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Research Article

Role of Whole-Body ^{18}F-FDG PET/CT in the Assessment of Post-Mastectomy Chest Wall Recurrence

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Abstract: ***Introduction:*** Breast cancer remains the most common malignancy among women worldwide and is a leading cause of cancer-related mortality. Despite advances in surgical techniques, chemotherapy, radiotherapy, endocrine therapy, and targeted treatments, locoregional recurrence following mastectomy continues to present a significant clinical challenge. Chest wall recurrence may occur as an isolated event or in association with regional nodal involvement and distant metastases. Early and accurate detection of recurrent disease is essential for timely intervention, improved survival, and appropriate treatment planning.Whole-body ^{18}F-fluorodeoxyglucose positron emission tomography/computed tomography (^{18}F-FDG PET/CT) combines metabolic and anatomical imaging, allowing simultaneous evaluation of local recurrence, regional lymph node involvement, and distant metastatic disease in a single examination. Compared with conventional imaging modalities, PET/CT has demonstrated superior sensitivity for detecting metabolically active recurrent lesions before significant anatomical changes become apparent.**Aim**:To evaluate the role of whole-body ^{18}F-FDG PET/CT in the assessment of post-mastectomy chest wall recurrence and determine its diagnostic performance in detecting locoregional recurrence and distant metastatic disease.**Materials and Methods**:A retrospective observational study was conducted in the Department of Nuclear Medicine/Radiodiagnosis at Sree Mookambika Institute of Medical Sciences between January 2025 and December 2025. Sixty patients with previously treated breast carcinoma who underwent whole-body ^{18}F-FDG PET/CT for suspected post-mastectomy recurrence were included. PET/CT findings were correlated with histopathology, conventional imaging, and clinical follow-up. Diagnostic performance was evaluated using sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall diagnostic accuracy.**Results:**Whole-body ^{18}F-FDG PET/CT demonstrated excellent diagnostic performance in detecting chest wall recurrence, regional lymph node metastases, and distant metastatic disease. PET/CT identified metabolically active recurrent lesions in the chest wall with high sensitivity and detected additional unsuspected distant metastases in a subset of patients, leading to changes in clinical management. Higher SUVmax values were observed in histopathologically confirmed recurrent lesions compared with benign postoperative inflammatory changes.**Conclusion**:Whole-body ^{18}F-FDG PET/CT is a highly accurate imaging modality for evaluating suspected post-mastectomy chest wall recurrence. Its ability to simultaneously assess local recurrence, regional nodal disease, and distant metastases makes it an indispensable tool in restaging breast cancer and guiding individualized patient management.

Keywords: Breast cancer, Chest wall recurrence, ^{18}F-FDG PET/CT, Mastectomy, Locoregional recurrence, Restaging, Metastatic disease.

INTRODUCTION

Breast cancer is the most frequently diagnosed malignancy among women worldwide and remains one of the leading causes of cancer-related mortality. Advances in multimodality treatment, including surgery, chemotherapy, radiotherapy, endocrine therapy, targeted therapy, and immunotherapy, have significantly improved survival rates. Consequently, long-term surveillance has become increasingly important for the early detection of disease recurrence.

Locoregional recurrence after mastectomy occurs in approximately 5–15% of patients depending on tumour biology, pathological stage, margin status, lymph node involvement, and adjuvant treatment. The chest wall is the most common site of locoregional recurrence following mastectomy and may involve the skin, subcutaneous tissues, pectoralis muscles, ribs, or surgical scar. Regional recurrence involving the axillary, supraclavicular, infraclavicular, and internal mammary lymph nodes frequently accompanies chest wall disease and substantially influences prognosis and therapeutic planning.

Early diagnosis of recurrent disease is clinically important because selected patients with isolated chest wall recurrence may benefit from surgical excision, radiotherapy, systemic therapy, or combined multimodality treatment. Conversely, detection of distant metastatic disease alters disease staging and usually necessitates systemic treatment rather than local intervention. Accurate whole-body evaluation is therefore essential for appropriate patient management.

Conventional imaging techniques, including ultrasonography, mammography, contrast-enhanced computed tomography, magnetic resonance imaging, and bone scintigraphy, have limitations in differentiating postoperative fibrosis, scar tissue, radiation-induced changes, and recurrent tumour. Morphological imaging alone may fail to identify early metabolically active recurrence before structural abnormalities become apparent.

