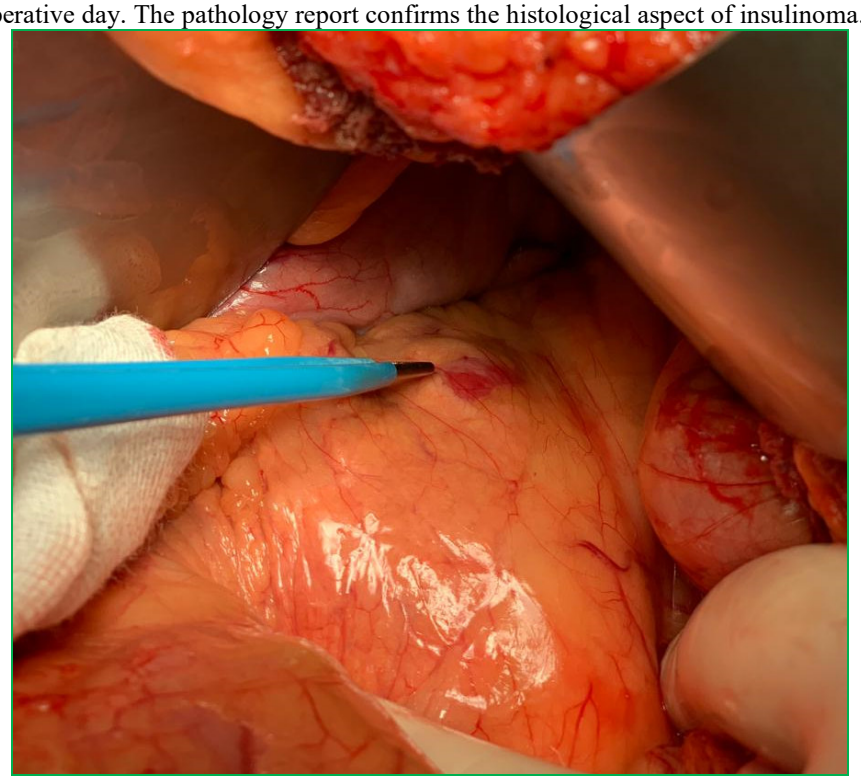

Figure 1. Tumor in situ. A formation of the body of pancreas.

