Clinical note

Pancreatic and thyroid metastases detected with $^{18}$F-FDG PET/CT in patient with colorectal cancer

V. Castillo Morales$^{a,*}$, P. García Alonso$^b$, M.A. Balsa Bretón$^b$, A. Ortega Valle$^b$, J. Penín González$^b$, C. Pey Illera$^b$

$^a$ Servicio de Medicina Nuclear, Hospital Universitario Ramón y Cajal, Madrid, Spain
$^b$ Servicio de Medicina Nuclear, Hospital Universitario de Getafe, Madrid, Spain

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ABSTRACT

A 53-year-old woman with diagnosis of colorectal cancer, who received surgical treatment and chemotherapy. After 5 years of complete remission, she showed an atypical oncological evolution. The utility of $^{18}$F-FDG PET/CT scan has been fundamental to detect suspected and unsuspected recurrence and to monitor response to treatment.

Metástasis pancreática y tiroidea detectadas con $^{18}$F-FDG PET/TAC en paciente con cáncer colorrectal

RESUMEN

Mujer de 53 años diagnosticada de cáncer colorrectal, quien recibió tratamiento quirúrgico y quimioterápico, tras 5 años de remisión completa presenta una evolución atípica de su patología oncológica. La utilidad de la PET/TAC con $^{18}$F-FDG ha sido fundamental para la detección de las recidivas, sospechadas y no sospechadas, y para la monitorización de la respuesta al tratamiento.

Introduction

Colorectal cancer (CRC) is the third cause of death by cancer in most Western countries following breast and lung cancer and is the second cause of death in non smoker patients. Taking both sexes into account, in Spain CRC is the most frequent tumor (25,600 new cases per year), with this incidence increasing (annual increase of 2.6%) and constituting the first cause of cancer death. In the last 10 years a significant improvement from the use of positron emission tomography/computed tomography (PET/CT) with $^{18}$F-FDG in CRC lies in the cases of adenocarcinoma which is the most frequent histological type and usually shows greater avidity for FDG than normal cells. The mucinous variants of adenocarcinoma, carcinoma tumors and gastrointestinal stroma tumors (GIST) present little or very variable avidity for FDG and may be a cause of false negative results. The use of PET/CT is currently indicated on suspicion of recurrence, which is frequent in one-third of the patients within the first two years of follow-up and in the restaging of patients with potentially surgically resectable metastasis. We present a case of CRC with atypical evolution in which PET/CT played a fundamental role in therapeutic decision making.

Clinical case

A 53-year-old woman with a history of smoking, uterine myoma and gastroesophageal reflux was diagnosed with CRC (T3 N1 M0) in 2005 and underwent surgery and adjuvant chemotherapy. After 5 years in complete remission, she consulted for dorsalgia in 2010 and underwent a chest X-ray showing a pulmonary nodule in the left lower lobe (LLL). Biochemical studies did not show alterations and a thoracic CT demonstrated a 2 cm × 2.5 cm nodule in segment 6 of LLL suspicious of malignancy. In view of these findings, a bronchoscopy was performed which showed a mass obstructing the lumen of segment 6 of LLL, resulting in adenocarcinoma of colonic origin. A PET/CT was requested for restaging and for planning the best therapeutic approach to implement. This study showed hypermetabolism in the lung nodule in LLL (SUVmax 6.84) (Fig. 1) compatible with the clinical information of metastasis. Incidental findings included a pathologic focal hypermetabolic lesion in the tail of the pancreas (SUVmax 3.59) (Fig. 2) which suggested malignancy, albeit without determination of the primary or metastatic origin, and increased uptake in a thyroid nodule in the right lobe (SUVmax 3.89) (Fig. 3) in which a selective study was recommended to determine its etiology. The case was discussed in a multidisci-


$^*$ Corresponding author.

E-mail address: valentinacas@gmail.com (V. Castillo Morales).
Fig. 1. Focal pathological uptake in left lower lobe of the lung, compatible with metastasis.

Fig. 2. Pathological focal hypermetabolism in the tail of the pancreas without radiological appearance in the CT, suggestive of malignancy.

Fig. 3. Hypermetabolic focal activity in the right thyroid lobe coinciding with a nodule in the CT. Fine needle aspiration biopsy: metastasis of colorectal cancer.