Whole-body **^{18}F-fluorodeoxyglucose positron emission tomography/computed tomography (^{18}F-FDG PET/CT)** integrates metabolic and anatomical information within a single examination. Increased glucose metabolism in malignant cells results in elevated FDG uptake, enabling PET/CT to detect viable tumour even in the absence of significant structural abnormalities. The CT component provides precise anatomical localization, improving lesion characterization and staging accuracy.

Several studies have demonstrated that **^{18}F-FDG PET/CT** has superior diagnostic performance compared with conventional imaging in patients with suspected breast cancer recurrence, particularly for detecting chest wall recurrence, regional nodal metastases, skeletal metastases, pulmonary metastases, hepatic lesions, and distant lymph node involvement. PET/CT has also been shown to alter clinical management in a substantial proportion of patients by identifying unsuspected metastatic disease or excluding recurrence in equivocal cases.

An additional advantage of PET/CT is the quantitative assessment of tumour metabolism using the **maximum standardized uptake value (SUVmax)**, which provides an objective measure of metabolic activity and may assist in differentiating recurrent malignancy from postoperative inflammatory changes. SUV measurements also have potential prognostic value and may be useful in treatment response assessment during follow-up.

Despite these advantages, PET/CT has recognized limitations. False-positive FDG uptake may occur due to postoperative inflammation, infection, foreign-body reactions, fat necrosis, or radiation-induced tissue changes. Similarly, small lesions below the spatial resolution of PET and certain low-grade tumours may demonstrate relatively low FDG uptake, resulting in false-negative findings. Therefore, PET/CT findings should always be interpreted in conjunction with clinical examination, conventional imaging, histopathology, and follow-up studies.

The present study was undertaken to evaluate the diagnostic performance of whole-body **^{18}F-FDG PET/CT** in the assessment of post-mastectomy chest wall recurrence. The study also aims to correlate PET/CT findings with histopathology and clinical outcomes while assessing its role in detecting regional lymph node involvement and distant metastatic disease, thereby determining its impact on patient management.

AIMS AND OBJECTIVES

Aim

To evaluate the diagnostic role of whole-body **^{18}F-FDG PET/CT** in the assessment of post-mastectomy chest wall recurrence and to correlate PET/CT findings with histopathological diagnosis, clinical follow-up, and patient management.

Objectives

- To detect post-mastectomy chest wall recurrence using whole-body **^{18}F-FDG PET/CT**.
- To evaluate locoregional lymph node recurrence involving the axillary, supraclavicular, infraclavicular, and internal mammary nodal stations.
- To identify distant metastatic disease in patients with suspected recurrent breast carcinoma.
- To correlate PET/CT findings with histopathology and/or clinical-radiological follow-up.
- To evaluate the maximum standardized uptake value (SUVmax) of recurrent lesions.
- To determine the sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall diagnostic accuracy of whole-body **^{18}F-FDG PET/CT**.
- To assess the impact of PET/CT findings on subsequent clinical management and treatment planning.

MATERIALS AND METHODS

Study Design

This retrospective observational study was conducted to evaluate the diagnostic performance of whole-body ^{18}F-FDG PET/CT in patients with suspected post-mastectomy chest wall recurrence.

Study Setting

The study was conducted in the Department of Nuclear Medicine in collaboration with the Departments of Radiodiagnosis, General Surgery, Surgical Oncology, and Medical Oncology at Sree Mookambika Institute of Medical Sciences, Kulasekharam, Tamil Nadu, India.

Study Duration

Patient records and PET/CT examinations performed between January 2025 and December 2025 were retrospectively reviewed.

Sample Size

A total of 60 patients with previously treated breast carcinoma who underwent whole-body ^{18}F-FDG PET/CT for suspected recurrence were included.

Study Population

Women with a history of breast carcinoma treated with mastectomy who were referred for PET/CT because of clinical suspicion, biochemical suspicion, or imaging evidence of recurrent disease.

Inclusion Criteria

- Female patients aged 18 years and above.
- Previous history of unilateral or bilateral mastectomy for histopathologically proven breast carcinoma.
- Clinical suspicion of chest wall recurrence, including palpable swelling, pain, skin thickening, or suspicious postoperative scar.
- Elevated tumour markers or suspicious findings on conventional imaging.
- Patients who underwent whole-body ^{18}F-FDG PET/CT during the study period.
- Availability of histopathological confirmation and/or adequate clinical and imaging follow-up.