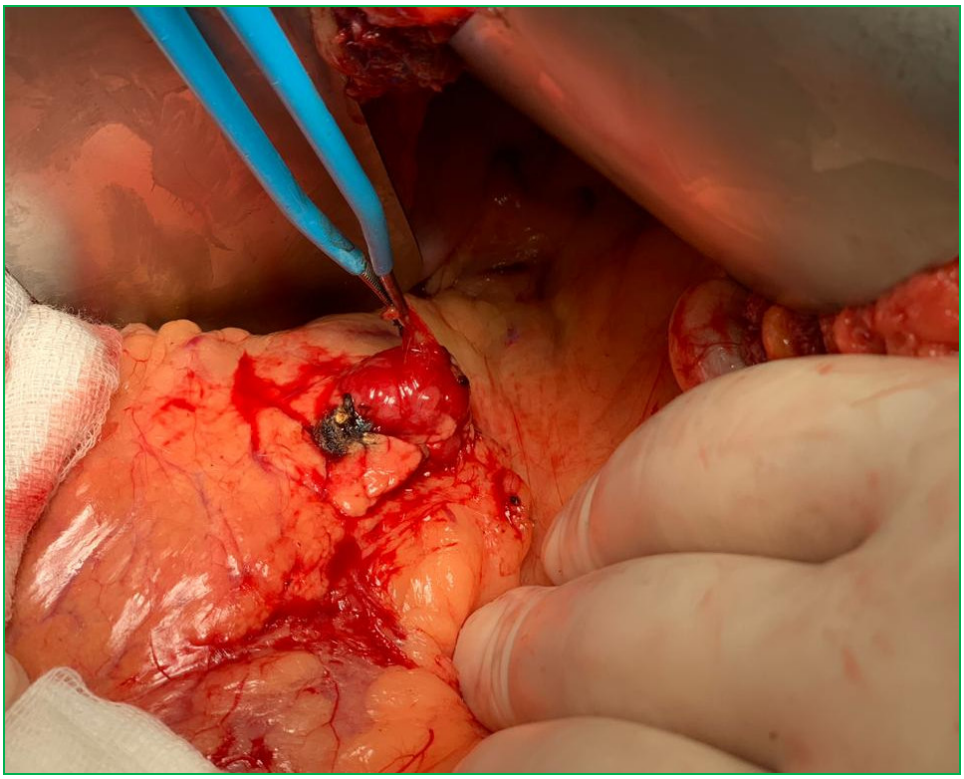

Figure 2. Hemostasis and enucleation of the tumor.

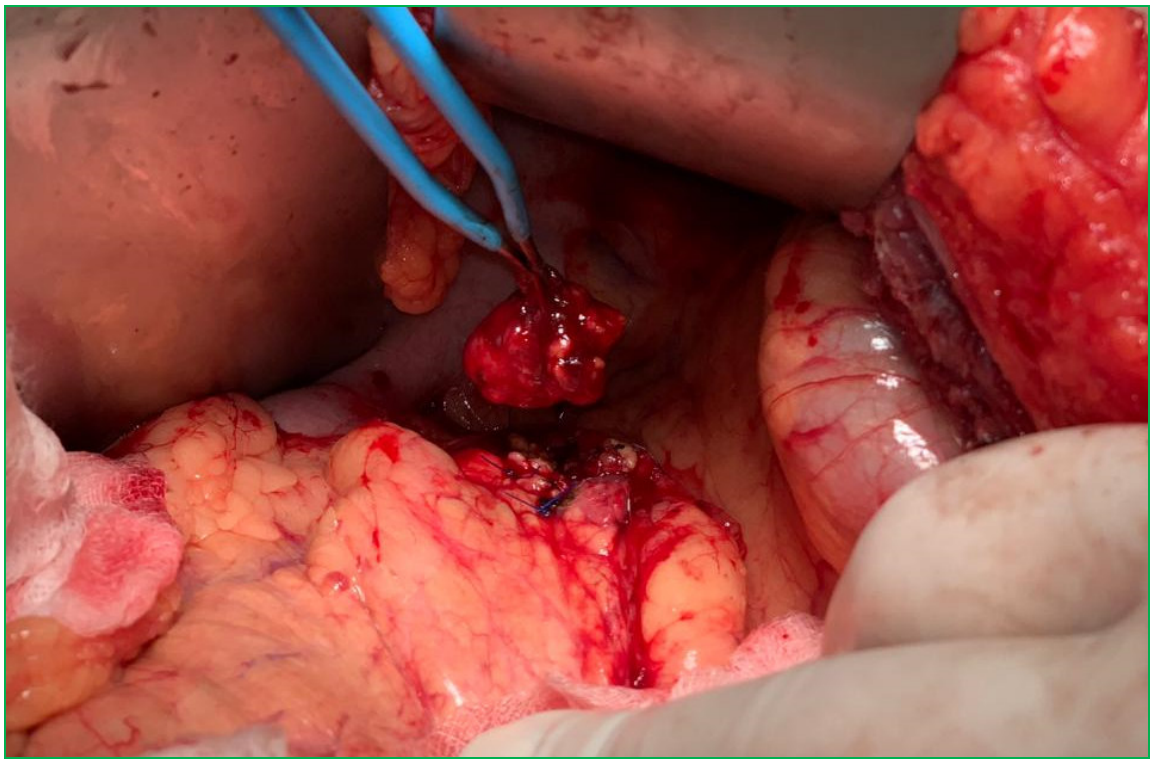

Figure 3. Complete extirpation of the tumor.

