F-18 Fluorodeoxyglucose Positron-Emission Tomography-Computed Tomography in a Case of Extensive Multi-Organal Extranodal Lymphoma with Cardiac Involvement Mimicking Apical Hypertrophic Obstructive Cardiomyopathy: Staging and Response Evaluation

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Abstract

18F fluorodeoxyglucose positron-emission tomography/computed tomography (^{18}F-FDG PET/CT) is a standard imaging tool in staging as well as response evaluation for lymphoma. Here, we present a young male with extensive extranodal lymphoma with cardiac involvement which presented as diffuse myocardial lesion mimicking hypertrophic obstructive cardiomyopathy. ^{18}F-FDG PET/CT helped in the staging by revealing multiple systemic involvements. Interim PET after three cycles of chemotherapy showed a complete metabolic response to therapy in all the extranodal sites including the cardiac involvement, thus retrospectively confirming the lymphomatous involvement. Previous literature also conforms to the superior role of ^{18}F-FDG PET/CT in the clinical management of extensive extranodal lymphoma.

Keywords: *18F fluorodeoxyglucose positron-emission tomography-computed tomography, cardiac lymphoma, diffuse large B-cell lymphoma, extranodal lymphoma, hypertrophic obstructive cardiomyopathy, response evaluation*

A 32-year-old male patient presented with a history of nasal stuffiness 6 months before. On workup, nasal endoscopy showed soft-tissue mass in the nasal cavity and the left maxillary sinus. Endoscopic biopsy from the nasal lesion was confirmative of diffuse large B-cell lymphoma (DLBCL) with immunohistochemistry positive for CD20 and CD45 and negative for CD3. The patient underwent 18F fluorodeoxyglucose positron-emission tomography/computed tomography (^{18}F-FDG PET/CT) for staging purpose. The study showed abnormal FDG uptake in lesions in multiple systemic organs suggestive of multi-organal extranodal involvement from DLBCL [Figure 1]. There was also abnormal FDG avidity in the myocardium of the left ventricle with marked asymmetric thickening of the left ventricular (LV) myocardium [Figure 2].

The patient was planned for chemotherapy. During the prechemotherapy workup, the electrocardiogram showed global T-wave inversion and cardiologist consultation was sought. A 2D-echocardiogram was done which showed asymmetrical hypertrophy of the myocardium suggestive of apical hypertrophic obstructive cardiomyopathy (HOCM). Although the patient was advised endomyocardial biopsy to detect nature of apical thickening of the LV (HOCM vs. lymphoma), patient refused biopsy and started with chemotherapy (R-CHOP regimen along with intrathecal methotrexate). After three cycles of chemotherapy, PET/CT was again done for interim response evaluation which showed complete metabolic response with resolution of the previously seen lesions [Figure 3]. The complete metabolic response of the cardiac lesion post-chemotherapy retrospectively confirmed cardiac infiltration of extranodal DLBCL, thus mimicking as apical pseudo-HOCM. The patient is currently doing well and is on the sixth cycle of chemotherapy at present.

Extranodal involvement occurs in ~25%–40% of non-Hodgkin's lymphoma cases.[1] However, extensive systemic multi-organ involvement like in the