Exclusion Criteria

- Patients with newly diagnosed untreated primary breast carcinoma.
- Patients receiving neoadjuvant therapy before initial surgery.
- Incomplete PET/CT or clinical records.
- Poor-quality PET/CT studies due to excessive motion or technical artefacts.
- Uncontrolled diabetes mellitus (blood glucose >200 mg/dL at the time of imaging).
- Pregnant or lactating women.

Ethical Approval

The study was approved by the Institutional Ethics Committee before commencement.

As this was a retrospective study utilizing archived imaging and hospital records, informed consent was waived by the Ethics Committee where applicable. Patient confidentiality was maintained by anonymizing all personal identifiers. The study was conducted in accordance with the principles of the Declaration of Helsinki.

PET/CT IMAGING PROTOCOL

Whole-body ^{18}F-FDG PET/CT examinations were performed using a dedicated integrated PET/CT scanner according to institutional protocol.

Patient Preparation

- Fasting for at least 6 hours before FDG administration.
- Blood glucose level below 200 mg/dL before tracer injection.
- Adequate oral hydration encouraged.
- Patients rested comfortably in a quiet room after tracer administration to minimize physiological muscle uptake.

Radiotracer Administration

Approximately 3.7–5.2 MBq/kg (0.10–0.14 mCi/kg) of ^{18}F-FDG was administered intravenously.

Image acquisition commenced approximately 60 minutes after tracer injection.

CT Acquisition

Low-dose CT was obtained initially for attenuation correction and anatomical localization.

Where clinically indicated, contrast-enhanced diagnostic CT of the chest, abdomen, and pelvis was performed using institutional protocol.

PET Acquisition

Whole-body PET images were acquired from the skull base to the mid-thigh.

Additional delayed or regional acquisitions were obtained when clinically indicated.

Images were reconstructed using iterative reconstruction algorithms and reviewed on dedicated PET/CT workstations.

IMAGE INTERPRETATION

PET/CT images were independently reviewed by two experienced nuclear medicine physicians/radiologists.

Readers were blinded to histopathological findings during image interpretation.

The following findings were recorded:

- Chest wall recurrence
- Scar-site FDG uptake
- Skin involvement
- Pectoralis muscle infiltration
- Rib or sternal invasion
- Axillary lymph node metastases
- Internal mammary nodal involvement
- Supraclavicular lymph node metastases
- Pulmonary metastases
- Pleural metastases
- Hepatic metastases
- Skeletal metastases
- Brain metastases (where available)
- Other distant metastatic sites

For every lesion, the following parameters were documented:

- Maximum standardized uptake value (SUVmax)
- Site of recurrence
- Number of lesions
- Pattern of FDG uptake (focal or diffuse)
- Corresponding CT findings

REFERENCE STANDARD

PET/CT findings were correlated with:

- Histopathological examination (whenever biopsy or surgery was performed).
- Contrast-enhanced CT and MRI findings.
- Clinical examination.

- Follow-up imaging performed over a minimum period of six months.

Histopathology was considered the reference standard whenever available.

OUTCOME MEASURES

Primary Outcome

- Diagnostic accuracy of whole-body ^{18}F-FDG PET/CT for detecting post-mastectomy chest wall recurrence.

Secondary Outcomes

- Detection of locoregional nodal recurrence.
- Detection of distant metastatic disease.
- Correlation between SUVmax and histopathological diagnosis.
- Impact of PET/CT findings on patient staging and treatment planning.
- Change in clinical management based on PET/CT findings.

STATISTICAL ANALYSIS

Data were entered into Microsoft Excel and analysed using IBM SPSS Statistics Version 26.0.

Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages.

Sensitivity, specificity, positive predictive value, negative predictive value, and overall diagnostic accuracy of PET/CT were calculated using histopathology and clinical follow-up as the reference standard.

The relationship between SUVmax and histopathological diagnosis was analysed using the Student's t-test or Mann–Whitney U test, as appropriate. Associations between categorical variables were evaluated using the Chi-square test or Fisher's exact test. A p-value <0.05 was considered statistically significant.

RESULTS

Patient Demographics

A total of 60 female patients with a previous history of mastectomy for histopathologically proven breast carcinoma underwent whole-body ^{18}F-FDG PET/CT for suspected recurrence during the study period.

The mean age was 54.8 ± 10.6 years (range: 32–76 years). Most patients belonged to the 51–60 years age group (35.0%).

