



CASE REPORT / ПРИКАЗ БОЛЕСНИКА

Laparoscopic enucleation of a neuroendocrine tumor on the posterior aspect of the pancreas – case report and literature review

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SUMMARY

Introduction Neuroendocrine tumors of the pancreas are rare neoplasms. They are divided into two groups: functional and non-functional. Non-functional tumors represent a diagnostic challenge, given that they often remain asymptomatic and are diagnosed as an incidental finding.

Case outline We present a patient in whom the tumor was discovered at the junction of the body and the tail of the pancreas, on the dorsal side. The patient had no specific symptomatology, there was no loss in body weight. Considering the diagnostic procedures conducted and the condition of the patient, we decided to perform laparoscopic enucleation. The procedure was carried out in a safe and efficient manner, so that operative and postoperative recovery was uneventful. The definitive histopathological examination confirmed the finding of a non-functional pancreatic neuroendocrine tumor.

Conclusion Laparoscopic enucleation is an effective and safe treatment modality for neuroendocrine tumors of the pancreas with well-known advantages, as compared to open surgery, but there is always a tendency to improve the already existing results and thus to contribute, not only to treatment, but to the greater comfort of the patient.

Keywords: pancreas; neuroendocrine tumor; laparoscopic enucleation

INTRODUCTION

Neuroendocrine tumors of the pancreas (pNETs) represent rare neoplasms. They are divided into two basic groups: functional (F-pNETs) and non-functional (NF-pNETs). NF-pNETs can often secrete chromogranin A, neuron-specific enolase, calcitonin, or other peptides, but they are mainly with no characteristic symptomatology [1, 2].

Pre-operative imaging diagnostics is needed for the evaluation and detection of the location of the tumor, and, in this sense, computed tomography (CT) of the abdomen, endoscopic ultrasonography (EUS), and magnetic resonance imaging (MRI) are applied. The octreotide scanner is particularly useful to determine the relevancy or the affinity of the tumor for somatostatin, as well as for the detection of possible tumor foci that were not observed by means of the above-mentioned radiological diagnostics [3].

Modalities of the NF-pNET surgical treatment, depending on the size and the localization of tumors, range from enucleation and atypical pancreatectomy to typical pancreatectomy with lymphadenectomy, including splenectomy; in the case of tumors localized in the distal part of the pancreas [4, 5].

CASE REPORT

A 56-year-old male patient was admitted to our clinic for diagnostics and treatment. At admission, he was asymptomatic and reported no previous loss in body weight. Three months before hospitalization at our clinic, a focal mass on the pancreas was detected, first with CT scanning, and then by positron emission tomography (PET/CT), which completed the diagnostics (Figure 1). The PET scan showed a radioactive

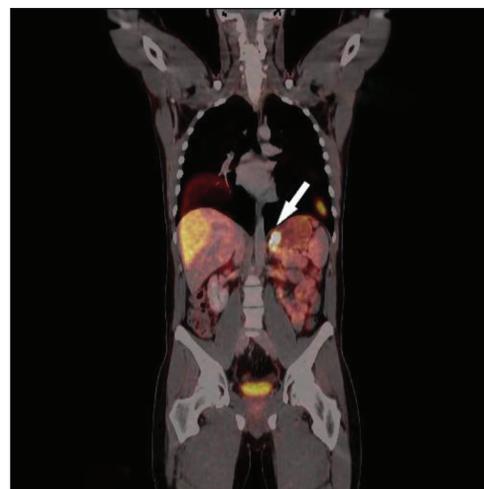


Figure 1. Gallium-68 PET/CT DOTATATE scan – with the presented radioactive focus in the part of the body towards the tail of the pancreas

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focus on the posterior aspect of the junction between the body and the tail of the pancreas. The tumor lesion was 18 mm in size and did not invade the intrahepatic duct nor disrupt the contour of the pancreas.

Taking into account the patient's general status and previously conducted diagnostic and clinical examinations, it was decided that the patient should undergo laparoscopic enucleation of the pancreatic tumor.

The patient was put under general endotracheal anesthesia, pneumoperitoneum was created, after which working ports were placed on the sites typical for this type of procedure. Exploration of the abdomen showed a normal finding. The omental bursa was first opened via the intercoloepiploic access, the posterior wall of the stomach was freed, and the upper edge of the pancreas was then accessible. The body and the tail of the pancreas were completely mobilized from the retroperitoneum, wherein the splenic artery and vein were identified. The finding of an enclosed tumor with a capsule, 2 cm in diameter, was verified at the transition from the body to the tail of the pancreas, on the posterior aspect of the pancreas, in the vicinity of the splenic artery (Figure 2). The tumor did not give the impression of infiltrating the pancreatic tissue toward the front, nor having contact with the Wirsung canal. The enucleation of the tumor was performed in full, with the use of the LigaSure device (SurgRx, Redwood City, CA, USA), without damaging the capsule (Figure 3). Re-exploration did not verify lesions of the Wirsung canal. The *pars libera* of the greater omentum was placed into the cavity of the removed tumor, wherein the cavity was completely obliterated. Instead of standard drains, two contact Foley catheters were placed in the vicinity of the cavity. A tissue sample of the tumor was sent for definitive histopathological analysis.

