

# Incidental $^{18}\text{F}$ -FDG PET/CT bilateral breast uptake due to carcinoma

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## Abstract

We report a case of 71-year-old female patient, previously treated with chemotherapy and surgical resection of sigmoid tract of the large bowel for adenocarcinoma (pT3N1M0), who underwent a  $^{18}\text{F}$ -FDG PET/CT for a suspicious hepatic lesion detected at CT scan during follow-up.  $^{18}\text{F}$ -FDG PET/CT showed no abnormal uptake in the liver both at 60 minutes and 120 minutes after injection but revealed a pathological uptake in two breast nodules, (one localized in upper-internal-quadrant of the right breast and the other in the upper-external-quadrant of the left breast). The patient underwent breast MRI, which confirmed the suspicious nature of both lesions; subsequently she underwent a trucut biopsy of both lesions which demonstrated a bilateral localization of papillary carcinoma (both lesions were classified as pT1c). The patient underwent bilateral mastectomy and the final biopsy confirmed the presence of breast cancer, while bilateral sentinel nodes biopsy showed no lymph-nodes metastases.

**KEY words:**  $^{18}\text{F}$ -FDG, PET/CT, breast cancer, incidental, bilateral

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## Background

Incidental and unexpected focal  $^{18}\text{F}$ -fluoro-2-deoxyglucose ( $^{18}\text{F}$ -FDG) uptakes in many organs are relatively frequent and can involve many organs as thyroid [1, 2], prostate [2], parotid gland [3] and colon [4]. Breast incidentaloma is commonly considered a breast lesion incidentally and newly detected by imaging techniques performed for an unrelated purpose and especially not for investigating breast diseases. Moreover, unexpected focal  $^{18}\text{F}$ -FDG uptakes can involve breast frequently revealing an unexpected breast cancer [5–8]; this means that, despite screening procedures, some lesions are still missed during traditional screening and could be incidentally revealed by  $^{18}\text{F}$ -FDG positron emission tomography (PET).

## Case report

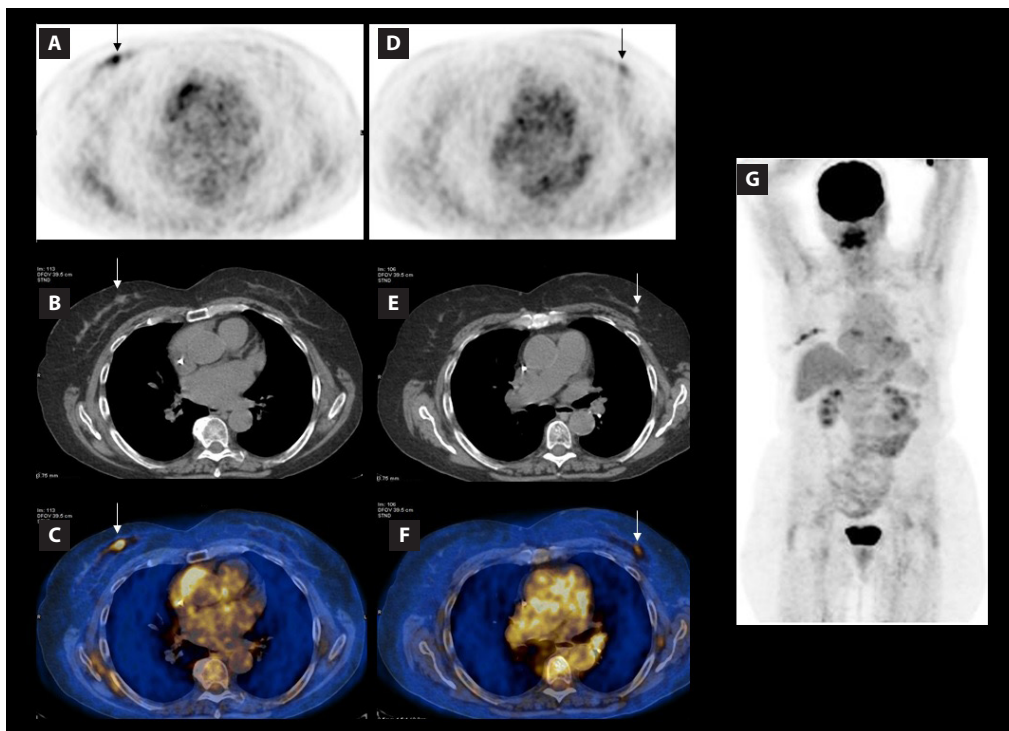
A 71-year-old female patient previously treated with chemotherapy and surgical resection of sigmoid tract of the large bowel for adenocarcinoma (pT3, N1, M0) underwent a CT scan during follow-up which was doubtful for a secondary lesion in the VII segment of the liver.  $^{18}\text{F}$ -FDG PET/CT was performed after intravenous administra-