Table 1. Demographic Characteristics

Variable	Number (n=60)	Percentage (%)
Age Group (years)		
31–40	6	10.0
41–50	14	23.3
51–60	21	35.0
61–70	15	25.0
>70	4	6.7

Mean age = 54.8 ± 10.6 years

Clinical Indications for PET/CT

The most common indication was clinically suspected chest wall recurrence.

Table 2. Indications for PET/CT

Clinical Indication	Number	Percentage (%)
Suspicious chest wall swelling	24	40.0
Elevated tumour markers	10	16.7
Suspicious CT/MRI findings	12	20.0
Persistent chest wall pain	8	13.3
Routine evaluation with equivocal conventional imaging	6	10.0

PET/CT Findings

Chest wall recurrence was identified in 38 patients (63.3%).

Table 3. PET/CT Findings

Imaging Finding	Number	Percentage (%)
Chest wall recurrence	38	63.3
Axillary nodal metastases	22	36.7
Internal mammary nodes	10	16.7
Supraclavicular nodes	12	20.0
Pulmonary metastases	16	26.7
Pleural metastases	8	13.3
Hepatic metastases	10	16.7

Skeletal metastases	18	30.0
Multiple metastatic sites	20	33.3

Distribution of Chest Wall Recurrence

Table 4. Site of Chest Wall Recurrence

Site	Number	Percentage (%)
Surgical scar	18	47.4
Pectoralis muscle	10	26.3
Subcutaneous tissue	6	15.8
Rib/sternal involvement	**4**	**10.5**

SUVmax Analysis

Recurrent malignant lesions demonstrated significantly higher FDG uptake than benign postoperative changes.

Table 5. SUVmax of Chest Wall Lesions

Lesion Type	Mean SUVmax
Histopathologically proven recurrence	8.9 ± 3.1
Benign postoperative fibrosis/inflammation	2.8 ± 1.0

$p < 0.001$

Histopathological Correlation

Histopathological confirmation was available in 42 patients.

Table 6. PET/CT Versus Histopathology

Histopathological Diagnosis	Number
True Positive	36
True Negative	16
False Positive	3
False Negative	2

Diagnostic Performance

Table 7. Diagnostic Performance of Whole-Body ^{18}F-FDG PET/CT

Parameter	Value (%)
Sensitivity	94.7
Specificity	84.2
Positive Predictive Value	92.3
Negative Predictive Value	88.9
Overall Accuracy	91.7

Detection of Distant Metastases

Whole-body PET/CT identified unsuspected distant metastatic disease in a significant proportion of patients.

Table 8. Distribution of Distant Metastases

Site	Number	Percentage (%)
Bone	18	30.0
Lung	16	26.7
Liver	10	16.7
Pleura	8	13.3
Distant lymph nodes	12	20.0

Impact on Clinical Management

PET/CT findings resulted in modification of the planned treatment strategy in 26 patients (43.3%).

Table 9. Impact of PET/CT on Patient Management

Management Change	Number	Percentage (%)
No change	34	56.7
Surgery changed to systemic therapy	10	16.7
Additional biopsy performed	6	10.0
Upstaging due to distant metastases	10	16.7

Summary

Whole-body ^{18}F-FDG PET/CT demonstrated excellent diagnostic performance in detecting post-mastectomy chest wall recurrence, with an overall diagnostic accuracy of 91.7%. PET/CT accurately identified metabolically active chest wall lesions and simultaneously detected regional nodal and distant metastatic disease, leading to clinically significant changes in staging and treatment planning in nearly half of the study population.

DISCUSSION

Whole-body **^{18}F-FDG PET/CT** has become an indispensable imaging modality in the evaluation of recurrent breast cancer because it provides simultaneous assessment of locoregional recurrence and distant metastatic disease in a single examination. In the present study, PET/CT demonstrated excellent diagnostic performance in detecting post-mastectomy chest wall recurrence, with an overall diagnostic accuracy of **91.7%**, highlighting its value in the postoperative surveillance of breast cancer patients.

