CASE REPORT

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Computed Tomography in the Diagnosis of Neuroendocrine Tumors of the Pancreas

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ABSTRACT

Neuroendocrine tumors of the pancreas (NETP) are rare malignancies that originate from pancreatic neuroendocrine cells and may be functional in nature through the clinical picture secondary to hormonal hypersecretion. These tumors can be detected incidentally by imaging in patients presenting with specific syndromes or as a result of the mass, volumetric effect of metastases and primary tumors. This article presents two cases diagnosed with NETP, of two men aged 58 and 77 years respectively in the Hospital, detected by CT and subsequently confirmed histopathologically, who presented with non-specific acute abdominal symptoms with altered general condition and fever. CT scan showed the presence of multiple NETP in both cases with liver metastasis in the 77-year-old patient. The potential value of CT combined with MRI for treatment is discussed.
Key words: CT, tumor, imaging, radiology, neuroendocrine, pancreas, metastasis

INTRODUCTION

Neuroendocrine tumors of the pancreas (NETP) represent a heterogeneous group of rare tumors (about 1% of all malignant tumors), having a particular way of presentation, with a clinical development and a completely individual diagnostic approach (1). Most neuroendocrine tumors (NET) are sporadic but can also be part of hereditary syndromes, which include the syndrome of multiple hereditary neuroendocrine neoplasia type I, von Hippel-Lidau syndrome, tuberous sclerosis and adenomas of the pituitary gland (2). Among these tumors, gastrinomas and insulinomas are notorious as representatives of NET due to their functional nature and the associated clinical picture, secondary to hormonal hypersecretion (3). Clinically, NETPs are rare pancreatic tumors occurring in less than 2% of pancreatic tumors; however, their incidence has increased significantly in the last decade to approximately 1/100,000 per year (4). The age of peak incidence of NETP is between 40 and 60 years (5).

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CASE REPORT

We present the cases of two patients, A.I. 58-year-old male patient and B.C.

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77-year-old male patient (known to have diabetes), who presented to the Hospital with diffuse abdominal pain and high fever, complaining of non-specific acute abdominal symptoms and ill general condition.

RESULTS

CT scan results of patient A.I. are the following: a necrotic mass, 32/22 mm, located in the inferior region of the pancreatic cephalic region and uncinate process, enlarged peripancreatic lymph nodes up to 20 mm in the short axis, and fatty encasement. Another 20 mm mass is seen, bordering the second jejunal loop. Multiple soft tissue lesions, some of them necrotic throughout the entire pancreatic parenchyma consisting of metastases. CT findings of patient B.C. are: multiple highlighted pancreatic lesions and liver metastases in the 2nd segment. For imaging, we used a Philips 64 slice CT scanner with a section thickness of 1 mm. The cases were later confirmed by histopathological diagnosis (*fig. 1*).

