



Somatostatin Receptor Scintigraphy with ^{111}In -Pentetreotide for Detection of Atypical Metastatic Localization of a Midgut Neuroendocrine Tumor: A Case Study

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Abstract

A 49-year-old man was referred to the University Hospital of Pointe-à-Pitre for abdominal pains. He underwent a midgut neuroendocrine tumor (NET) resection 8 years ago. The computed tomography revealed multiple liver metastases. ^{111}In -pentetreotide, SPECT/CT identified liver metastases and a suspect cardiac uptake. A cardiac magnetic resonance imaging confirmed a thickening of the bottom wall of the heart, measuring 24 mm compatible with a cardiac metastasis of the NET. ^{111}In -Pentetreotide SPECT/CT remains a good functional imaging compared to conventional somatostatin receptor scintigraphy to precise anatomical localization of NET metastases and could help to select the best morphological imaging to complete the staging of metastatic NET. The delayed detection of the cardiac metastasis did not allow setting up an effective management and the patient died due to an uncommon hepatic metastasis compression of the heart.

Keywords: Neuroendocrine tumor; Somatostatin receptor scintigraphy; ^{111}In -pentetreotide

Introduction

Midgut tumors are among the most common neuroendocrine tumors (NETs). The classification distinguishes between well differentiated neuroendocrine tumors with benign or uncertain behavior, well differentiated carcinomas and poorly differentiated carcinomas [1]. The majority of the tumors is well differentiated but has heterogeneous behavior based on the site of origin. Even when small have the potency to metastasize frequently to the liver (85%), peritoneal cavity (18%), bones (8%), other intra-abdominal sites (6%), lungs (4%), bones and lymph nodes [2]. The cardiac metastases have been rarely reported as case clinical reports [3].

Somatostatin receptor scintigraphy with ^{111}In -pentetreotide (SRS) is a functional imaging, classically used to detect metastatic NETs that express somatostatin receptors. ^{111}In -pentetreotide was the first scintigraphic agent approved for NETs and has been the most widely studied [4]. However, the sensitivity and specificity of SRS are known to be unsatisfactory, with a sensitivity of less than 60% [5]. Newer PET radiotracers such as ^{68}Ga -labeled somatostatin analogs and ^{18}F -DOPA are used in positron emission tomography/computed tomography and help to better detect NET [5,6]. However, ^{111}In -Pentetreotide SPECT/CT (Single-Photon Emission Computed Tomography) remains the most easily available imaging in some countries that helps to detect metastatic lesions of NETs. We aimed to report the detection of atypical cardiac metastasis of a midgut neuroendocrine tumor using somatostatin receptor scintigraphy with ^{111}In -pentetreotide and cardiac magnetic resonance imaging.

Case Presentation

A 49-year-old man was referred to our hospital for abdominal pains. He underwent an intestinal NET resection 8 years ago. The computed tomography revealed multiple liver metastases. Hepatic biopsies confirmed the diagnosis of metastases of a grade 2 NET with a MIB-1 of 4%. Biological analysis found increased levels of 5-HIAA excretion in 24-h urine samples. Because carcinoid heart

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Received Date: 15 Nov 2017

Accepted Date: 26 Dec 2017

Published Date: 02 Jan 2018

Citation:

Belia L, Glaude L, Faes C, Michelin T, Hedreville M, Grégory M, et al. Somatostatin Receptor Scintigraphy with ^{111}In -Pentetreotide for Detection of Atypical Metastatic Localization of a Midgut Neuroendocrine Tumor: A Case Study. *Ann Clin Case Rep.* 2018; 3: 1488.

