

Clinical note

Multimodal approach in radioguided surgery in a case of multiple paraganglioma

N. Sánchez^{a,*}, A. Tapias^a, H. Bowles^a, E. Delgado^b, R. Almenara^b, D. Fuster^a, S. Vidal-Sicart^a

^a Nuclear Medicine Department, Hospital Clínic, Barcelona, Spain

^b Gastrointestinal Surgery Department, Hospital Clínic, Barcelona, Spain

ARTICLE INFO

Article history:

Received 6 March 2017

Accepted 19 April 2017

Available online xxx

Keywords:

Freehand-Spect

Portable gamma camera

Paraganglioma

¹²³I-MIBG

Radio-guided surgery

ABSTRACT

The case involves a 34-year-old who underwent surgical removal of a retroperitoneal paraganglioma adjacent to the left kidney lower pole, and visualized by CT and MRI.

The ¹²³I-MIBG scan was positive for this lesion and, in addition, another more caudal uptake, of smaller size and intensity, was observed at L5 level. It was not considered for removal, due to its lack of morphological definition.

One week after the surgery, the patient presented with difficult-to-control high blood pressure.

A second ¹²³I-MIBG scan was performed. The previously described second image was more intense, and surgery was planned to remove it.

A combination of techniques including Freehand-SPECT and a portable hybrid gamma camera (with optical camera) were used pre-operatively to identify the location of the lesion. The combination of intra-operative laparoscopic gamma probe and portable hybrid gamma camera enabled the tumor to be located, excised, and its complete removal to be assessed. The histopathology analysis confirmed a second paraganglioma.

© 2017 Elsevier España, S.L.U. y SEMNIM. All rights reserved.

Abordaje multimodal en la cirugía radioguiada de un caso de paraganglioma múltiple

RESUMEN

Mujer de 34 años intervenida quirúrgicamente de un paraganglioma retroperitoneal adyacente al polo inferior del riñón izquierdo, visualizado por TC y RM.

La gammagrafía con ¹²³I-MIBG fue positiva y además se evidenció otra captación de menor intensidad, prevertebral-L5, no subsidiaria de extirpación debido a la ausencia de traducción radiológica.

Una semana después de la cirugía, la paciente presentó HTA de difícil control.

Se realizó un segundo estudio con ¹²³I-MIBG. La imagen sin traducción radiológica previa mostró mayor captación gammagráfica y fue localizada en las imágenes morfológicas, por lo que se reintervino la paciente.

Se utilizó una combinación de técnicas, incluyendo Freehand-SPECT y una gammacámara portátil-híbrida (con cámara óptica) para identificar la localización de la lesión, consiguiendo una buena planificación preoperatoria. La combinación de sonda gamma laparoscópica y gammacámara portátil-híbrida permitió la localización intraoperatoria del tumor y la evaluación de su completa extirpación. El análisis anatomopatológico confirmó un segundo paraganglioma.

© 2017 Elsevier España, S.L.U. y SEMNIM. Todos los derechos reservados.

Palabras clave:

Freehand-Spect

Gammacámara portátil

Paraganglioma

¹²³I-MIBG

Cirugía radioguiada

Introduction

Radioguided surgery may be useful in locating neuroendocrine tumors, detecting smaller lesions than preoperative imaging tests and palpation by the surgeon. It also detects residual lesions and indicates a shorter route to access the lesion and ensuring total resection of all lesions being minimally invasive.

Its use is not generalized, due to technical difficulties, limited published series, and variability of criteria in the type of radiopharmaceutical, dose and interval between tracer injection and surgery.

Although intraoperative localization of small tumor lesions remains a challenge, many groups have reported a greater success of intraoperative detection of small intra-abdominal neuroendocrine tumors using the gamma-probe and the portable gamma camera during surgery. The intraoperative image acquisition in real time with the lesion activity is very useful to verify the complete resection of the disease.

With this article we intend to corroborate that radio-guided surgery is very useful in locating small neuroendocrine tumors,

* Corresponding author.

E-mail address: nusanchez@clinic.ub.es (N. Sánchez).

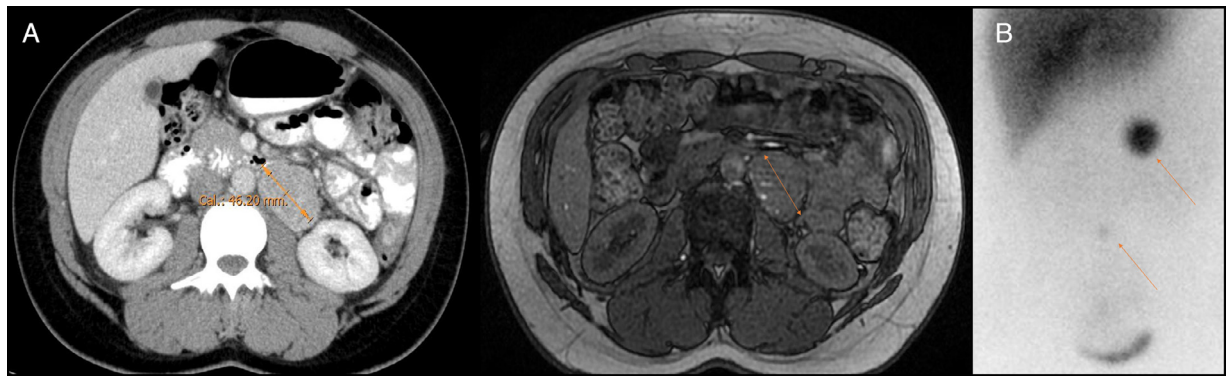


Fig. 1. (A) CT and MRI axial slices showed a 5 cm left paraaortic infrarenal tumor. (B) ^{123}I -MIBG scintigraphy showing high intensity uptake in the lesion described in CT/MRI concerning with a paraganglioma. And another more caudal uptake, of smaller size and intensity in the retroperitoneal space at the level of L5.

detecting residual lesions intraoperatively and ensuring total resection.