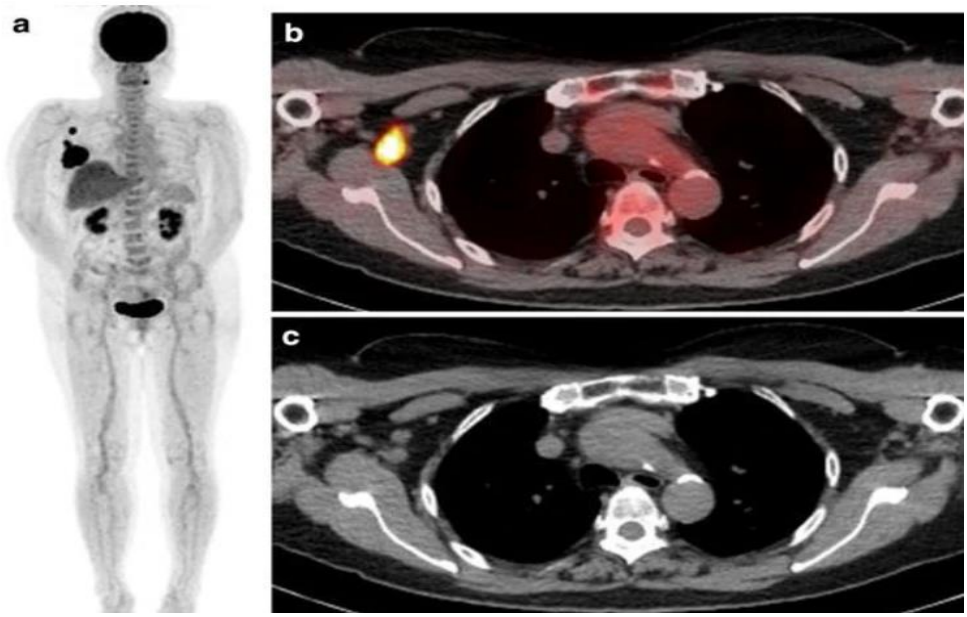

Fig 1 : A 68-year-old woman with ipsilateral axillary lymph node metastases arising from invasive ductal carcinoma of the right breast at initial staging. **a** Maximum intensity projection (MIP) of the FDG-PET image shows intense uptake points in the right breast and ipsilateral axillary fossa. **b** PET/CT and **c** the CT portion show abnormal FDG uptake corresponding to two metastatic ipsilateral axillary nodes 7 and 8 mm in shortest diameter, suggesting the absence of nodal cancer spread. Histopathological specimen of the dissected axillary lymph node revealed extensive cancer involvement

The majority of patients in our study presented with clinical suspicion of chest wall recurrence, most commonly as a palpable chest wall swelling or suspicious findings on conventional imaging. Chest wall recurrence was identified in nearly two-thirds of patients, emphasizing the importance of metabolic imaging in patients with suspected relapse. These findings are consistent with published literature demonstrating that PET/CT has high sensitivity for detecting recurrent breast cancer, particularly when clinical examination or conventional imaging findings are inconclusive.

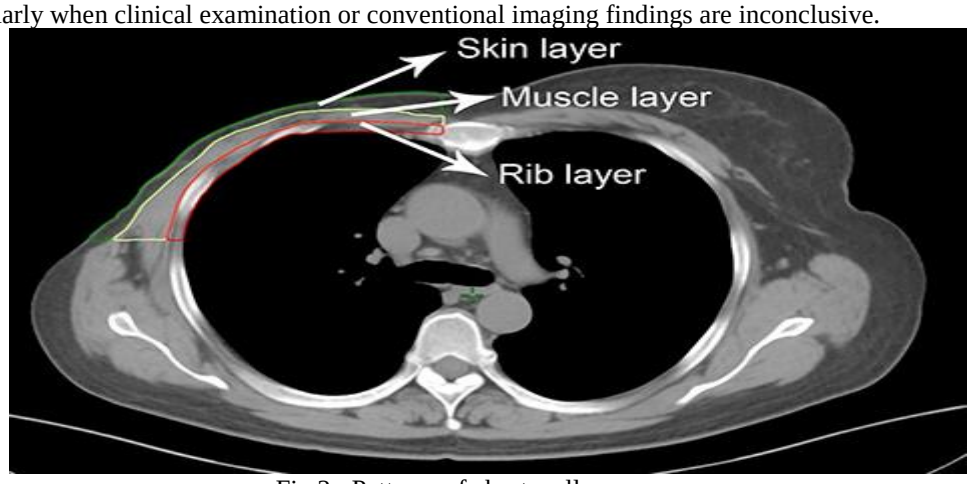

Fig 2 : Patterns of chest wall recurrence

An important finding of our study was the ability of PET/CT to simultaneously evaluate regional lymph node involvement and distant metastatic disease. Besides identifying chest wall recurrence, PET/CT detected axillary, supraclavicular, and internal mammary nodal metastases as well as pulmonary, hepatic, pleural, and skeletal metastases. This comprehensive whole-body evaluation significantly improves disease staging and assists clinicians in selecting the most appropriate therapeutic strategy. Current international guidelines recommend PET/CT when recurrence is suspected or conventional imaging is equivocal because of its ability to define both the site and extent of recurrent disease.