tion of 3.5 MBq/kg; total body images were acquired 60 minutes after injection on Discovery ST tomograph (GE — Milwaukee, WI, USA; 4-slice-CT, 80mA, 120Kv; 3 minutes PET-bed; 128 × 128 matrix, 60 cm field of view) and further abdominal images were also acquired after 120 minutes from injection. The study showed no pathological uptake in the liver both after 60 and 120 minutes but revealed unexpected pathological uptakes in two breast nodules: one localized in the upper-inner-quadrant (UIQ) of the right breast and the other in the upper-external-quadrant (UEQ) of the left breast (Figure 1). The subsequent bilateral mammography confirmed the lesions described with PET/CT, particularly one lesion in the UIQ of the right breast next to the areola with a diameter of 30 mm, the other about 15 mm in the UEQ of the left breast. To study in depth the nature of these lesions the patient underwent breast MRI, which confirmed the suspicious features of both nodules (Figure 2). Afterwards she performed a trucut biopsy of the lesions which showed a bilateral localization of papillary carcinoma (both lesions were classified as pT1c) (Figure 3). Subsequently the patient underwent to bilateral mastectomy and the biopsy confirmed the presence of breast cancer, while bilateral sentinel nodes biopsy showed no lymph-nodes metastases.

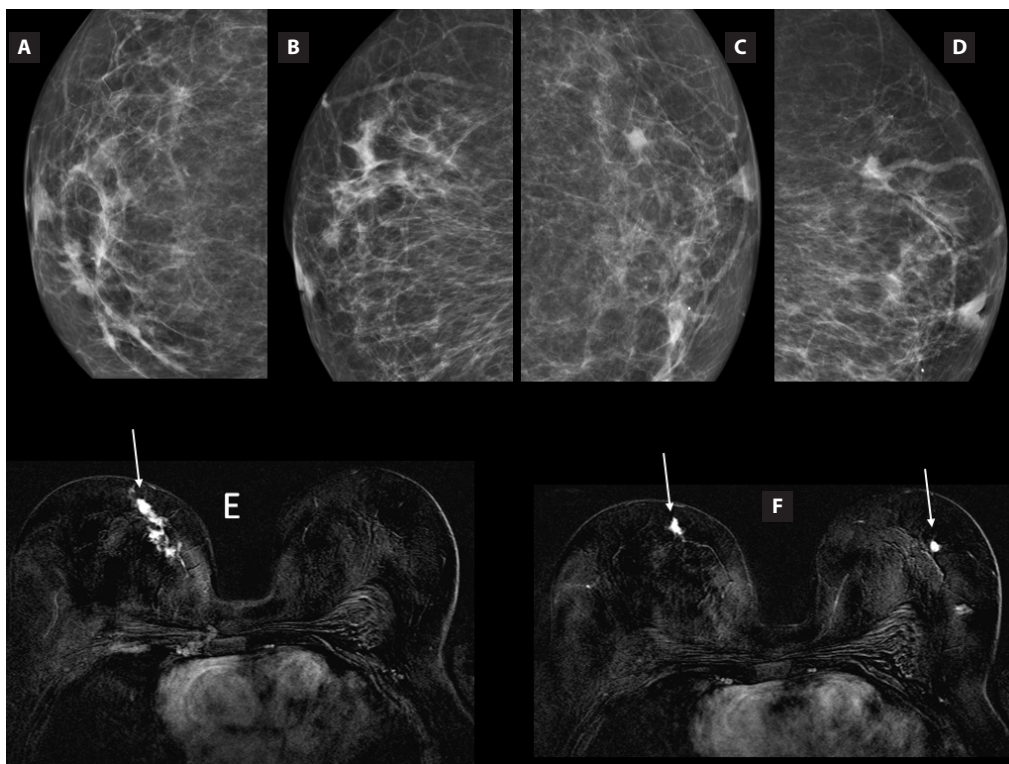
## Discussion

In patients affected by cancer workups usually focus on the patient's primary disease, and incidental coexistence of another primary malignant lesion can be missed. The singularity of this case is the bilateral breast incidentaloma histologically confirmed

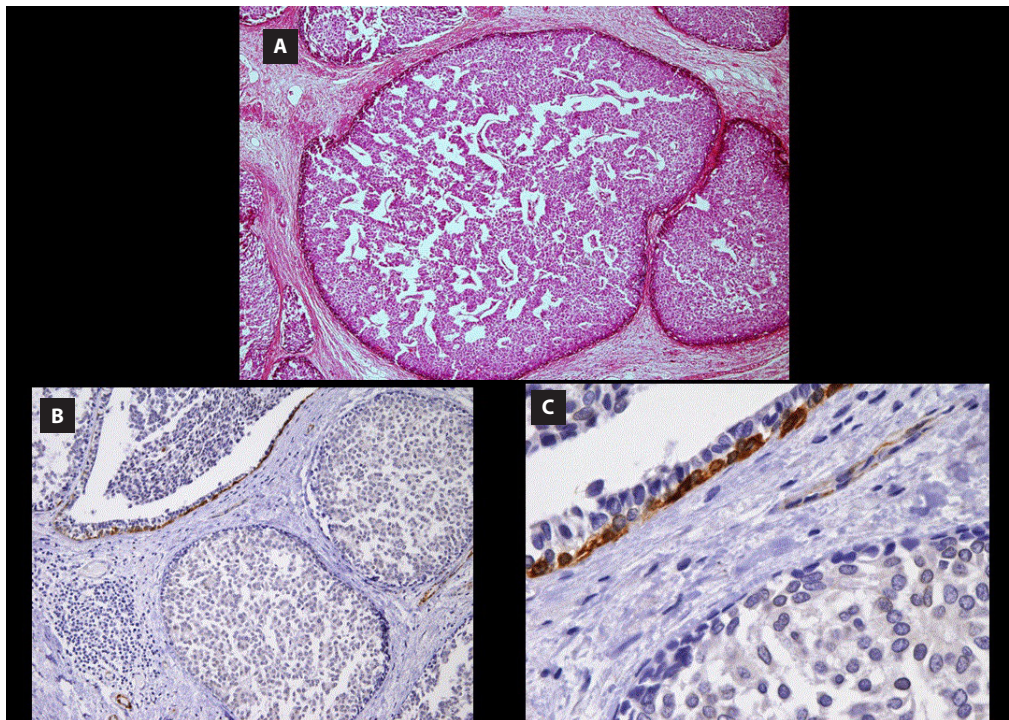
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**Figure 1A–G.** Axial CT (A), axial PET (B) and fused images (C) of the right breast nodule showing a focal area of FDG uptake in the UIQ; axial CT (D), axial PET (E) and fused images (F) of left breast nodule showing a focal area of FDG uptake in UEQ and maximum intensity projection image of the body after 60 minutes (G)



**Figure 2A–F.** Mammography: craniocaudal view (A) and mediolateral view (B) showing discrete area of densification of 28 × 8 mm in the upper-inner-quadrant (UIQ) in the para-areolar region of right breast; craniocaudal view (C) and mediolateral view (D) showing parenchymal opacity with irregular pattern of about 15 mm in the upper-external-quadrant (UEQ) of left breast. Axial MRI images reveal multiple areas of nodular contrast enhancement involving the right breast in UIQ which reaches up to 7–8 mm from the nipple (E) and a single area of nodular contrast enhancement involving the left breast in UEQ (F)



