Clinical note

Papillary thyroid carcinoma synchronous with breast cancer: An incidental finding in an 18F-FDG PET-CT study carried out in a search for occult breast cancer

J. Banzo a,∗, M.A. Ubieto a, C. González b, P. Razola c, L. Tardín c, A. Andrés c, A. Santapau c, A. Parra c, E.F. Rambalde c, E. Prats c

a Unidad de Medicina Nuclear, Grupo Hospitalario Quirón La Floresta, Zaragoza, (Proyecto OTRI de Investigación Grupo Hospitalario Quirón y Universidad de Zaragoza), Zaragoza, Spain
b Servicio de Ginecología y Obstetricia, HCU Lozano Blesa, Zaragoza, Spain
c Servicio de Medicina Nuclear, HCU Lozano Blesa, Zaragoza, Spain

A R T I C L E   I N F O

Article history:
Received 24 August 2011
Accepted 11 November 2011

Keywords:
Occult breast cancer
Thyroid papillary carcinoma
Synchronous tumors
18F-FDG PET-CT

A B S T R A C T

The most common cause of metastatic involvement of axillary lymph nodes in women is ipsilateral breast cancer. The definition of occult breast malignancy has changed over time. Nowadays, it is considered to exist when it coincides with an isolated metastatic axillary abnormal lymph node in the absence of a palpable tumor in the ipsilateral breast, non-diagnostic breast tumor mammography and no detection of other malignancies outside the breast which could potentially affect the axillary nodes. The value of 18F-FDG PET/CT scan in these patients has not been established, but it could be useful in those patients with a non-diagnostic MRI. It is not uncommon in 18F-FDG PET/CT studies to identify incidental hypermetabolic focal image in the thyroid. The high prevalence of cancer in these lesions makes it recommendable to perform a US study and/or FNAP biopsy.

© 2011 Elsevier España, S.L. and SEMNIM. All rights reserved.

Carcinoma papilar de tiroides sincrónico con cáncer de mama: hallazgo casual en una exploración 18F-FDG PET-TAC por búsqueda de un cáncer oculto de mama

R E S U M E N

La causa más frecuente de afectación metastásica de los ganglios linfáticos axilares en mujeres es una neoplasia en la mama ipsilateral. La definición de neoplasia oculta de mama se ha modificado con el tiempo. Actualmente, hay que considerar una neoplasia oculta de mama cuando coincide una linfadenopatía axilar metastásica aislada en ausencia de una tumoralización palpable en la mama ipsilateral, una mamografía no diagnóstica para un tumor mamario y la no detección de una neoplasia primaria fuera de la mama, que potencialmente pudiera afectar a los ganglios axilares. En estos casos, el valor de la exploración 18F-FDG-PET-TAC no está establecido, aunque puede ser de utilidad en pacientes con una RM no diagnóstica. No es infrecuente que, en una exploración 18F-FDG-PET-TAC, se identifique de forma casual una imagen hipermetabólica focal en tiroides. La elevada prevalencia de cáncer en este tipo de lesiones, aconseja practicar una exploración con US y/o PAAF.

© 2011 Elsevier España, S.L. y SEMNIM. Todos los derechos reservados.

Introduction

At present there is wide consensus related to not indicating 18F-FDG PET–CT in the detection of primary breast neoplasm. Neither is this technique an alternative to histological study to confirm or exclude breast cancer because of the limitations of the procedure in identifying small size lesions with a low grade of malignancy or as an alternative to sentinel lymph node biopsy for lymph node staging.1 Nonetheless, in selected patients 18F-FDG PET-CT may provide relevant information to orient the diagnosis and treatment planning.

We present the findings of a 18F-FDG PET-CT performed in a patient with criteria of occult breast neoplasm (OBN) in which the mammography, ultrasond (US) and magnetic resonance (MR) findings were negative in localizing the primary tumor. Moreover, positron emission tomography (PET) incidentally localized an unsuspected synchronous thyroid tumor.

Clinical case

A 65-year-old patient with no personal or familiar history of interest consulted for a bleeding, eczematous lesion in the areolarnipple complex of the left breast of six months of evolution. Both the gynecological and mammographic examinations performed 11 months previously had been normal. On physical examina-
tion a poorly defined left retroareolar thickening was observed with a bleeding, de-epithelialized area of 10 mm in diameter in the nipple of the right breast and an adenopathy in the left axilla. Cytological study by scraping of the left areola demonstrated keratin scales with signs of atypia. The mammography showed left retroareolar duct thickening with no other alterations of interest (Fig. 1A) while ultrasonography only confirmed the presence of the left axillary adenopathy. Fine needle aspiration puncture (FNAP) of this adenopathy showed metastasis of ductal breast carcinoma. No tumoral lesion was found in either breast on MR (Fig. 1B). An \(^{18}\)F-FDG PET-CT study identified a hypermetabolic lesion (SUVmax. = 3.6) of around 11 mm in diameter localized in the external region of the areola of the left breast not accompanied by structural alterations in the correlative CT slices without contrast. Likewise, the left axillary adenopathy located at level I showed an increase in FDG uptake with no other metabolically active adenopathies in the territory of the internal mammary region, left supraclavicular region or mediastinum (Fig. 2). In addition, a hypodense hypermetabolic (SUVmax. = 3.5) nodule of 10 mm was localized in the inferior pole of the right thyroid lobe (Fig. 3). Thick needle biopsy (TNB) of the left areolar region performed due to the result of the PET-CT study showed ductal carcinoma. A posterior US-guided FNAP of the thyroid nodule was positive for tumoral cells, suggestive of papillary carcinoma. With the diagnosis of periareolar breast neoplasm and synchronous thyroidal tumor, the patient underwent elective surgery with simultaneous central tumorectomy of the left breast with Grisotti reconstruction, left axillary lymphadenectomy and total thyroidectomy.