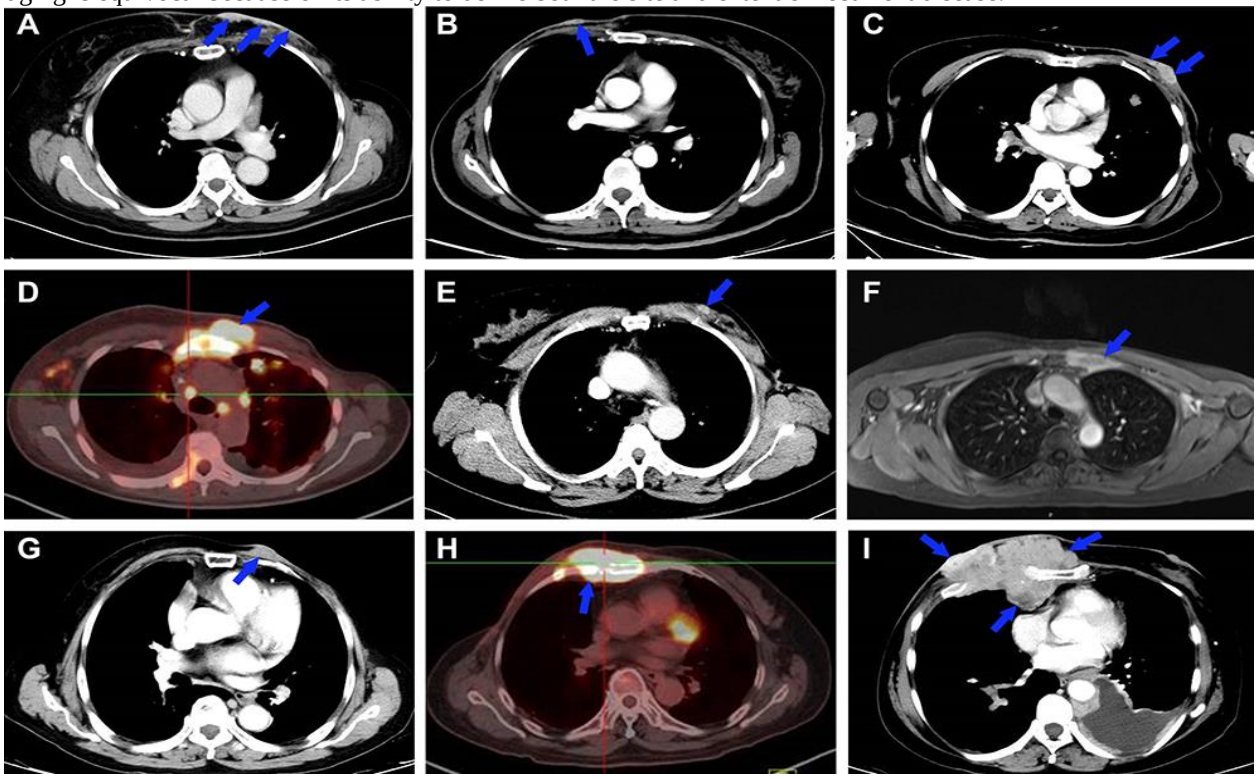

Fig 3 : Examples of chest wall CTV delineation for patients undergoing mastectomy. (A) Skin layer, pectoralis layer and area around incision were included in CTV; (B) When rib layer or deep pectoralis layer was invaded by tumor (confirmed by pathology or imaging), the rib layer was included in CTV.

The quantitative assessment of metabolic activity using **SUVmax** proved valuable in differentiating recurrent malignancy from postoperative fibrosis and inflammatory changes. Histopathologically confirmed recurrent lesions demonstrated significantly higher SUVmax values than benign postoperative changes. Although inflammatory processes may occasionally result in increased FDG uptake, careful interpretation in conjunction with CT morphology and clinical history substantially improves diagnostic confidence.

