Detection of Dural Metastases Before the Onset of Clinical Symptoms by 16 alpha-[F-18]Fluoro-17 beta-Estradiol PET in a Patient With Estrogen Receptor-Positive Breast Cancer

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Detection of Dural Metastases Before the Onset of Clinical Symptoms by 16α-[^{18}F]Fluoro-17β-Estradiol PET in a Patient With Estrogen Receptor–Positive Breast Cancer

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Abstract: We offer an illustrative case about estrogen receptor (ER) imaging (also known as 16α-[^{18}F]fluoro-17β-estradiol ([^{18}F]-FES) PET) and the detection of metastatic lesions in the dural region. We present a case of a woman with ER-positive metastatic breast cancer and high [^{18}F]-FES uptake in the dural region on PET imaging, without associated clinical symptoms. These lesions were missed on [^{18}F]-FDG PET because of physiological [^{18}F]-FDG uptake in the brain. This case highlighted some difficulties in the interpretation of imaging of brain metastases and demonstrated the added value of [^{18}F]-FES PET imaging. [^{18}F]-FES PET could be used to prove the presence of ER-positive metastases in the brain.

Key Words: [^{18}F]-FES PET, brain metastases, breast cancer, estrogen receptor

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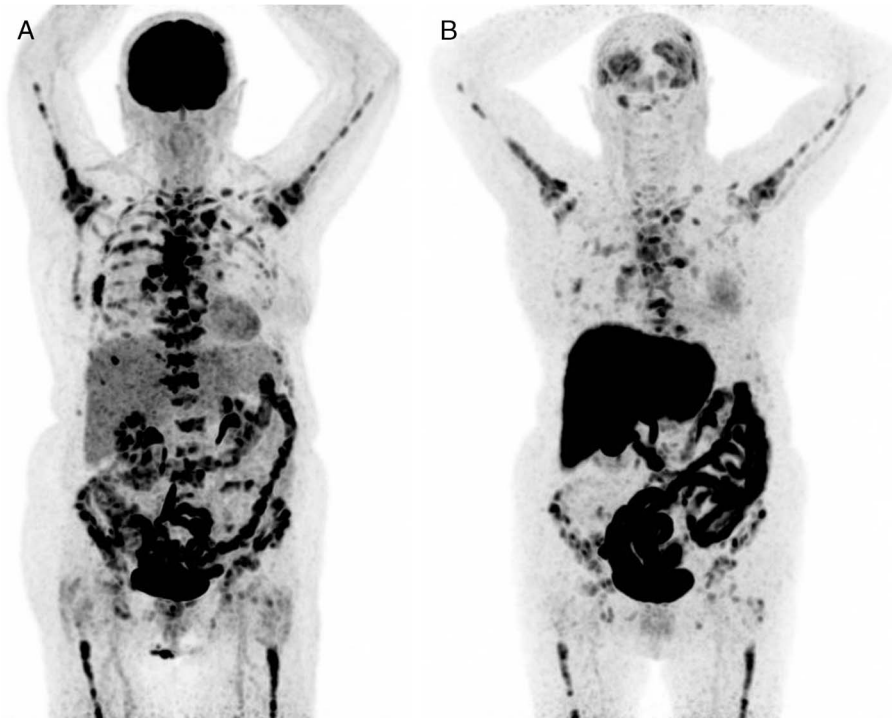

FIGURE 1. Here, we present images of a 76-year-old woman with estrogen receptor (ER)–positive metastatic breast cancer. A whole-body [^{18}F]-FDG PET/CT, performed for disease staging according to guidelines,[1] showed extensive metastatic disease in bone, bone marrow, mediastinal lymph nodes, and physiological [^{18}F]-FDG uptake in the brain (**A**: maximum intensity projection image). The patient showed disease progression after 2 lines of endocrine treatment. To assess ER status of metastases, PET imaging with 16α-[^{18}F]fluoro-17β-estradiol ([^{18}F]-FES) was performed as part of a clinical trial,[2] showing high ER expression in the known metastases, but also increased [^{18}F]-FES uptake in the dural region, interpreted as possible dural metastases (**B**: maximum intensity projection image). The SUVmax values of the dural lesions ranged between 3.6 and 4.4. In literature, an SUVmax cutoff value of ≥2.0 is considered as ER-positive.[2,3] These lesions were not detected with [^{18}F]-FDG PET/CT imaging, and associated clinical symptoms were lacking at the moment the scans were performed. Tumor progression was confirmed on all imaging modalities, and a third-line endocrine treatment was started.

