Stage Migration of Metastatic Malignant Cutaneous Melanoma by ^{18}F-FDG PET-CT Scan- A Case Report

[1]FatemaTuz Zohra, [1,2]Azmal Kabir Sarker, [1]Juwel Hosen, [1]Md. Khairul Islam, [1]Rahima Akter Sharmin, [1]Md. Jakir Hosen, [1]Rayhan Alam, [1]Md. Abul Hasnat, [1]M Monjur Ahasan

[1]Institute of Nuclear Medical Physics, AERE, Savar, Dhaka 1349

[2]Institute of Nuclear Medicine and Allied Sciences, Mitford, Dhaka 1100

Correspondence Address: Dr. FatemaTuz Zohra, Institute of Nuclear Medical Physics, AERE, Savar, Dhaka 1349
Email: zohra.baec@gmail.com

ABSTRACT

^{18}F-fluorodeoxyglucose (FDG) positron emission tomography-computed tomography (PET-CT) often causes stage migration that in turn facilitates management strategy of the diseases. This case report is an excision biopsy proven case of malignant cutaneous melanoma (malignant CM) stage pT3aN3b with clinico-pathological stage IIIC disease that was restaged to pT3aN3cM1b or stage IV disease after an ^{18}F-FDG PET-CT scan and completely changed the therapeutic approaches. Utilization of pre therapeutic ^{18}F-FDG PET-CT ensures appropriate staging and aids in adoption of stage appropriate management in malignant CM.

Key words: **Metastatic, Malignant cutaneous melanoma, ^{18}F-FDG, PET-CT.**

Bangladesh J. Nucl. Med. Vol. 23 No. 1 & 2 year 2020

Doi: https://doi.org/10.3329/bjnm.v23i1-2.57709

INTRODUCTION

Avasc Over the past few decades ^{18}F-fluorodeoxyglucose (FDG) PET-CT is increasingly being found superior to other imaging modalities for staging of metastatic cutaneous melanoma (CM) resulting in stage migration and change of management (1,2). Though melanoma is less prevalent in Southeast Asia, ^{18}F-fluorodeoxyglucose (FDG) PET-CT imaging is being regularly practiced in Bangladesh for the staging and management (3).

The combination of functional and morphologic imaging using the new advanced dual modality PET-CT is supposed to provide superior performance in overall TNM staging of various oncologic diseases. It is considered to be significantly more accurate than CT or PET alone (4,5). Detection of ^{18}F-FDG avid subcutaneous metastasis in malignant melanoma has prognostic implication and can help not only to restage the disease but also to guide new therapeutic strategies. The use of PET-CT is a possible first-line modality for detection and differentiation of metastases in areas inaccessible by physical examination or biopsy (6).

CASE REPORT

A 66 years old female initially presented with a solid, firm small mass in her left sole of the foot and underwent excision biopsy, which, on histopathology revealed malignant CM (stage T3a). She was found to have inguinal lymphadenopathy which was cytologically proven as nodal metastasis of stage N3. With clinico-pathological stage IIIC disease, she underwent ^{18}F-fluorodeoxyglucose (FDG) PET-CT scan for exclusion of distant metastasis. Whole body PET-CT scan (from vertex to toe) was performed with 5 mCi intravenous administration of ^{18}F-FDG after proper preparation with Philips 128 slice ingenuity TF following the standard protocol using no contrast.

There were multiple hypermetabolic (SUVmax up to 13.5) metastatic subcutaneous nodules throughout the left lower limb along the course of great saphenous vein (Figure 1).

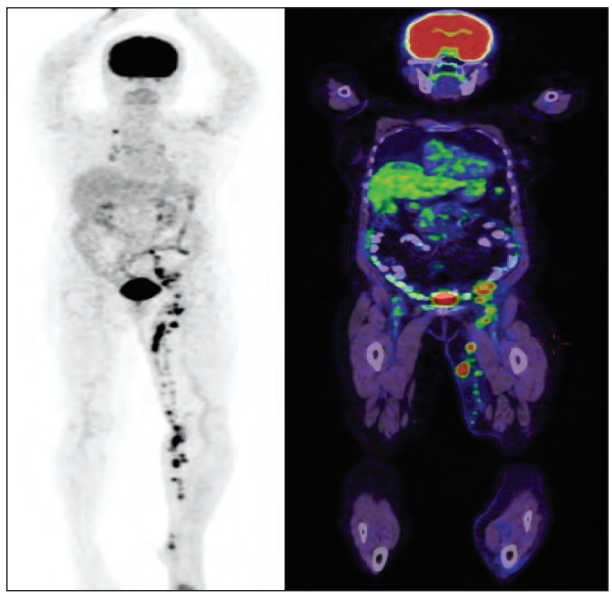


Figure 1: Whole body ^{18}F-FDGPET-CT images of Maximum Intensity Projection (MIP) view (left) and coronal view (right) showing hypermetabolic nodules in left lower limb.