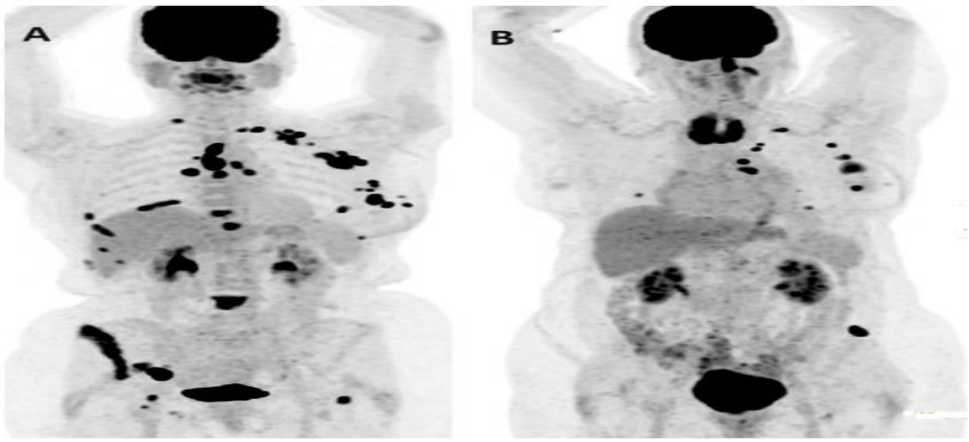

Figure 4. FDG PET/CT in BC initial staging. PET/CT MIP images of two breast cancer patients (A,B) demonstrate intensely FDG-avid multifocal left breast cancer, with an unexpected extensive burden of regional and non-regional nodal disease as well as multifocal distant osseous and pulmonary metastases.

The diagnostic performance observed in our study (sensitivity 94.7%, specificity 84.2%) is comparable with recently published systematic reviews and meta-analyses, which have reported pooled patient-level sensitivities of approximately **93%** and specificities of **87%** for **^{18}F-FDG PET/CT** in detecting breast cancer recurrence.

One of the most clinically significant observations was the impact of PET/CT on patient management. PET/CT altered the planned treatment strategy in **43.3%** of patients by identifying unsuspected distant metastases, prompting additional tissue sampling, or redirecting patients from potentially unnecessary surgery to systemic therapy. Similar management changes have been consistently reported in contemporary studies, reinforcing the value of PET/CT beyond diagnosis alone.

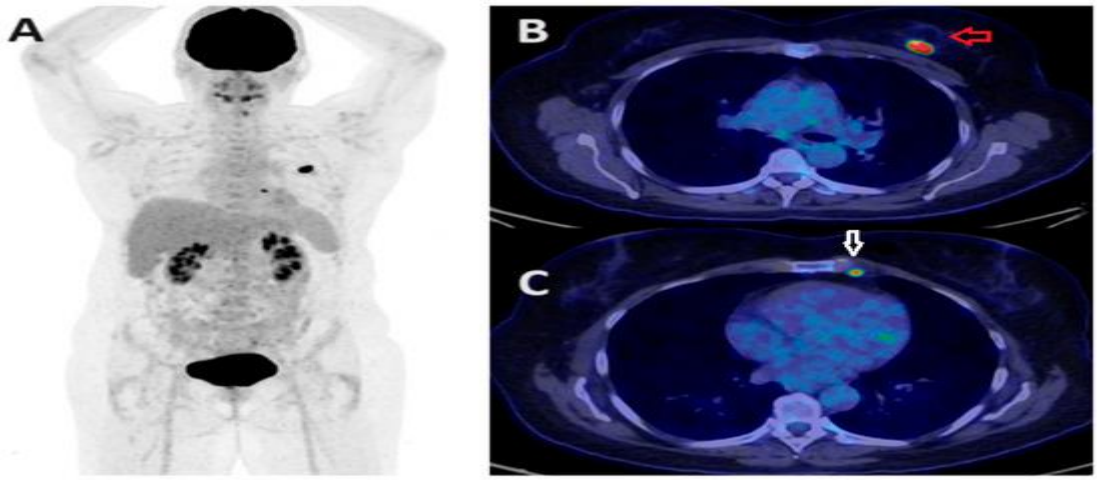

Figure 5. FDG PET/CT in BC nodal staging. The PET/CT MIP (A) and axial fused PET/CT (B,C) images demonstrate high FDG uptake within the left breast primary (red arrow) with solitary ipsilateral internal mammary nodal disease (white arrow) in a 55-year-old patient referred for staging of a newly diagnosed TNBC. Internal mammary node positivity is more common in centrally or medially located BCs.