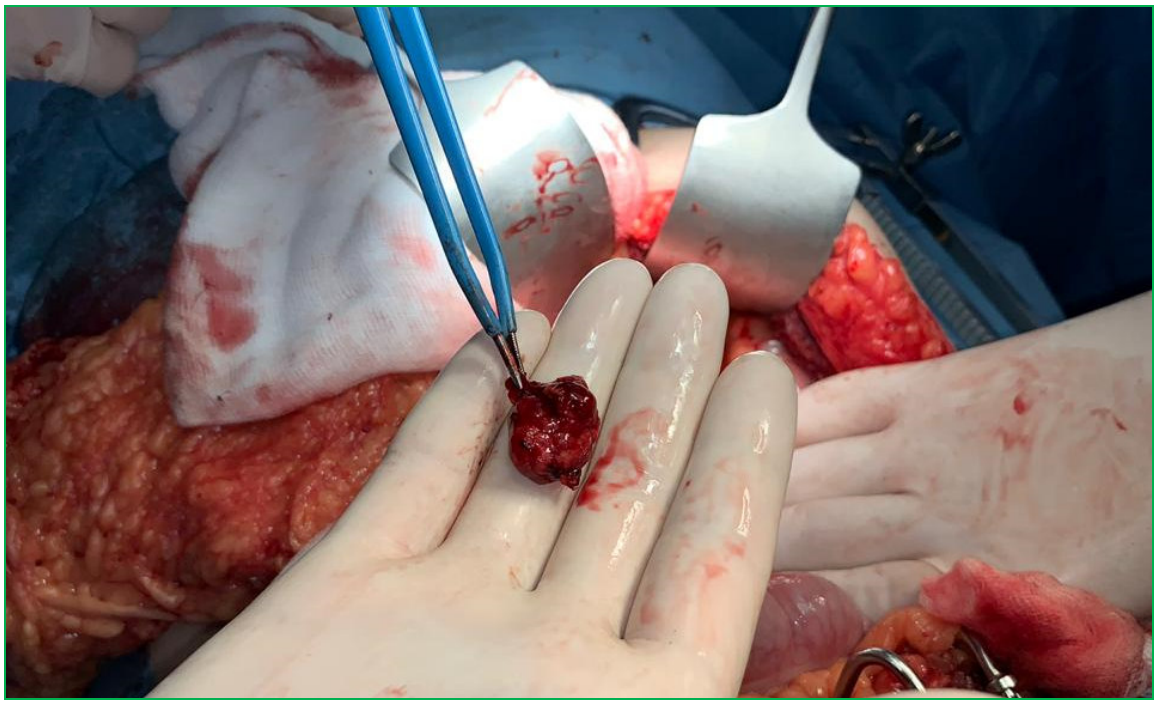

Figure 4. Removal of tumoral mass, relative size comparison.

3. Discussion

The preoperative evaluation of insulinoma patients is a crucial aspect of the successful treatment. Patients should be thoroughly questioned for the lifestyle habits and diet; also, complete hormonal panel and tests should be performed. This is due to the diagnostic challenge of organic hypoglycaemia.

Next step on the correct diagnosis is the imaging and tumor location. Upon literature review, it is advised to perform triphasic abdominal Computed Tomography, which consists of a normal, arterial contrast enhancement and venous enhancement sequence. An important role is played by the Magnetic Resonance Imaging (MRCP) to evaluate the patency of pancreato-biliary system. With the development of Endoscopic Ultrasound, it has cemented its role as a sensitive and reliable examination, capable of fine needle aspiration when indicated. Other procedures include PET/CT and somatostatin receptor scintigraphy.

The surgical approach is dependent on the location of the tumor and its distance to the Wirsung ductus. Some procedures include caudal pancreatectomy, resection of the uncinate process, central pancreatectomy. Enucleation is advised wherever possible to preserve parenchyma.

4. Conclusion

Reliable imaging tools combining CT, MRI, EUS, and nuclear medicine, can achieve insulinoma localization preoperatively in nearly all patients. Blind pancreatectomy or exploratory laparotomy is not advised.

