VIA MEDICA

Nuclear Medicine Review 2015, 18, 1: 37–38
DOI: 10.5603/NMR.2015.0009

ISSN 1506–9680

Case report

^{18}F-FDG-PET/CT in staging, recurrence detection and response evaluation of primary splenic lymphoma with eight years follow up

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[Received 14 VII 2014; Accepted 19 XII 2014]

Abstract

Primary splenic lymphomas (PSL) are rare malignancies which involve spleen with or without splenic hilar lymph nodes. Confirmation of diagnosis depends upon tissue sampling but noninvasive methods are useful in early diagnosis, treatment response monitoring and recurrence detection. Here we describe a case of PSL detected by ^{18}F-FDG-PET/CT which was histopathologically proven to be diffuse large B-cell lymphoma (DLBCL) treated with CHOP regimen. ^{18}F-FDG-PET/CT was found to be very useful in all stages (staging, recurrence detection and treatment response monitoring) of PSL with eight years of follow up.

KEY words: primary splenic lymphoma, ^{18}F-FDG, PET/CT, staging; response monitoring

Nuclear Med Rev 2015; 18, 1: 37–38

Background

Malignant cells are usually hypermetabolic so they use excess glucose which is the principle used in ^{18}F-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography/computed tomography (PET/CT). PET/CT can identify functional hypermetabolic lesion even in the absence of any anatomically visible disease. ^{18}F-FDG-PET/CT is proven to be useful in staging of both Hodgkin's disease and NHL [1]. It has very high sensitivity, specificity, PPV and NPV in differentiating benign from malignant splenic lesion [2]. But there are very few (to our knowledge only 2) case reports about ^{18}F-FDG-PET in detection of primary splenic lymphoma (PSL) [3, 4]. Here we present a case of PSL patient who underwent serial ^{18}F-FDG-PET/CT scans in our department in last 8 years and ^{18}F-FDG-PET/CT proved to be of great value in staging, treatment response evaluation and recurrence detection.

Case report

A 44-year-old male presented with fever for 1 month with associated heaviness on left upper abdomen. Infectious disease screening for malaria, enteric fever was negative. There was no derangement in liver or kidney function test. Hematological investigations revealed mild anemia with hemoglobin 8.8 gm/dl which was normochromic normocytic but normal leukocyte and platelet count. His LDH was 660 IU/L. He underwent abdominal ultasonography which revealed splenomegaly with normal echotexture. An abdominal CT scan showed diffusely hyperdense spleen with no other lymphadenopathy. He also underwent bone marrow biopsy which showed no lymphomatous involvement. He was then referred for ^{18}F-FDG-PET/CT to look for other organ involvement. ^{18}F-FDG-PET/CT study revealed enlarged spleen with diffuse increased ^{18}F-FDG uptake (Figure 1). No other focus of abnormal ^{18}F-FDG uptake was noted which was consistent with PSL Ahmann stage 1 [5]. As the patient did not give consent for splenectomy, on suspicion of splenic lymphoma splenic biopsy was performed [6]. Splenic biopsy confirmed it as diffuse large B-cell lymphoma (DLBCL). He was then put on 6 cycles of chemotherapy consisting of Cyclophosphamide, Adriamycin, Vincristine and Prednisone. Post therapy scan shows resolution of lesion (Figure 2A–D). The patient was on 3 monthly follow-up and ^{18}F-FDG-PET/CT was performed yearly. Two years after the detection of PSL his PET/CT showed recurrence of the disease; this was confined to spleen and retroperitoneal lymph node (Figure 2E–H) only though the patient was asymptomatic. This time the patient was treated with RICE regimen consisting of Rituximab, Ifosfamide, Carboplatin and Etoposide. Splenectomy was not performed due to patient's refusal. After 3 cycles of chemotherapy

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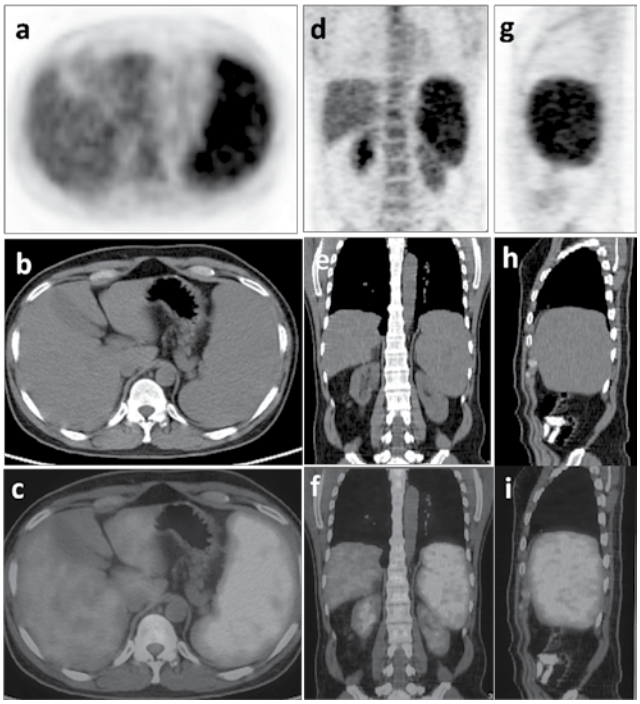