**Figure 3A–C.** H&E-stained section (A) shows multiple neoplastic nodules composed of epithelial cells growing in a solid pattern with fibrovascular cores among the solid cellular proliferation. Calponin immunostaining demonstrates absence of myoepithelial cell within the cellular proliferation (B), highlighting the focal residual myoepithelial cells at the periphery of some neoplastic nodules (C)

as cancer; to best of our knowledge this is the first reported case in literature discovered with  $^{18}\text{F}$ -FDG PET/CT.  $^{18}\text{F}$ -FDG PET/CT is not currently recommended for primary breast cancer detection because of high false negative rates in the presence of small early breast cancer. Low sensitivity was described for the identification of small non-palpable (< 1 cm) and low-grade malignancies [9] but it showed an added value in the detection of loco regional recurrence or distant metastases in locally advanced breast cancer [10]. Since screening procedure for breast cancer started a reduction of mortality was observed and an extension of lives despite the overdiagnosis still represents a problem. Despite screening procedure for breast cancer the data available in literature report a small number of incidental breast uptakes in patients studied with  $^{18}\text{F}$ -FDG PET/CT for non-breast-related oncological reasons, which suggest that some lesions are still missed during traditional screening procedures [5–8]. In differentiating benign from malignant lesion  $\text{SUV}_{\text{max}}$  values showed a low accuracy and a cut-off value couldn't be considered [6, 7]. A recently published revision of the literature suggest that prevalence of hypermetabolic lesions in the breast is between 0.36 and 1.84% and overall risk of malignancy is between 18 and 100% [6]. This case report suggests that every breast uptake need further imaging in order to rule out malignancy. Despite being not frequent, breast incidentalomas are clinically relevant showing a high percentage of malignancy and, therefore, need further investigation.

### Conflict of interest

The authors declare that they have no conflict of interest.

### References

- Bertagna F, Treglia G, Piccardo A et al. FDG-PET/CT thyroid incidentalomas: a wide retrospective analysis in three Italian centres on the significance of focal uptake and SUV value. *Endocrine* 2013; 43: 678–685.
- Bertagna F, Sadeghi R, Giovannella L, Treglia G. Incidental uptake of  $^{18}\text{F}$ -fluorodeoxyglucose in the prostate gland. Systematic review and meta-analysis on prevalence and risk of malignancy. *Nuklearmedizin* 2014; 53: 249–258.
- Treglia G, Bertagna F, Sadeghi R, Muoio B, Giovannella L. Prevalence and risk of malignancy of focal incidental uptake detected by fluorine-18-fluorodeoxyglucose positron emission tomography in the parotid gland: a meta-analysis. *Eur Arch Otorhinolaryngol* 2015; 272: 3617–326.
- Treglia G, Calcagni ML, Rufini V et al. Clinical significance of incidental focal colorectal (18)F-fluorodeoxyglucose uptake: our experience and a review of the literature. *Colorectal Dis* 2012; 14: 174–180.
- Bertagna F, Evangelista L, Piccardo A et al. Multicentric study on  $^{18}\text{F}$ -FDG-PET/CT breast incidental uptake in patients studied for non-breast malignant purposes. *Rev Esp Med Nucl Imagen Mol* 2015; 34: 24–29.
- Bertagna F, Treglia G, Orlando E et al. Prevalence and clinical significance of incidental F18-FDG breast uptake: a systematic review and meta-analysis. *Jpn J Radiol* 2014; 32: 59–68.
- Shin KM, Kim HJ, Jung SJ et al. Incidental breast lesions identified by (18)F-FDG PET/CT: which clinical variables differentiate between benign and malignant breast lesions? *J Breast Cancer* 2015; 18: 73–79.
- Benveniste AP, Marom E, Benveniste MF et al. Incidental primary breast cancer detected on PET-CT. *Breast Cancer Res Treat* 2015; 151: 261–268.
- Kumar R, Chauhan A, Zhuang H et al. Clinicopathologic factors associated with false negative FDGPET in primary breast cancer. *Breast Cancer Res Treat* 2006; 98: 267–274.
- National Comprehensive Cancer Network (NCCN). NCCN clinical practice guidelines in oncology. *Breast Cancer* 2011; 2: BINV1–14, IBC1, M532.