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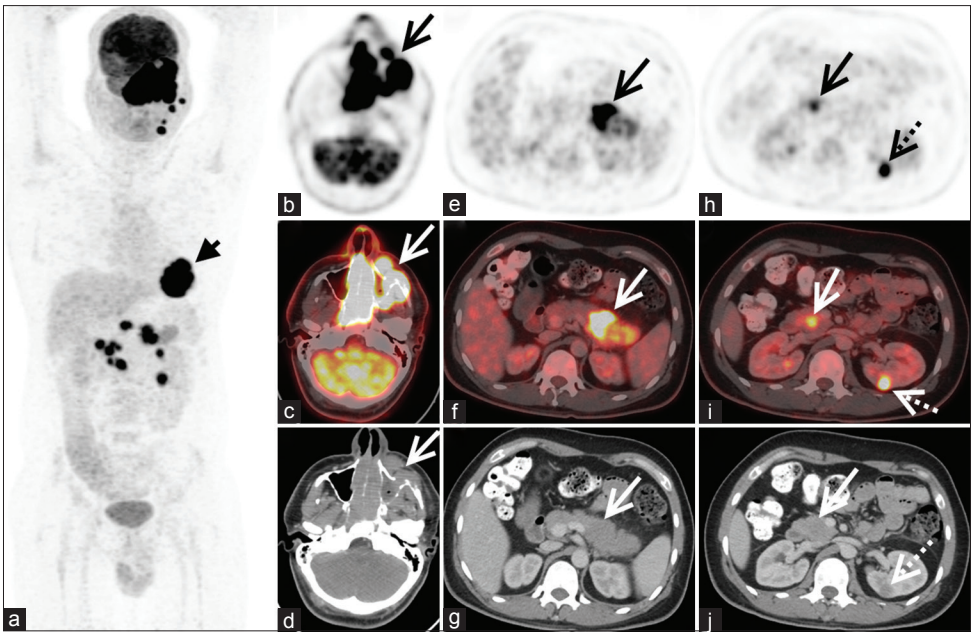

Figure 1: 18F fluorodeoxyglucose positron-emission tomography-computed tomography showing abnormal tracer uptake in multiple organs as seen in the maximum intensity projection (a) with tracer avid soft-tissue lesions in the nasal cavity (arrow: b-d), body of pancreas (arrows: e-g), duodenal wall (arrows: h-j), and cortex of the left kidney (dotted arrows: h-j). The maximum intensity projection (a) also shows intense tracer uptake in the myocardium (arrow head)

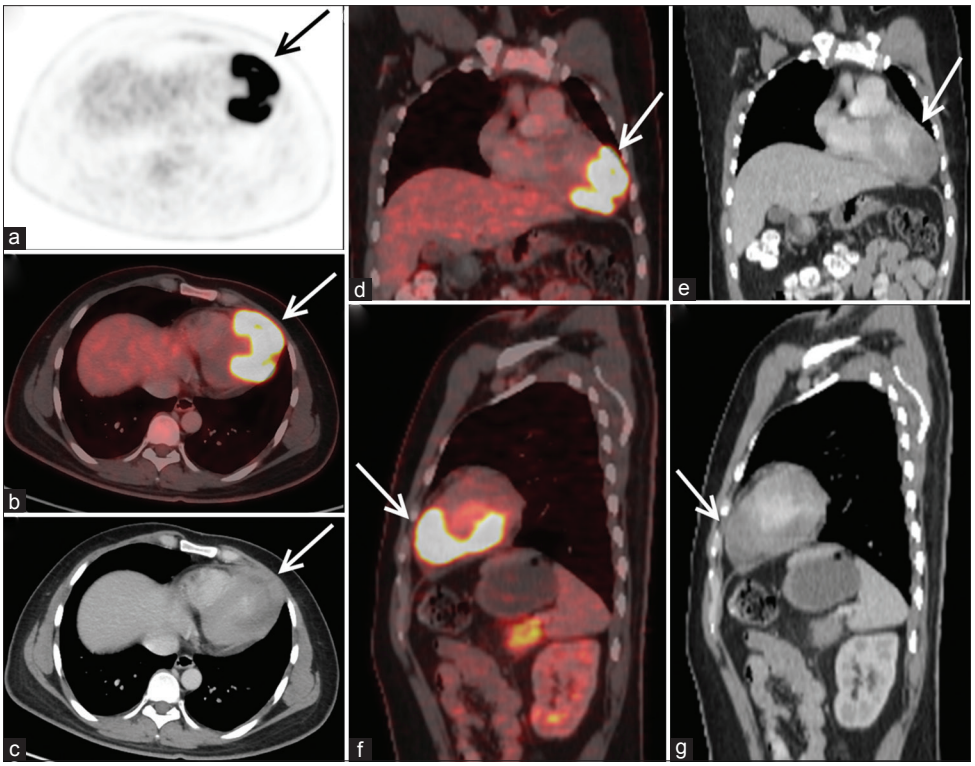

Figure 2: Diffusely increased fluorodeoxyglucose uptake in the thickened myocardium, predominantly in apex and extending to adjacent anterior, septal, lateral, and inferior walls as shown with arrows in the axial positron emission tomography (a), fused axial positron-emission tomography-computed tomography (b), axial computed tomography (c) and the corresponding coronal (d and e) and sagittal views (f and g)