Multiple conglomerated hypermetabolic (SUVmax13.0) lymph nodes were found in left inguino-femoral regions (Figure 2).

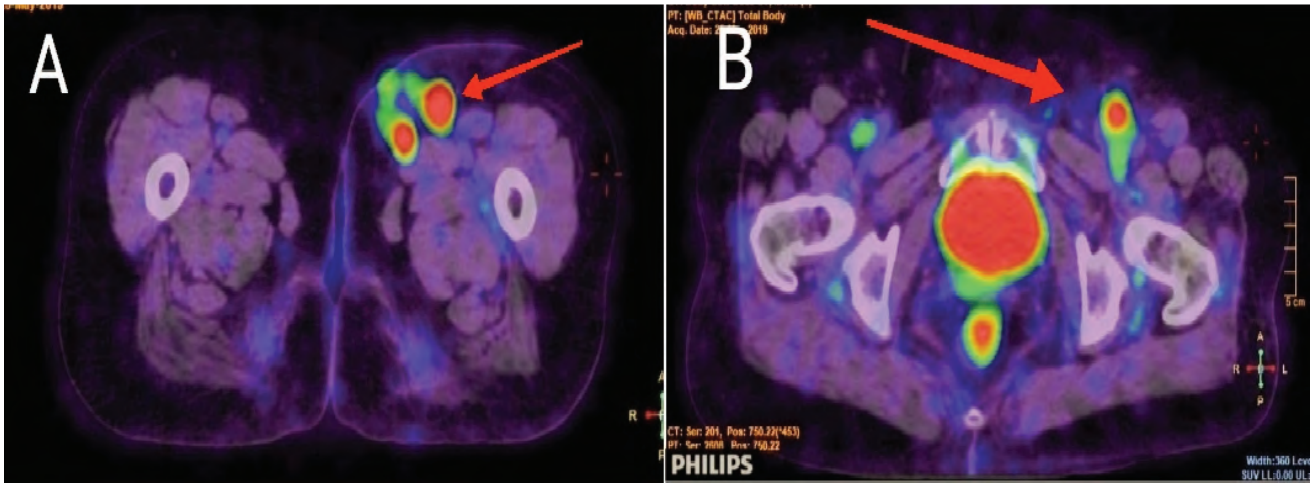


Figure 2: Axial images of 18F-FDG PET-CT scan, showing hypermetabolic left inguino-femoral lymph nodes (A, B).

Soft tissue density areas (up up to 14 mm with HU 57) with hypermetabolism (SUVmax 19.0) were noted in posterior and medial aspect of left psoas muscle at the level of 5th lumbar vertebra (Figure 3).