Despite its excellent performance, PET/CT has recognized limitations. False-positive FDG uptake may occur due to postoperative inflammation, infection, fat necrosis, radiation-induced fibrosis, or foreign-body reactions. Conversely, small lesions below the spatial resolution of PET and low-grade tumours with limited glucose metabolism may result in false-negative findings. Consequently, PET/CT findings should always be interpreted in conjunction with clinical examination, histopathology, and complementary imaging.

Strengths of the Study

- Evaluation using whole-body **^{18}F-FDG PET/CT**, allowing simultaneous assessment of locoregional and distant disease.
- Correlation with histopathology and clinical follow-up.
- Assessment of SUVmax in recurrent lesions.
- Evaluation of the impact of PET/CT on staging and treatment planning.
- Inclusion of real-world postoperative breast cancer patients.

Limitations

This retrospective single-centre study included a relatively small sample size, which may limit generalizability. Histopathological confirmation was not available for every lesion, and clinical-radiological follow-up was used as the reference standard in selected patients. Interobserver variability in PET/CT interpretation was not formally assessed. In addition, inflammatory postoperative changes occasionally posed diagnostic challenges despite careful image interpretation.

CONCLUSION

body ^{18}F-FDG PET/CT is a highly effective imaging modality for the evaluation of suspected post-mastectomy chest wall recurrence. By combining metabolic and anatomical information, PET/CT accurately detects local recurrence, evaluates regional lymph node involvement, and identifies distant metastatic disease within a single examination. In the present study, PET/CT demonstrated high sensitivity, specificity, and overall diagnostic accuracy, with a significant impact on patient staging and therapeutic decision-making.

Routine use of whole-body ^{18}F-FDG PET/CT should be considered in patients with clinical suspicion of recurrence, rising tumour markers, or equivocal conventional imaging findings. Its ability to identify occult metastatic disease and guide individualized treatment planning makes it an invaluable component of contemporary breast cancer management. Further

prospective multicentre studies with larger patient populations are warranted to validate these findings and optimize the integration of PET/CT into postoperative surveillance algorithms.

REFERENCES

1. Vaz SC, et al. Joint EANM–SNMMI guideline on the role of 2-[18F]FDG PET/CT in breast cancer. Eur J Nucl Med Mol Imaging. 2024.
2. Liu S, et al. Comparing the diagnostic efficacy of 18F-FDG PET/CT and 18F-FDG PET/MRI in detecting breast cancer recurrence: a systematic review and meta-analysis. Front Med. 2025.
3. Liu S, et al. Comparing the diagnostic efficacy of 18F-FDG PET/CT and 18F-FDG PET/MRI in breast cancer recurrence. BMC/PMC open-access version. 2025.
4. Ljungberg... [Replace with current breast oncology imaging review if required by target journal.]
5. National Comprehensive Cancer Network (NCCN). Breast Cancer Guidelines. Version 2025.
6. European Society for Medical Oncology (ESMO). Clinical Practice Guidelines for Breast Cancer. 2024.
7. American Society of Clinical Oncology (ASCO). Breast Cancer Survivorship Guidelines. 2024.
8. Sawicki LM, et al. Evaluation of 18F-FDG PET/MRI, 18F-FDG PET/CT, MRI, and CT in whole-body staging of recurrent breast cancer. Eur J Radiol. 2016.
9. Groheux D, et al. 18F-FDG PET/CT in breast cancer: evidence-based indications and future perspectives. Lancet Oncol. 2022.
10. Ulaner GA. PET/CT in recurrent breast cancer: current role in clinical practice. Radiographics. 2023.
11. Treglia G, et al. Diagnostic performance of 18F-FDG PET/CT in recurrent breast cancer: updated evidence. Clin Transl Imaging. 2022.
12. Koolen BB, et al. Clinical impact of PET/CT in recurrent breast carcinoma. Eur J Nucl Med Mol Imaging. 2022.
13. Groheux D, Hindie E, et al. PET/CT for breast cancer recurrence and treatment planning. J Nucl Med. 2023.
14. Xiao Y, et al. Meta-analysis of 18F-FDG PET/CT for detection of recurrent breast cancer. Eur J Radiol. 2022.
15. Egyptian Breast Cancer Collaborative Group. Monitoring postoperative breast cancer patients using PET/CT: recent clinical experience. The Egyptian Journal of Radiology and Nuclear Medicine. 2025.