This occurred in this patient, with a small synchronic retroperitoneal paraganglioma treated with this methodology.

In addition, we show the different Nuclear Medicine techniques that can be performed in the preoperative planning and two of the existing tools of recent intraoperative use.

Preoperatively, we located the lesion with the use of SPECT-TC images, 3D Volumetric Reconstruction with Osirix, Freehand-SPECT and portable gamma camera merged with optical vision camera. Finally, in the radio-guided surgery, we used the latter to identify the uptake, to guide in the total resection and to verify “in vivo” in the operating room, the complete absence of activity.

Clinical case

We present the case of a 34-year-old woman with high blood pressure and subacute low-back pain, positive metanephrines and SDHB (succinate dehydrogenase subunit B) mutation under treatment with doxazosin and propranolol.

CT and MRI showed a 5 cm left paraaortic infrarenal tumor (originating in the inferior mesenteric artery, in relation to the Zuckerkandl organ) suggesting a paraganglioma (Fig. 1A). We performed a diagnostic ^{123}I -Metaiodobenzylguanidine (MIBG) scintigraphy, showing high intensity uptake in the lesion described concerning with a paraganglioma. Additionally, a lower intensity focal uptake was also found in the retroperitoneal space at the level of L5, without any anatomic correlation so it was not considered for surgery (Fig. 1B).

After tumor removal, the patient maintained good tension controls but one week later blood pressure increased again, requiring medical treatment.

Due to the persistence of symptoms, a second ^{123}I -MIBG scan and SPECT-TC was performed showing a high uptake in the L5 paravertebral zone, corresponding to a 13-mm lesion in the morphological imaging.

We decided to remove this small ^{123}I -MIBG uptake with radio-guided surgery as it would be difficult to locate with conventional surgical approach.

Discussion

Paragangliomas are rare neuroendocrine tumors located in the extra-adrenal paraganglionic system. They have their origin in the neural crest and may secrete catecholamines, hormones and peptides. Although they have a preference for the vicinity of large

vessels, they can appear anywhere from the base of the skull to the bladder. They may be catecholamine secreting or non-secreting. In secretors tumors, the classic tetrad is given by hypertension, headache, palpitations and sweating.¹⁻³

Although CT and MRI are the most common diagnostic techniques, the ^{123}I -MIBG scan has become the imaging study of choice for paragangliomas with a sensitivity in the rank from 77% to 100% for the detection of functional paragangliomas with higher specificity in comparison with anatomic imaging techniques.^{1,4} In addition, ^{123}I -MIBG scan allows to scan the whole body to stage the disease and to detect multiple paragangliomas.

When possible, surgery is indicated and a radioguided approach with different devices, has been used in some cases described in the literature.⁴⁻⁹

In this patient, an axial CT slice showed a contrast-enhanced nodule (13 mm of diameter) located in the retroperitoneum and very close to the medial anterior part of L5 vertebral body and medial to the right iliac artery (red arrow) (Fig. 2A). An ^{123}I -MIBG scan was performed and a focal uptake of radiotracer was clearly observed in images obtained after 4 h of radiotracer injection, suggesting a functional neuroectodermal tissue (paraganglioma), without any other potential pathologic uptake (Fig. 2B). A radio-guided procedure via laparoscopic approach was scheduled in order to minimize morbidity.

Axial, coronal and sagittal slices of 3-dimensional (3D) reconstructed fused SPECT/CT images (4 h after intravenous injection of 370 MBq (10 mCi) of ^{123}I -MIBG showed a pathologic focal uptake next to L5 vertebral body (green arrows) (Fig. 3). A volume rendering 3D image-set was generated using an Unix-based program (Osirix, Pixmeo, Geneva, Switzerland) serving as a road map for the surgeon.¹⁰

However, planar scintigraphy and SPECT/CT cannot be intraoperatively used during surgery for real-time purposes. To solve this potential problem, there are two portable devices to assess the uptake observed in the scintigraphy. One of them, uses freehand SPECT technique (declipse-SPECT; SurgicEye, Munich, Germany) and the other is a high-resolution portable gamma (Sentinella[®], Oncovision, Valencia, Spain).

Declipse-SPECT is a new system designed for use in the operating room. This device combines a gamma probe with an infrared optical spatial localization system using fiducial markers attached to the probe and the patient. It has been used in some radioguided procedures like sentinel lymph node biopsy in breast cancer and malignant melanoma. It allows for 3D imaging and real-time navigation with an augmented reality approach.^{5,6,9}

We used Declipse-SPECT images preoperatively. After 120 s scanning in different angles and directions over the area where

Download English Version:

<https://daneshyari.com/en/article/8825774>

Download Persian Version:

<https://daneshyari.com/article/8825774>

[Daneshyari.com](https://daneshyari.com)