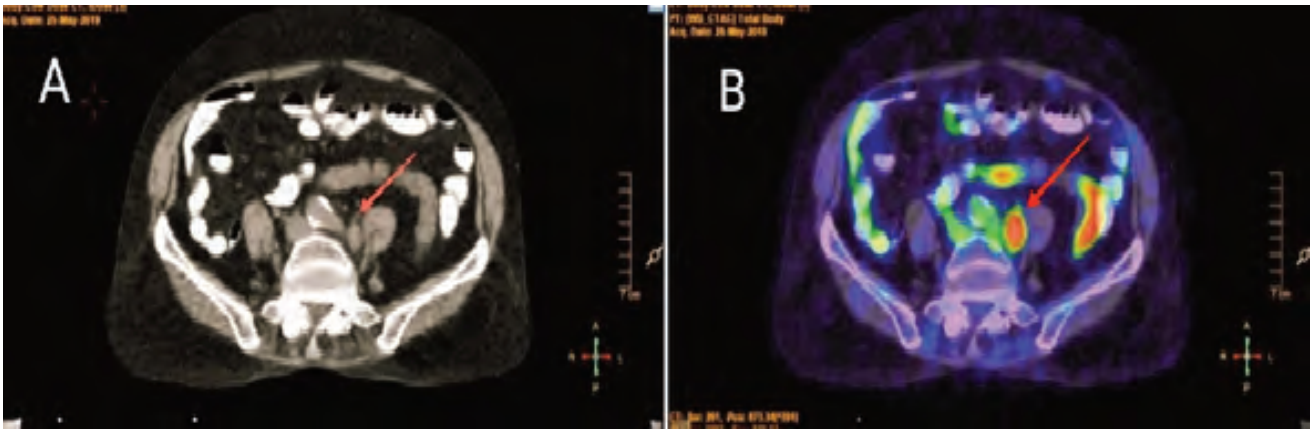
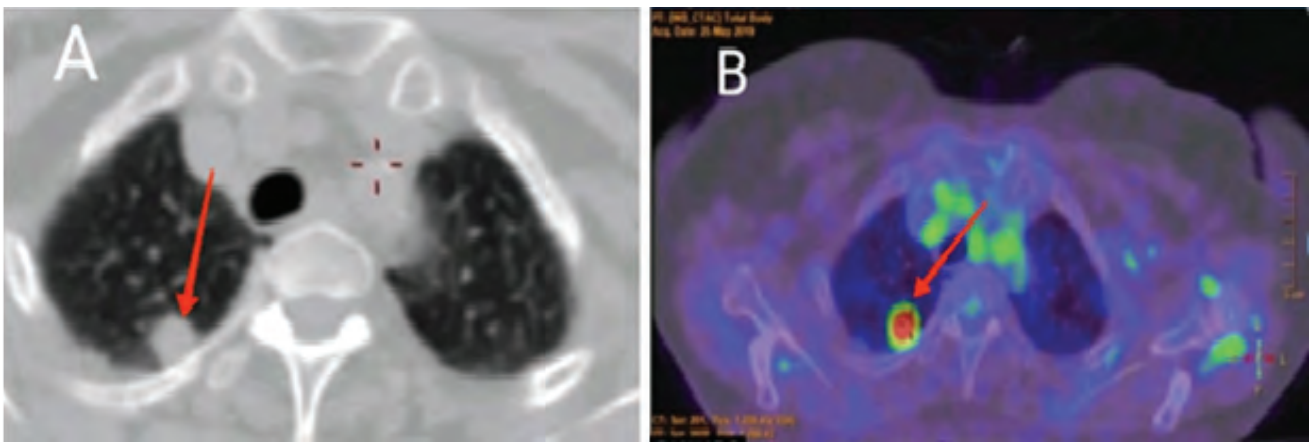


Figure 3: Axial CT image (A) showing soft tissue density mass and fused axial view (B) showing hypermetabolic activity in the mass at the medial aspect of left psoas muscle.

Multiple (at least three) hypermetabolic (SUVmax up to 10.6) nodules with diameter of upto 13 mm in right lung, (Figure 4, A-B) and a 15 mm hypermetabolic (SUVmax 5.4) right hilar lymph node (Figure 4, C-D)



