LIMITATIONS OF F-18 FDG PET/CT IN EXCLUDING BILATERAL PALATINE TONSILLAR METASTASES

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ABSTRACT

A case of treated bilateral invasive ductal cancer with bilateral tonsillar metastases, discovered unexpectedly in pursuit of persistent tonsillar FDG uptake. Following successful resolution of tonsillitis with a course of antibiotics, a PET/CT scan performed for staging revealed markedly increased FDG uptake in the tonsils associated with clinically obvious tonsillar inflammation. Tonsillectomy revealed small metastatic lesions in both tonsils which could have been missed if uptake was assumed to-be physiological and tonsillectomy was denied.
Key Words: Tonsillar metastases, tonsillar FDG uptake, invasive ductal breast carcinoma, physiological FDG uptake.

CASE REPORT

A 47-year-old Caucasian female was diagnosed with lymph node positive ER/PR, HER 2/neu negative right breast cancer stage IIA (T1c M1) in 2003. She underwent a right modified mastectomy and had 4 cycles of adjuvant chemotherapy consisting of Adriamycin and Cytoxan, followed by dose-dense Taxol. In 2008, the patient noted a palpable nodule in left breast, which was biopsied and revealed a well-differentiated metaplastic carcinoma, i.e. carcinosarcoma. It was negative for estrogen receptors, progesterone receptors, and HER-2/neu negative. On March 5, 2009, the patient underwent left breast mastectomy that showed moderately differentiated invasive ductal carcinoma with intermediate nuclear grade II/III. Greatest tumor dimension was 0.8 cm and sentinel lymph node was negative. Pathologic staging was T1b pN0 MX. The patient was then treated with 4 cycles of Taxotere and Cytoxan. The patient subsequently developed sore throat, and was very concerned about this being caused by metastatic breast cancer. A PET/CT scan performed after intravenous injection of 13 mCi of F-18 FDG, which showed markedly increased tonsillar uptake bilaterally (figure-1A). In view of sore throat and enlarged tonsils, the findings were attributed to tonsillitis. The patient was treated with antimicrobial therapy for 5 weeks, and in spite of this, she still had a sore throat. A repeat PET CT (figure-1B) after intravenous injection of 13 mCi of F-18 FDG showed persistent uptake but much decreased compared to the prior exam. Because of ongoing tonsillar inflammation symptoms, the patient underwent bilateral tonsillectomy. Pathological examination of removed tonsils revealed bilateral small tonsillar metastases consistent with metastatic breast cancer. The dimensions of metastatic disease were 3 mm in the right tonsil, and 0.7 mm in the left tonsil. It was ER/PR negative, HER-2/neu negative. Presence of tonsillar metastases led to conclusion that the patient had stage-IV metastatic breast cancer.

DISCUSSION

PET/CT is a very powerful tool for staging and restaging tonsillar cancers. Typically, tonsillar cancers are squamous cell carcinomas with tonsillar lymphomas being second most common cancer of tonsils. Most tonsillar cancers are primary tumors; metastatic disease is extremely uncommon. Primary carcinoma of tonsils accounts for 0.5% of all malignancies in the United States, each year. [1] In only 0.8% of cases, tonsillar tumors are metastatic. [1]

The case presented here is a rare case of breast cancer with bilateral tonsillar metastases, which were discovered unexpectedly in pursuit of persistent bilateral tonsillar FDG uptake following successful resolution of tonsillitis with a course of antibiotics. The size of the metastatic lesions was too small to account for diffuse bilateral uptake of FDG. However, the presence of tumor may have led to secondary infection, persistent sore throat and tonsillar enlargement that lead to increased FDG uptake. This case illustrates limitations of FDG-PET scan in excluding small malignant lesions in locations with physiologically increased FDG such as tonsils.

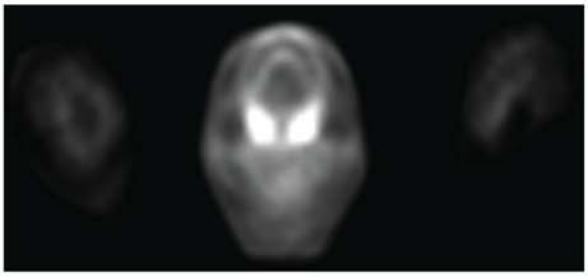

Figure 1A: Axial PET scan images obtained after IV injection of 13 mCi of F-18 FDG show increased FDG uptake in bilateral tonsils.

There have been other reports showing how malignant process can be masked by increased FDG activity on PET scan due to non-malignant etiologies. Akram et al reported on a case with melanoma metastases to the palatine tonsils obscured by physiological FDG uptake. 2 Chhabra et al reported on a case with bone metastases that were obscured increased bone marrow uptake after administration of hematopoietic factor. 3 Chamroonrat et al demonstrated how a malignant process could mimic physiological gastric uptake on FDG PET. 4 Shrikanthan et al reported on a case with inflammatory FDG activity in the esophagus obscuring concurrent primary cancer. 5 In our case, the missed malignant process in the tonsils was probably too small to show focal FDG uptake higher than normal tonsillar tissue. Most tonsillar cancers present with larger unilateral focus of asymmetrically increased uptake and are detected readily with high sensitivity on FDG PET/CT scans.

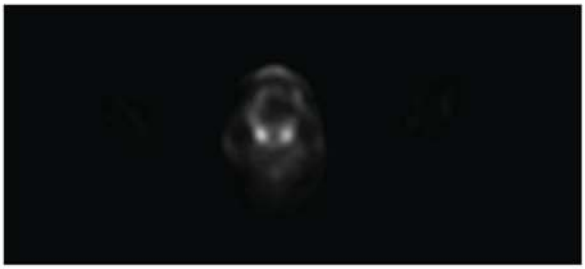

Figure 1B: A follow-up axial PET scan images obtained after treatment with antimicrobial therapy for 5 weeks. There is persistent but relatively decreased FDG uptake.

FDG PET is a very powerful tool for staging and restaging many cancers, however, physiological localization of FDG localization may hide early small lesions and render false negative scans. Careful examination of PET/CT findings with appropriate clinical and radiographic correlation is helpful in accurate staging in most cases.

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