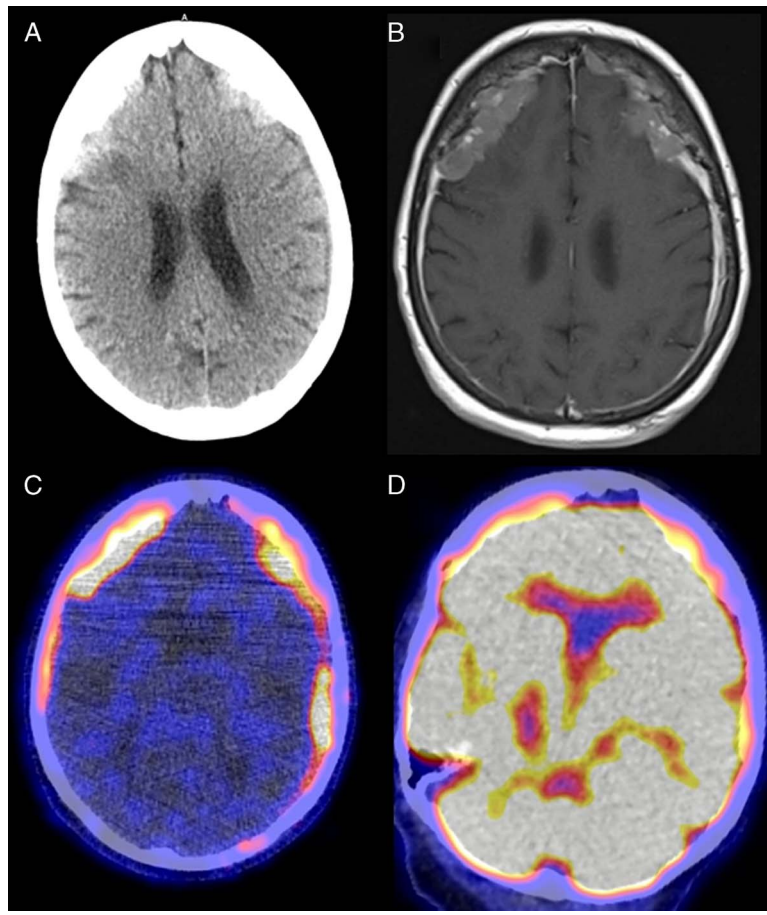

FIGURE 2. Three weeks later, the patient experienced an accidental fall and a CT scan of the brain revealed bilateral subdural lesions, interpreted as traumatic hematomas (**A**). However, further analysis with brain MRI did confirm dural metastases (**B**), as previously already detected on [^{18}F]-FES PET (**C**: fused PET/CT image). These lesions were not visible on the previous [^{18}F]-FDG PET because of physiological [^{18}F]-FDG uptake (**D**: fused PET/CT image). In literature, a high degree of agreement between [^{18}F]-FES PET findings and ER status by immunohistochemical assay is described.[4] In our center, [^{18}F]-FES PET is used in breast cancer patients presenting with a clinical dilemma.[5] By providing whole-body information on ER status of metastases, [^{18}F]-FES PET can improve treatment decision-making.[6,7] In conclusion, [^{18}F]-FES PET can be used in difficult cases when it is important to collect all available information for therapy decision-making. If [^{18}F]-FES PET indicates possible dural/intracerebral lesions, further analysis is warranted, even in the absence of clinical symptoms. The clinical added value of [^{18}F]-FES PET was previously described in patients with metastatic lobular breast cancer.[8] This case demonstrated the added value of [^{18}F]-FES PET for detecting ER-positive brain metastases.