Figure 1. Baseline ^{18}F-FDG-PET/CT study. Trans-axial (**A–C**), coronal (**D–F**) and sagittal (**G–I**) views of PET (**A**, **D**, **G**), CT (**B**, **E**, **H**) and PET/CT (**C**, **F**, **I**) images revealing ^{18}F-FDG avid enlarged spleen with diffuse uptake

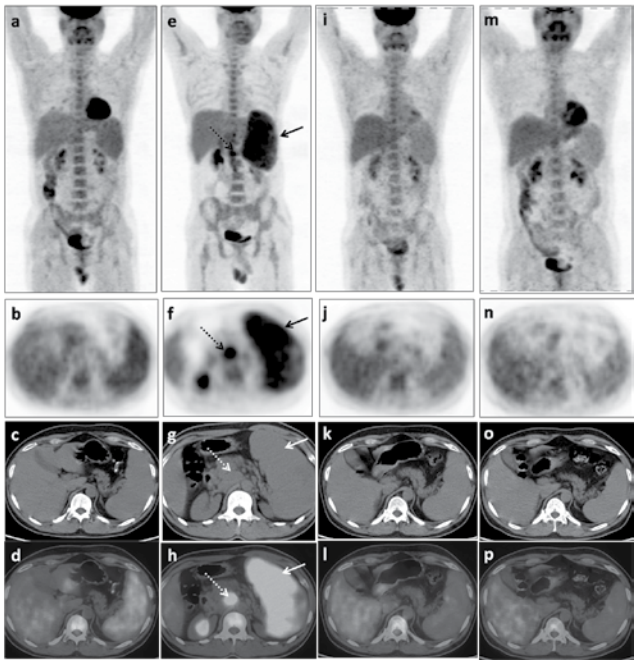

Figure 2. Serial follow-up ^{18}F-FDG-PET/CT studies. Maximum intensity projection PET (**A**) and transaxial PET (**B**), CT (**C**) and PET/CT (**C**) images of post chemotherapy ^{18}F-FDG-PET/CT scan showing resolution of lesion (**A–D**). Subsequent follow-up study (**E–H**) showed recurrence of the disease which was confined to enlarged spleen (arrow) and retroperitoneal lymph node (dotted arrow). After change in chemotherapy regimen, subsequent follow-up PET/CT studies were normal (**I–P**)

PET/CT showed complete resolution of the disease and he is on follow up. Presently he is in his eighth year of follow up. He is asymptomatic and his last two PET/CT scans were normal (Figure 2I–P).

Discussion

Lymphomatous involvement of spleen is a common occurrence. Both conventional imaging like computerized tomography, ultrasonography and functional imaging like ^{18}F-FDG-PET or PET/CT can be used to assess the splenic involvement. ^{18}F-FDG-PET/CT is already widely acceptable tool for accurate staging for Hodgkin's (HD) and non-Hodgkin's lymphoma (NHL) [7]. Few studies have also showed its usefulness in detecting splenic lesions. ^{18}F-FDG-PET/CT had 100% sensitivity and 95% specificity in detecting splenic involvement in malignant lymphoma in a study by De Jong et al. [2]. Metser et al. proposed an SUV threshold of 2.3 to have a 100% sensitivity, specificity, PPV and NPV in differentiating benign from malignant solid splenic masses. Using splenic uptake greater than hepatic uptake as the criterion for a positive study, the sensitivity, specificity, and accuracy of ^{18}F-FDG-PET/CT were 92%, 100%, and 97% respectively in their study [8]. In another study Rini et al. found PET/CT to have 100% sensitivity in comparison to only 57% for conventional CT scan in detecting splenic lesions in lymphoma [9]. But lymphoma restricted to spleen known as PSL is extremely rare. To our knowledge, there are only two case reports where ^{18}F-FDG-PET/CT aided in the diagnosis of PSL [3, 4]. Our experience with this case documents that ^{18}F-FDG-PET/CT is a very useful tool in all stages (diagnosis, staging, recurrence detection and treatment response monitoring) of PSL with eight years of follow up.

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