The patient's postoperative recovery was uneventful. Drains were removed on the third postoperative day. The patient was discharged from the hospital four days after surgery. One month after the surgery, abdominal ultrasound follow-up was performed, and the findings were normal. Six months after the surgery, MRI examination was carried out and abdominal findings were normal. The patient is still in the process of regular monitoring and medical follow-up.

Definitive PH: The histological organization of pNETs is predominantly pseudoglandular, insular and trabecular in the foci, but definitely well differentiated. The finding of this tumor was immunohistochemically confirmed, it did not demonstrate any production of hormones, and was assessed as NET-G2 as to its proliferative potential (Figure 4).

The aim of our study was to review laparoscopic enucleation, as an efficient, safe, and secure surgical approach in the treatment of non-functioning neuroendocrine tumors localized on the dorsal side of the pancreas.

All procedures performed involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. Written consent to publish all shown material was obtained from the patient.

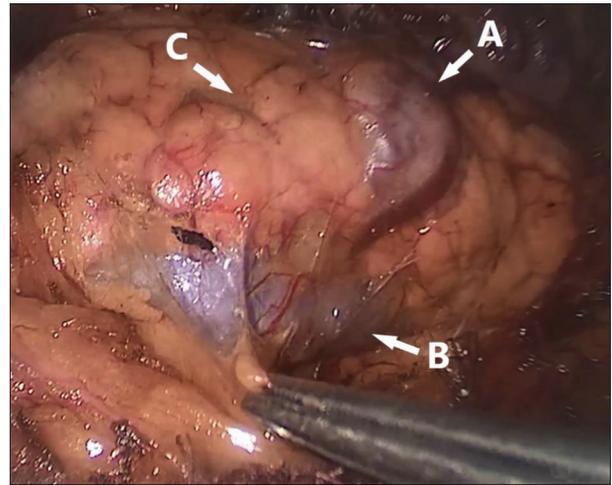


Figure 2. Intraoperative finding – the relationship of the tumor to the lienal artery; (A) tumor; (B) lienal artery; (C) posterior wall of the pancreas

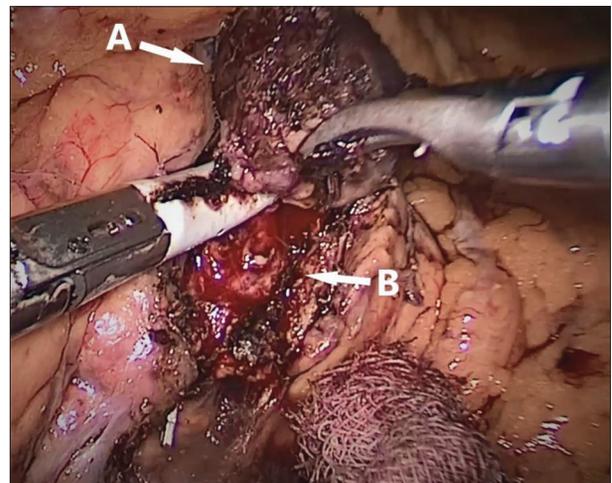


Figure 3. Intraoperative photo: tumor enucleated using LigaSure device; (A) tumor of the pancreas; (B) the cavum of the removed tumor

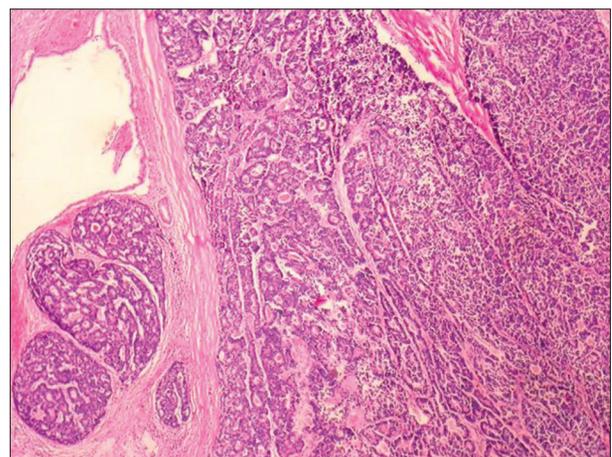


Figure 4. Total histomorphological and immunohistochemical findings correspond to well-differentiated neuroendocrine tumor of the pancreas, category (NET - G2)

DISCUSSION

pNETs originate from cells of the pancreatic islets and represent a heterogeneous group of pancreatic neoplasms. Depending on their ability to secrete biologically active hormones, and whether they show typical clinical symptoms, pNETs are divided into F-pNETs and NF-pNETs [6].

