

Emerging role of ¹⁸F-FDG PET/CT in breast cancer

Breast cancer (BC) is the most common cancer in women worldwide and unfortunately Pakistan is one of the countries having the highest rate.¹ BC related mortality is higher in patients having advanced disease at the time of diagnosis. Various therapeutic strategies are available which include surgery (from radical to breast conserving options), radiation therapy, hormonal therapy and targeted therapy. Precise staging of the disease and information about the phenotype of tumor (ER: estrogen receptor; progesterone receptor: PR; Human epidermal factor receptor2: HER2) is very important for selection of proper therapeutic options. Epidemiological data have shown that young BC patients have more aggressive tumors with potential for early metastases than older patients.² Similarly patients with triple negative breast cancer (ER, PR and HER2 negative) have the worst while ER+/HER2- have the best prognosis.³ Studies have also shown that patients with triple negative and HER2+ BC have a higher predilection for extra-skeletal metastases.⁴

Although ¹⁸F-Fluorodeoxy Glucose (¹⁸F-FDG) is a non-specific imaging agent but using PET/CT hybrid imaging scanner allows accurate localization of functional abnormalities and also minimizes false-positive and false-negative interpretations.⁵ In low risk BC patients (tumor up to 3 cm and clinically non-palpable axillary nodes), ¹⁸F-FDG PET/CT is not included in the paradigm for initial staging in BC cancer patients due to low incidence of distant metastasis.⁴ Furthermore, sensitivity of ¹⁸F-FDG PET/CT for axillary nodal metastasis in clinically negative axilla is lower than sentinel node biopsy.⁶ So use of ¹⁸F-FDG PET/CT in early stage BC is not justified due to its high cost, radiation exposure, potential false positive findings resulting in unjustified further investigations and delay in care as well. Although few recent studies have suggested that ¹⁸F-FDG PET/CT could also be valuable in stage II BC patients, especially in stage II-B for detecting unexpected distant metastasis.⁷ Data from Memorial Sloan Kettering Cancer Centre, New York suggested that ¹⁸F-FDG PET/CT might be valuable in young patients with stage II-B and III disease. Studies have also shown that ¹⁸F-FDG uptake was found higher in triple negative BC and ¹⁸F-FDG PET/CT may be used in staging patients with this phenotype.⁹ Patients with triple negative and HER2+ BC are found to have higher proportion of extra-skeletal metastases.¹⁰ Similarly patients with histopathological Grade-III tumor are more prone to have extra-axillary nodal metastasis but rate of distant metastasis does not differ between low and high grade tumors.⁹ Patients with invasive lobular cancer are considered not good candidates for staging with ¹⁸F-FDG PET/CT due to low avidity of primary tumor for ¹⁸F-FDG as compared to invasive ductal cancers.¹¹ Furthermore, patients with invasive lobular cancers are prone to have ¹⁸F-FDG non-avid sclerotic bony metastasis and predilection for metastasis in peritoneum and hollow viscera.¹⁰ However, there is mounting evidence that, in high-risk BC patients (locally advanced and inflammatory BC - Stage III according to AJCC classification) ¹⁸F-FDG PET/CT plays an important role by modifying staging and management in a substantial percentage of patients.⁴ Many studies have shown that ¹⁸F-FDG PET/CT outperformed conventional imaging modalities for detecting metastases in extra-axillary nodes, chest, abdomen and bones in a single session.¹² Based on these facts and analysis of current literature, ¹⁸F-FDG PET/CT should be the first imaging modality used for restaging in BC patients with known or suspected recurrence. ¹⁸F-FDG PET/CT has a promising role in response evaluation of neoadjuvant chemotherapy. Presently data have shown variable findings due to use of non-standardized imaging protocols, heterogeneity in phenotypes and interpretation criteria. Therefore, it is imperative to adopt standardized imaging protocols upon properly selected BC phenotypes and homogenous interpretation criteria to make ¹⁸F-FDG PET/CT more valuable tool in assessing response to neoadjuvant chemotherapy.

Conflict of Interest: None

References

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Maseeh uz Zaman,¹ Nosheen Fatima,¹ Areeba Zaman,² Sidra Zaman,² Unaiza Zaman²

¹ Department of Radiology, Aga Khan University Hospital (AKUH), Karachi, Pakistan

² Dow Medical College / Dow University of Health Sciences (DUHS), Karachi, Pakistan.