index case is rarely described.[2-4] The involvement of nasal cavity with extra-nodular manifestation initially raised the suspicion of extranodal NK/T-cell lymphomas (ENKL and nasal type). However, the IHC was positive for the pan B-cell marker CD20. In IHC, NK/T-cell lymphomas are negative for CD20 (pan B-cell marker) and positive for expression of T-lineage antigens including CD2, CD7, and CD8 and NK lineage markers (such as CD56). In addition, evidence of the Epstein–Barr Virus (EBV) involvement by *in situ* hybridization staining for EBV-encoded small nuclear

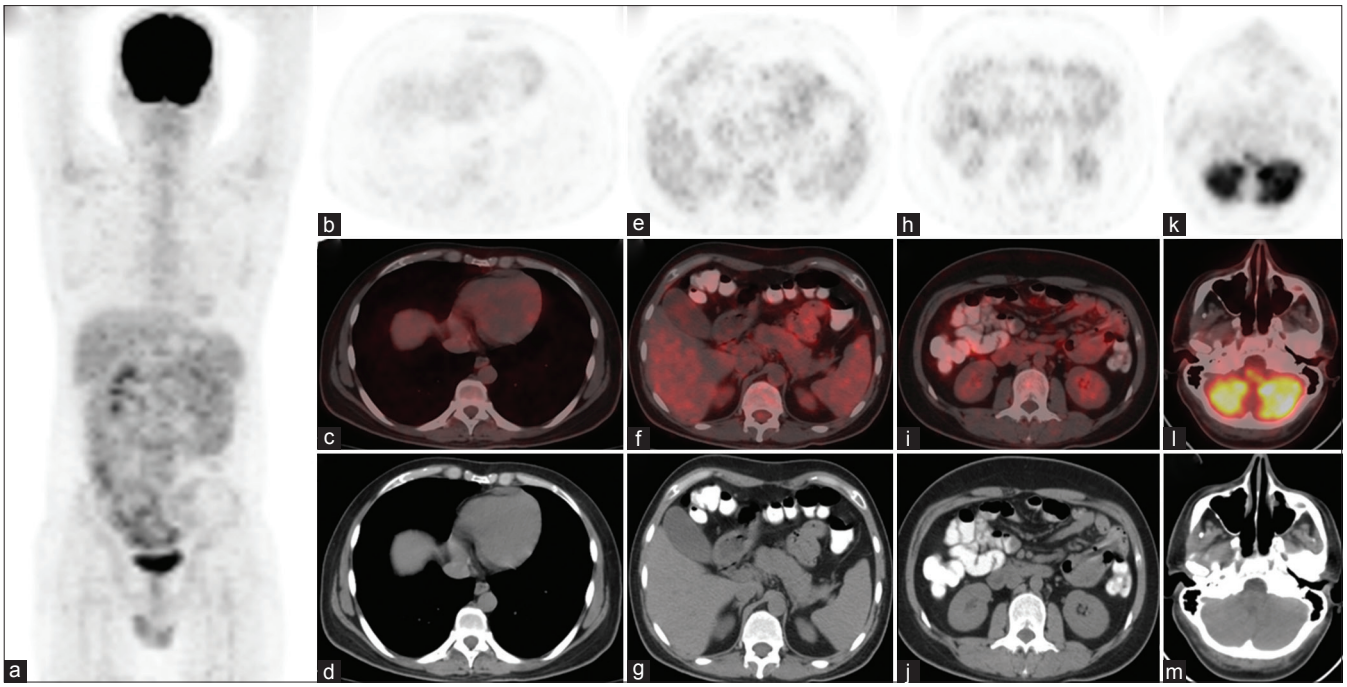

Figure 3: 18F fluorodeoxyglucose positron-emission tomography-computed tomography done for response evaluation showing resolution of the tracer uptake as well as the lesions in the previously seen extranodal organs as seen in the maximum intensity projection (a), axial positron emission tomography (b, e, h and k), axial fused positron-emission tomography-computed tomography (c, f, i and l) and axial computed tomography (d, g, j and m) images indicating a complete metabolic and structural response