ISSN: 2474-1655

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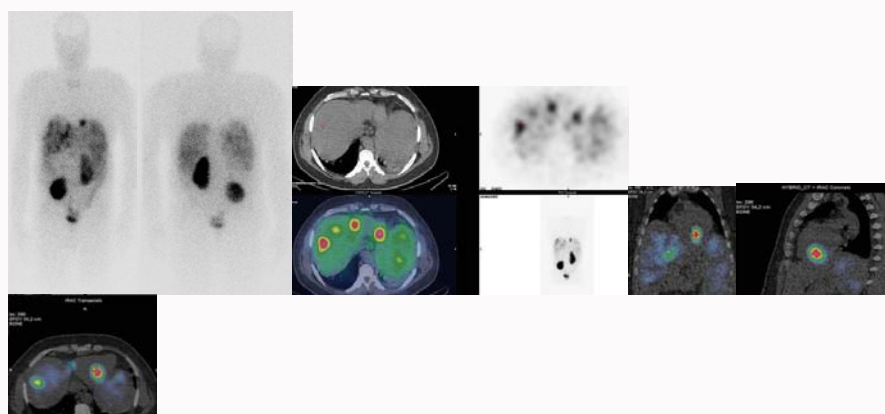


Figure 1: Somatostatin receptor scintigraphy: A) Whole body scan, AP view; B) SPECT-CT images showing multiple liver metastases; C) Fusion SPECT-CT showing a focal intense uptake in the heart inferior wall.

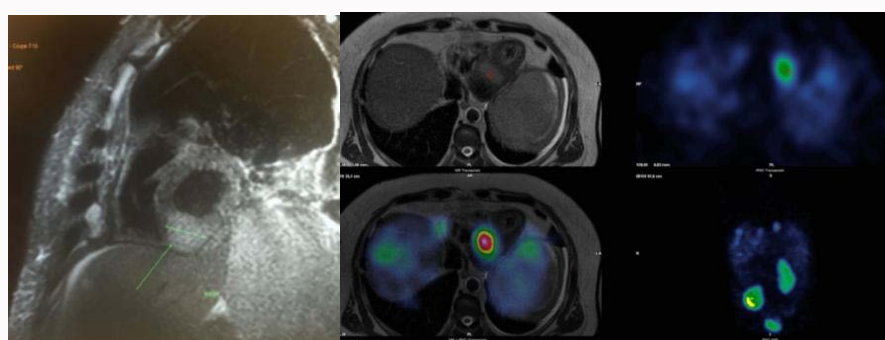


Figure 2: Myocardial MRI (T2stir sagittal) and fusion images of SRS SPECT with MRI: gadolinium enhancing lesion of 24 mm in the myocardial inferior wall.

disease is a classical complication of carcinoid tumors, we performed an echocardiography that did not find tricuspid valve disease but revealed a global heart hypokinesia. After intravenous injection of 140 MBq ^{111}In -pentetreotide, SPECT/CT (General Electric, Discovery NM/CT 670 Pro) identified liver metastases (Figure 1) and a suspect cardiac uptake (Figure 2).

A cardiac magnetic resonance imaging (Philips 1.5 Tesla) was performed and revealed a thickening of the bottom wall of the heart, measuring 24 mm compatible with a cardiac metastasis of the NET. SMS analogs were started but failed to improve hepatic metastasis evolution and cardiopulmonary function that leads to the death of the patient by hepatic compression on the heart.

Discussion

Liver are the most frequent organ localization for NETs metastasis but it can be associated with cardiac metastasis that accentuate the prognosis [2]. Carcinoid syndrome is well known in well differentiated secreting NET but the occurrence of intracardiac metastasis remains scarce. Several cases are reported in the literature with the peculiarity of being associated with no cardiac symptoms [3]. This location remains independent of the MIB-1 that may vary from 1 to 7% [3].

Even we did not have new markers of imaging for NET such as ^{68}Ga -DOTATATE PET/CT, ^{111}In -Pentetreotide SPECT CT remains an useful tool to detect cardiac metastasis of NETs as previously described [2,7-9] The delayed detection of the cardiac metastase did not allow to set up an effective management and the patient dead due to an uncommon hepatic metastasis compression of the heart.

Conclusion

^{111}In -Pentetreotide SPECT/CT remains a good functional imaging compared to conventional somatostatin receptor scintigraphy to precise anatomical localization of NET metastases and could help to select the best morphological imaging to complete the staging of metastatic NET. Cardiac metastasis of NET is rare and worsens the prognosis even in case of G2 NET.

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