NF-pNETs are generally asymptomatic. Their symptomatology is mostly related to the effect of the mass of the tumor itself on the pancreas or on the surrounding structures, as well as to their correlation with metastases [7]. When the symptomatology is present, it presents with abdominal pain, weight loss, jaundice, and less frequently with anorexia, nausea, fatigue, palpable masses in the abdomen, and other signs and symptoms [8]. Mainly, NF-pNETs present as asymptomatic and are accidentally discovered, most commonly as incidental findings within the diagnostics of other diseases [7, 8].

CT is an initial diagnostic examination in detecting pNETs. These tumors are usually clearly defined lesions. The presence of a hypoechogenic mass in the arterial phase of tomography and the presence of calcifications inside the mass detected is generally associated with a more aggressive form of the tumor, and therefore with a poorer prognosis [9]. The MRI has a higher sensitivity and specificity as compared to the CT scan. The PET/CT and octreotide scanner are the most sophisticated methods used to confirm the diagnosis, as well as to detect the possible presence of metastases or other tumor foci in the body, which were not detected with the previous imaging diagnostic. EUS fine-needle aspiration may be of great importance in determining the nature and localization of the tumor, preoperatively [4, 9].

In the patient that we have presented, preoperative diagnostics equivalent to the guidelines of the current

literature was performed, and, after the completion of the preoperative evaluation, we were able to conclude, with great certainty, the diagnosis of NF-pNET, and we accordingly decided on the modality of treatment.

Surgical treatment is the only curative treatment modality for these tumors and, depending on the size of the tumor and its location, it ranges from organ preservation procedures to atypical and typical resection of the pancreas and accompanying lymphadenectomy [5, 10]. According to the literature, with pNETs whose diameter is < 3 cm, enucleation of the tumor can be safely applied. In the 1990s, Gagner performed the first successful laparoscopic procedure on the pancreas and presented his initial experiences and results [10]. Since then, there have been numerous studies and papers which, through their results, indicate the advantages of minimally invasive surgical approaches to the treatment of these tumors, with special emphasis on the enucleation of these lesions, which remains limited by the size of the tumor [11, 12].

Due to uncharacteristic clinical presentation, especially with NF-pNETs, which generally remain asymptomatic and are usually discovered as an incidental finding in the framework of other diagnostic targets, it should be kept in mind that early detection and surgical treatment have good immediate and long-term results in the treatment of this disease. Therefore, it is very important to apply a careful and multidisciplinary approach in each patient. Laparoscopic enucleation, although limited by the size of the tumor, provides an effective, safe, and secure access, regardless of the location of the tumor. The improvement of operational techniques and the introduction of new instruments and equipment provide an opportunity for improving current results.

Conflict of interest: None declared.

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Лапароскопска енуклеација неуроендокриног тумора на задњој страни панкреаса – приказ болесника и преглед литературе

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САЖЕТАК

Увод Неуроендокрини тумори панкреаса су ретке неоплазме. Деле се у две групе: на функционалне и нефункционалне. Нефункционални тумори представљају дијагностички изазов, с обзиром на то да често остају асимптоматски и дијагностикују се случајно или као узгредни налаз.

Приказ болесника Представљамо болесника код кога је тумор откривен на месту спајања тела и репа панкреаса на дорзалној страни. Болесник није имао специфичну симптоматологију, био је без губитка телесне масе. С обзиром на спроведену дијагностику и опште стање болесника, одлучили смо се за лапароскопску енуклеацију. Овај поступак је примењен на сигуран и ефикасан начин, тако да је опе-

ративни и постоперативни ток прошао без компликација. Дефинитивним хистопатолошким прегледом потврђено је да је реч о нефункционалном неуроендокриног тумору панкреаса.

Закључак Лапароскопска енуклеација је ефикасан и сигуран начин лечења ових тумора са добро познатим предностима у односу на отворену хирургију, али увек постоји тежња ка побољшању већ постојећих резултата и на тај начин се може допринети не само лечењу већ и бољем комфору болесника.

Кључне речи: панкреас; неуроендокрини тумор; лапароскопска енуклеација