RNA-1 within transformed cells is critical to the diagnosis of ENKL (nasal and nonnasal).[5] Although frequently missed, cardiac involvement from lymphoma is ~18% in autopsy studies.[6] Despite the potentially lethal nature, most patients remain asymptomatic as in the index case. Cardiac involvement in lymphoma poses a diagnostic challenge with lesions mimicking many other benign heart conditions like infarct,[7] or as HOCM[8] as in this case. Functional imaging like FDG PET/CT has shown superiority over CT in the evaluation of extra-nodal involvement and PET/CT has been reported to reveal previously unsuspected cardiac involvement.[9-13] Assessment of response with a serial PET has been suggested to be more accurate than magnetic resonance imaging and echocardiography for assessing cardiac lymphoma regression. PET/CT proved useful in this patient in bringing out the extra-nodal sites as well as showing the response to therapy and in proving the cardiac involvement retrospectively.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

References

1. Freeman C, Berg JW, Cutler SJ. Occurrence and prognosis of extranodal lymphomas. Cancer 1972;29:252-60.
2. Dhull VS, Sharma P, Singla S, Faizi NA, Thulkar S, Bal C, *et al.* Extensive extranodal involvement of rare sites in non Hodgkin's lymphoma detected on (18)F- FDG PET-CT: A case report. Nucl Med Mol Imaging 2013;47:125-9.
3. Bai X, Codreanu I, Kaplan SL, Servaes S, Zhuang H. Non-Hodgkin lymphoma dominated by multiple organ extranodal disease revealed on FDG PET/CT. Clin Nucl Med 2015;40:360-3.
4. Paes FM, Kalkanis DG, Sideras PA, Serafini AN. FDG PET/CT of extranodal involvement in non-Hodgkin lymphoma and Hodgkin disease. Radiographics 2010;30:269-91.
5. Kohrt H, Advani R. Extranodal natural killer/T-cell lymphoma: Current concepts in biology and treatment. Leuk Lymphoma 2009;50:1773-84.
6. Petersen CD, Robinson WA, Kurnick JE. Involvement of the heart and pericardium in the malignant lymphomas. Am J Med Sci 1976;272:161-5.
7. Sankaranarayanan R, Prasanna K. A case of primary cardiac lymphoma mimicking acute myocardial infarction. Clin Cardiol 2009;32:E52-4.
8. Kim DH, Kim YH, Song WH, Ahn JC. Primary cardiac lymphoma presenting as an atypical type of hypertrophic cardiomyopathy. Echocardiography 2014;31:E115-9.
9. O'Mahony D, Peikarz RL, Bandettini WP, Arai AE, Wilson WH, Bates SE, *et al.* Cardiac involvement with lymphoma: A review of the literature. Clin Lymphoma Myeloma 2008;8:249-52.

10. Nguyen JD, Carrasquillo JA, Little RF, Ryan QC, Wilson W, Chen CC, *et al.* Fluorodeoxyglucose positron emission tomography in the presence of cardiac metastases. Clin Nucl Med 2003;28:979-80.
11. Agrawal K, Mittal BR, Manohar K, Kashyap R, Bhattacharya A, Varma S, *et al.* FDG PET/CT in detection of metastatic involvement of heart and treatment monitoring in non-Hodgkin's lymphoma. World J Nucl Med 2012;11:33-4.
12. Ilica AT, Kocacelebi K, Savas R, Ayan A. Imaging of extranodal lymphoma with PET/CT. Clin Nucl Med 2011;36:e127-38.
13. Römer W, Garbrecht M, Fuchs C, Schwaiger M. Images in cardiovascular medicine. Metabolic imaging identifies non-Hodgkin's lymphoma infiltrating heart. Circulation 1998;97:2577-8.