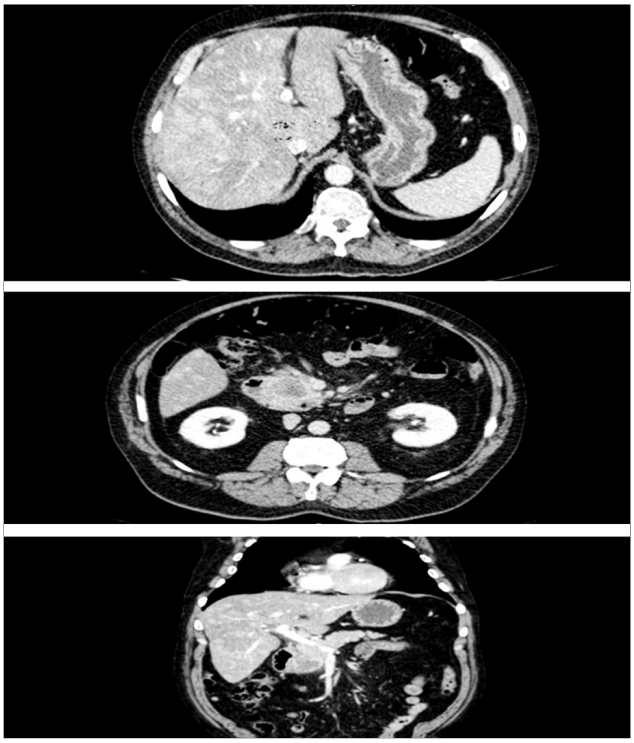

Figure 1 - CT scan of pacient

DISCUSSIONS

From a medical point of view, TNEP are classified in the specialized literature into: functional TNEP (10-40%), which determines symptomatology according to the amplitude of the excessive secretion of hormones and amines, and non-functional TNEP (60-90%), the latter being discovered accidentally or due to the volumetric effect of the tumor on the organs in the immediate vicinity, during a radio-imaging evaluation (6). The clinical picture includes symptomatology: abdominal pain, weight loss, jaundice and other common symptoms of the supramesocolic floor. The most common metastatic location of TNEP is found in the liver, especially in the right liver lobe, which in some situations can be presumptively diagnosed pre-operatively as hepatocellular carcinoma or another type of malignancy (7). In the second case described by us, the detected TNEP showed metastases in the second liver lobe. From a diagnostic point of view, the most used and reliable method remains CT with contrast substance to which the use of MRI is added. The preferred method for imaging diagnosis and to appreciate the functional character of TNEP remains 68GA-DOTATOC-PET/CT, but the most accurate results are obtained as a result of using the alternative method with 18F-FDG PET/CT in which the activity can be observed and agglomeration of protein analogs of somatostatin (8). Confirmation of the diagnosis of certainty is done by direct intraoperative or percutaneous echo-guided biopsy (9). Jejunal metastases of TNEP can be detected per primam and may pass pre-operatively surgically and radio-imagingly as primary jejunal gastrointestinal stromal tumors, the differential diagnosis being elucidated by contrast-enhanced CT and MRI by highlighting the primary pancreatic tumor, usually non-functional that generate a mass effect. Confirmation of such a situation is done by intra-operative histopathological diagnosis or by percutaneous method by highlighting the neuroendocrine growth pattern and the immunohistochemical profile (10). Computed tomography (CT) should be performed with a multidetector CT scanner with 1.5 mm slice thickness and multiplanar reconstructions with the use of CT contrast. On the other hand, a CT scan without contrast or with a lower resolution scanner can detect the presence of calcifications associated with TNEP as well as to assess contrast uptake in the wall of secondary cystic lesions. Crucial from the point of view of radiographic diagnosis would be the use of multiphase imaging of the supramesocolic abdomen after administration of iodinated contrast medium with early arterial phase, portal-venous and venous contrast phase (11). Studies demonstrate an outstanding performance of CT imaging in the diagnosis and detection of TNEP with a sensitivity and specificity of approximately 73% and 96% of cases, respectively. At the same time, for the detection of liver metastases

secondary to TNEP, the sensitivity and specificity of CT are approximately 82% and 92% of cases, respectively (12). On the other hand, MRI can be used alternatively for the detection of TNEP as well as for abdominal staging, CT can be used alternatively or additionally, when there is clinical suspicion for a small TNEP, equivocal imaging morphology or not detectable by CT. Mainly, MRI examination can be useful using scanners with maximum 2-3 mm section thickness, preferably 3D reconstruction being required. In this respect, image acquisition using T1-weighted (T1W), T2-weighted (T2W) with and without fat-suppressed phase contrast sections in axial and coronal orientation, dynamic with fat-suppressed contrast-enhanced 3D T1W sequences is recommended – non-intensified, arterial with 20s delay, portal vein with 50s delay and 120s delayed phase. Magnetic resonance cholangiopancreatography (MRCP) may also be useful immediately after contrast administration (13). Liver metastases can be delineated by MRI by enhancing DW1 diffusion imaging, but also by using a Gd-based contrast medium to improve the detection and delineation of metastases in the hepatocytic environment in which they are found by using usually delayed phase contrast, after 10-20 minutes (14).

CONCLUSIONS

The importance of computed tomography was highlighted in both cases presented. The use of optimized protocols in patients with suspected or confirmed TNEP by CT, additional MRI, multiphase imaging after the application of intravenous contrast medium should be possible and used as often as possible in the setting of clinical suspicion of TNEP.

Conflict of interest

All authors declare that they have no conflict of interest.

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Ethical statement

Written informed consent was obtained from the patients of this case report.

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