Clinical implications of 18 FES PET/CT in ER positive breast cancer: a retrospective analysis of institutional use, staging treatment decisions and diagnostic performance

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Abstract

Biomarkers like estrogen receptors (ER) guide therapy in breast cancer. While immunohistochemical (IHC) staining of tumor tissue is the standard method for evaluating ER expression, 16α-[18F]-fluoro-17β-estradiol positron emission tomography (FES PET/CT) imaging is an advanced non-invasive imaging modality to evaluate ER positive breast cancer with correlation of 0.73 with IHC and overall accuracy of ~91.66% . The value-based pricing of new diagnostic tests aims to maximize the health-related outcomes given a prespecified willingness to pay; and in rural communities of America, this could be challenging. Therefore, as a first step, we sought to determine the real world relevance (diagnostic, therapeutic, prognostic) of FES PET/CT in the underserved Appalachian region.

Methods

Our retrospective study analyzed 68 patients with ER-positive breast cancer who underwent FES PET/CT scans at tertiary referral cancer center in Appalachia from February 13, 2023, to February 13, 2024. Inclusion criteria were age ≥18 years with confirmed (tissue) ER-positive breast cancer of any stage. FES PET/CT scans were performed to determine the ER status and guide systemic therapy decisions by the ordering physicians. We evaluated the changes in staging; treatment plans; and draw correlations between FES PET/CT SUV values and ER expression in primary and metastatic breast tumor lesions.

Results

FES PET/CT identified ER-positive disease in 73.1% (n=49/68) of patients with local or metastatic breast malignancy, including 2 cases missed by primary site biopsy. Scans led to upstaging of disease in 43.2% (n=29/68), leading to changes in systemic treatment for 58.4% (n=39/68), encompassing therapy escalation, and new regimen initiation. The median time to change in cancer therapy after FES PET/CT was 12 days. All patients had biopsies of the primary or metastatic lesions before FES PET/CT. Eight patients underwent tissue confirmation to discordance between IHC and FES PET/CT results with the end results of concordance.

Conclusion

Our study investigated the clinical utility of FES PET/CT in 68 eligible patients between February 13, 2023, and February 13, 2024, in rural America. We observed that oncologists ordered FES PET/CT

per standard guidelines and results matched in the context of metastatic sites, SUV values, and ER expression correlations. Additionally, we were able to determine it's therapeutic advantage (de-escalation, escalation, initiation of new therapies) in breast cancers.