When the tumor has been evidenced, the next step for the surgeons to decide the best surgical procedure (excision and parynchyma sparing, or pancreatectomy). The open surgical approach is currently advised as there is no clear consensus on the benefits of the minimal invasive laparoscopic route.

On this specific case the abdominal computed tomography was unable to identify the location of the tumor. Other diagnostic options are thus indicated. Following MRCP, the localization in the body of pancreas of insulinoma was confirmed. During the surgery the continuity of Wirsung ductus was preserved, and a complete enucleation of the tumor performed.

Conflict of interest

The author(s) declare(s) that there is no conflict of interest. The authors alone are responsible for the content and writing of the paper.

Financial disclosure

There is no financial support to this study.

Ethical aspect

Informed consent was obtained from all participants in the study and all procedures were conducted in

accordance with the Declaration of Helsinki.

References

1. Vázquez Quintana E. The surgical management of insulinoma. Bol Asoc Med P R. 2004 Jan-Feb;96(1):33-8. PMID: 15575328.
2. Zhuo F, Anastasopoulou C. Insulinoma. 2023 Jun 20. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 31335019.
3. de Carbonnières A, Challine A, Cottereau AS, Coriat R, Soyer P, Abou Ali E, Prat F, Terris B, Bertherat J, Dousset B, Gaujoux S. Surgical management of insulinoma over three decades. HPB (Oxford). 2021 Dec;23(12):1799-1806. doi: 10.1016/j.hpb.2021.04.013. Epub 2021 Apr 27. PMID: 33975801.
4. Andronesi D, Andronesi A, Tonea A, Andrei S, Herlea V, Lupescu I, Ionescu-Târgovişte C, Coculescu M, Fica S, Ionescu M, Gheorghe C, Popescu I. Insulinomul pancreatic--analiza unei serii clinice de 30 de cazuri [Insulinoma of the pancreas: analysis of a clinical series of 30 cases]. Chirurgia (Bucur). 2009 Nov-Dec;104(6):675-85. Romanian. PMID: 20187465.
5. Mabrut JY, Lifante JC, Cherki S, Sin S, Berger N, Peix JL. La localisation préopératoire des insulinomes est-elle utile? [Is preoperative localization of insulinomas necessary?]. Ann Chir. 2001 Nov;126(9):850-6. French. doi: 10.1016/s0003-3944(01)00620-4. PMID: 11760575.
6. Andreassen M, Ilett E, Wiese D, Slater EP, Klose M, Hansen CP, Gercke N, Langer SW, Kjaer A, Maurer E, Federspiel B, Kann PH, Bartsch DK, Knigge U. Surgical Management, Preoperative Tumor Localization, and Histopathology of 80 Patients Operated on for Insulinoma. J Clin Endocrinol Metab. 2019 Dec 1;104(12):6129-6138. doi: 10.1210/jc.2019-01204. PMID: 31369096.
7. Vaidakis D, Karoubalis J, Pappa T, Piaditis G, Zografos GN. Pancreatic insulinoma: current issues and trends. Hepatobiliary Pancreat Dis Int. 2010 Jun;9(3):234-41. PMID: 20525548.
8. Tarris G, Rouland A, Guillen K, Loffroy R, Lariotte AC, Rat P, Bouillet B, Andrianiaina H, Petit JM, Martin L. Case Report: Giant insulinoma, a very rare tumor causing hypoglycemia. Front Endocrinol (Lausanne). 2023 May 10;14:1125772. doi: 10.3389/fendo.2023.1125772. PMID: 37234805; PMCID: PMC10206132.
9. Doi R. Determinants of surgical resection for pancreatic neuroendocrine tumors. J Hepatobiliary Pancreat Sci. 2015 Aug;22(8):610-7. doi: 10.1002/jhbp.224. Epub 2015 Mar 13. PMID: 25773163.