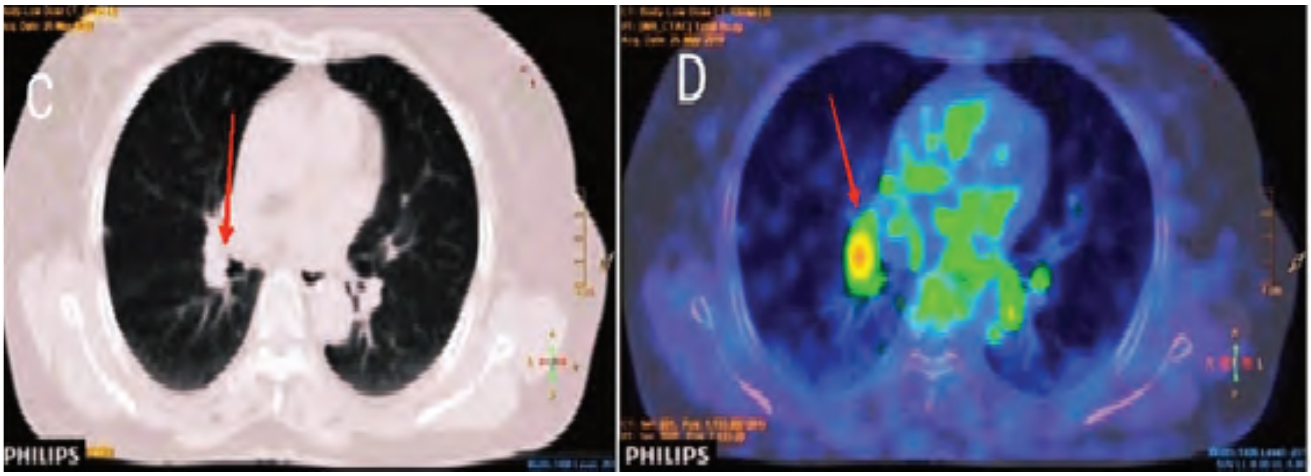


Figure 4: ^{18}F-FDG PET-CT scan of metastatic malignant cutaneous melanoma, CT axial image (A) showing soft tissue density nodule and fused axial view (B) showing hypermetabolic nodule in right lung. CT axial image (C) showing a 15 mm enlarged and fused axial view (D) showing hypermetabolic (SUVmax 5.4) right hilar lymph node

Thus there was PET-CT based restaging in to N3cM1b or stage IV disease. Based on this the concerned oncologist adopted combination chemotherapy as her new management strategy.

DISCUSSION

The reported global incidence of melanoma in 2015 was more than 5 cases per 100 thousand while its estimated incidence in Bangladesh was 1.1 with mortality rate of 0.3 (3). Worldwide, the incidence of CM is higher with poorer survival rate after 6th decade of life compared to those in younger (7-9). While there has been improvement in survival in the last few decades, but the survival still remains poor as the disease stage advances (8).

Melanoma cells uptake high volume of glucose analog 18F-fluorodeoxyglucose (^{18}F-FDG). This high ^{18}F-FDG uptake and the disputable metastatic spread of malignant melanoma are best conditions for functional metabolic imaging with whole body ^{18}F-FDG PETCT scan (2). Reinhardt MJ et al. showed the most significant advantage of combined PET-CT imaging in comparison to the single modalities was an improved detection and differentiation of distant metastases, especially of visceral metastases (6).

Up to 31% of patients with CM can present with stage IV disease at initial diagnosis (10). ^{18}F-FDG PET-CT is recommended for baseline evaluation, surveillance and prognostication of AJCC stage III and IV malignant CM (11,12) by virtue of its proven superiority compared to other imaging modalities in terms of sensitivity and specificity. ^{18}F-FDG PET-CT causes stage migration in 34% (1) and change of management effect in 26% (2). For regional staging, study showed better accuracy of PET in Stage III melanoma compared with Stage I and II disease (13).

^{18}F-FDG PET-CT is useful for detection of centimetric or larger sized metastatic CM in deep soft-tissue, lymph node, lung, liver or brain (14). Identification of nodal metastasis and isolated metastases in brain or lung by 18F-FDG PET-CT can guide metastatectomy leading to improvement of survival in metastatic CM (2,15). In this case, metastatectomy was refrained because of the patient's age and associated ischemic heart disease. Cardiac arrhythmia (16) and greater lesion size (17) are risk factors for increased morbidity in elderly patients.

The 5-year survival for stage IV CM is 15-20% (4). Median survival rate with pulmonary metastases is 7.3 months that further declines to less than seven months in patients with metastases in other visceral sites. The treatment of metastatic CM with chemotherapy has a response rate of 20% with single agents and 40% with combination agent. Recent trend of management also include surgery, radiation therapy, interferon, interleukin-2, vaccines, and gene transfer therapy (18).

Lung has remained the most common site of involvement with reported proportion of up to 36% of

cases with visceral metastasis from malignant CM (10). This constitutes about 5% of all secondary pulmonary malignancies (19). The common manifestation of thoracic metastasis of malignant CM have been described as multiple (40%) or solitary (20%) pulmonary nodules while the rare forms include miliary pattern, mediastinal lymphadenopathy, pleural effusions, lytic bone lesions and extra-pleural mass (20).

CONCLUSION

^{18}F-FDG PET-CT has an important role in restaging of metastatic malignant CM that aided oncologist to administer stage appropriate regimen of chemotherapy.

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