Discussion

CRC may be disseminated by contiguity or by peritoneal, lymphatic and hematogenous spread, with metastasis by this route being more frequent in the liver, lung, bone and brain and, on rare occasions, in thyroid or suprarenal tissue and the pancreas. In the latter case, 2% of single malignant lesions are metastatic, although this percentage rises to 40% in the presence of oncologic antecedents. Pancreatic metastasis is usually found within the context of peritoneal carcinomatosis and disseminated disease and less often as a single lesion. Pancreatic metastases are described, in order of frequency, in neoplasms of the kidney, lung (small cell), breast (especially lobular), sarcomas (leiomyosarcoma), colon and GIST. The time of their presentation usually varies greatly according to the origin of the primary tumor, being an average of 70 months (14–24 months for lung cancer, from 10 to 22 years for renal carcinoma, from 4 to 6 years for sarcoma and 8 years for breast cancer). Metastases may present with a clinical picture similar to that of primary adenocarcinoma of the pancreas (vomiting, abdominal pain, cholestasis, digestive hemorrhage, weight loss) or may be asymptomatic and present a better prognosis than primary tumors of the pancreas. CT studies may present 3 types of images: single lesion, multinodular and diffuse infiltration, almost always being hypervascular. Up to 10% of the metastatic pancreatic lesions not seen in the CT are detected by PET. Thyroid metastases represent only 1.4% of the malignant pathology of the gland. The primary tumors most frequently producing metastasis in this organ include those of the breast, the kidney, lymphomas, lung cancer and head and neck tumors. Incidental hypermetabolic lesions in the thyroid gland are found with a certain frequency in PET/CT studies and have been described in 1.2–5.6% of the cases. Diffuse uptake is usually related to benign disease ( Graves disease, autoimmune, bacterial and viral thyroiditis) while focal uptake, associated or not with alterations in the radiological study, should undergo histological study since up to 50% of the cases may correspond to malignant lesions. F-FDG PET/CT is currently indicated in CRC, fundamentally in cases in which there is reasonable suspicion of recurrence due to elevation in serum tumor markers without evidence of disease by other diagnostic methods or in undetermined lesions detected by conventional methods as well as in the restaging of cases of known, potentially surgically treatable relapse with the aim of ruling out the presence of other metastatic foci to avoid surgery and thereby reducing the costs. The sensitivity and specificity of PET in these indications are between 90–95% and 65–85%, respectively, leading to changes in the therapeutic approach in 25–50% of the cases. In the present case it was decided to first histologically study the thyroid gland probably due to its easy access. With the results obtained, chemotherapy treatment was initiated since unnecessary, and most likely incomplete, surgical treatment was ruled out on the confirmation of 2 foci of metastatic disease (lung and thyroid) as well as probably a third focus (tail of the
pancreas), thereby implementing the most adequate therapy in the patient and fulfilling one of the main objectives of PET/CT in CRC.

It would be of interest to consider the possibility of the use of PET/CT in the follow up of patients treated for CRC since this technique presents greater precision in the early detection of local and metastatic recurrence and allows differentiation of post-surgical changes of persistence/tumor recurrence which carry a great therapeutic impact. Following rectal surgery and pelvic radiotherapy presacral masses are sometimes observed in which differentiation between fibrosis and relapse by CT may be difficult. In these cases PET/CT has greater precision, presenting a positive predictive value of 88% and a negative predictive value of 100%. In the case of liver metastases, PET/CT presents a sensitivity of 90% and a specificity of 92%, compared with the 83 and 84%, respectively, of CT; and despite being very similar, PET/CT is also better in the detection of intrahepatic recurrence after hepatectomy. In extrahepatic metastases, PET/CT has a sensitivity of 90% compared to the 64% with CT, considering that PET is more sensitive in the abdomen, the pelvic and the retroperitoneum. However, studies on cost are necessary to determine the possibility of introducing this technique as a first line method in the follow-up protocol of CRC.

Conclusions

PET/CT is a highly effective tool in the evaluation of recurrence in patients with CRC and has the potential to change the therapeutic approach implemented such as in the case presented. It could, therefore, be taken into account as a routine diagnostic tool in the follow up of these patients.

References