The anatomopathological report of the breast lesion was of infiltrating ductal carcinoma G2 (Ki67: 20%) with invasion of the nipple and areola. From an immunohistochemistry point of view, the tumor was positive for estrogen and progesterone receptors and was HER-2 negative. Metastasis was found in 3 of the 23 axillary lymph nodes removed with tumor extension beyond the capsule in 2 and one metastatic implant in the axillary fat. In the total thyroidectomy piece a tumor of 10 mm was identified with well defined apparently non-encapsulated limits localized in the inferior pole of the right hemithyroid lobe near the isthmus, corresponding to a microfollicular papillary carcinoma. The patient received adjuvant chemo- and radiotherapy and was awaiting admission for ablation of the thyroid remnants.

Figure 1. (A) Mammography of the left breast. Thickened retroareolar duct with no other alterations of interest. (B) MR. No tumor lesion was identified in either breast.
Discussion

The most frequent cause of metastatic axillary adenopathy is a neoplasm in the ipsilateral breast, being the first clinical manifestation of breast cancer in 0.3–1% of women. The definition of OBN has been modified over time in parallel with the diagnostic procedures and its incidence has progressively reduced in the last decades. A patient is considered to have OBN on the appearance of isolated metastatic axillary lymphadenopathy in the absence of a palpable tumor in the ipsilateral breast, a non-diagnostic mammography for breast tumor and the absence of detection of a primary neoplasm outside the breast which may potentially affect the axillary lymph nodes. Most authors do not include US for the definition of OBN because of the elevated rate of false positive and false negative results. Computerized tomography (CT) $^{18}$F-FDG PET-CT and scintigraphy with $^{99m}$Tc-MIBI have not been systematically used in patients with OBN and thus, no solid data are available to know their utility.

The systematic review by de Bresser et al. in which they analyzed the value of MR in patients with OBN showed that this imaging technique detects suspicious neoplastic lesions in 71% of the cases. On considering only lesions with histological confirmation, MR shows a sensitivity and specificity of 90% and 31%, respectively. The low specificity of MR indicates the need to perform histological study of the lesions detected, guided by the MR results or by US study oriented by MR.

The predominant histopathological tumor type in OBN is infiltrating ductal carcinoma with moderate histological grade coinciding with the results recently published by Lu et al. Triple test negative tumors also predominate, despite the small size of most of these tumors. The localization of the primary tumor in OBN is crucial to adequately plan the treatment to be administered and establish the prognosis. The use of $^{18}$F-FDG PET-CT is not recommended to detect a primary breast neoplasm, largely due to the low sensitivity of the procedure in well-differentiated tumors of less than 1 cm in size. Although the results may be improved by acquiring the images in a supine prone position or using positron emission mammography (PEM), $^{18}$F-FDG PET has a secondary role compared to conventional techniques. In the specific case of OBN, the current data on the value of $^{18}$F-FDG PET-CT in the localization of the primary tumor are scarce and most correspond to clinical notes similar to the present report. In the metaanalysis on the detection of occult primary tumor by $^{18}$F-FDG PET-CT carried out by Kwee and Kwee breast cancer was the most frequent cause of false negative results. Nonetheless, as in the present case, $^{18}$F-FDG PET-CT may be indicated in cases of OBN in which MR was not diagnostic.

In addition, the added value of PET examination lays in the capacity of this test to detect lymph node metastases in lymph node stations other than the axilla and unsuspected distant metastasis. It is not infrequent for a $^{18}$F-FDG PET-CT study to identify hypermetabolic images often localized in the lung, thyroid gland and the colon corresponding to an unknown synchronous or metachronic neoplasm requiring the use of additional diagnostic tests. The prevalence of malignancy of focal hypermetabolic thyroid lesions detected incidentally is of 14.56%, being higher than incidental thyroid lesions detected by CT or US, with a prevalence of malignancy of 1.5–10%. At present, the clinical guidelines elaborated by the “American Thyroid Association” and “National Comprehensive Cancer Network” recommend the use of US and/or US-guided FNAP in all focal hypermetabolic lesions detected incidentally. Further studies are needed to establish what cut-off of the SUVmax level allows better discrimination among focal benign and malignant thyroid lesions. Although different authors have described a significant association between breast carcinoma and thyroid diseases including differentiated neoplasms, a wide cohort of patients is required to confirm this association.

In conclusion, although $^{18}$F-FDG PET-CT has limited value in the detection of breast cancer, this study is indicated in patients with OBN when MR does not provide definitive diagnostic information. Incidental detection of a local hypermetabolic lesion in the thyroid gland indicates the need to perform US and/or FNAP.

References