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Case Report

Bilateral renal involvement in diffuse large B-cell lymphoma on fluorodeoxyglucose positron emission tomography/computed tomography

ABSTRACT

Secondary renal involvement in patients with diffuse large B-cell lymphoma (DLBCL) is rare and associated with poor prognosis. We, hereby, described a case of a patient diagnosed with DLBCL, in whom bilateral renal involvement was detected on 18F-fluorodeoxyglucose positron emission tomography/computed tomography (^{18}F-FDG PET/CT). The patient received 4 courses of chemotherapy, and follow-up^{18}F-FDG PET/CT revealed the complete resolution of the diffuse increased renal^{18}F-FDG uptake. Renal lymphoma is uncommon and^{18}F-FDG PET/CT is particularly useful for detecting extranodal involvement in DLBLC.

Keywords: 18F-fluorodeoxyglucose positron emission tomography/computed tomography, diffuse large B-cell lymphoma, renal 18F-FDG uptake, renal lymphoma

INTRODUCTION

Renal involvement in aggressive lymphoma is most often seen along with the dissemination of systemic disease.[1] In this case report, we describe a 17-year-old female with diffuse large B-cell lymphoma (DLBCL) and kidney involvement at diagnosis visualized on 18F-fluorodeoxyglucose positron emission tomography/computed tomography (^{18}F-FDG PET/CT).

CASE REPORT

A 17-year-old female, without medical history, presented with a 15-day history of diplopia, nasal obstruction, and left orbital pain, associated with fever and night sweats. The physical examination found a left exophthalmos and bilateral cervical lymphadenopathy. T2-weighted orbital magnetic resonance imaging showed a left soft-tissue mass slightly hyperintense compared to muscle involving intra- and extraconal space responsible for an exophthalmos, with an extension to the left ethmoid sinus and the left nasal fossa. Biopsy of the nasal mass and histopathologic examination objectified a high-grade DLBCL (CD20+, Bcl2+, CD3-, and CD5-, with a Ki-67 proliferation index of 95%). In addition, the cerebrospinal fluid analysis was consistent with a central nervous system (CNS) involvement.

Baseline^{18}F-FDG PET/CT revealed intense^{18}F-FDG uptake throughout the bilaterally enlarged renal parenchyma, on the soft tissue in the left orbit extending into the left nasal cavity, and on cervical and abdominal lymph nodes.

Yassir Benameur, Adnane Hammani[1], Kamal Doghmi[1], Abderrahim Doudouh

Departments of Nuclear Medicine and [1]Clinical Hematology, Mohammed V Military Teaching Hospital, Faculty of Medicine and Pharmacy of Rabat, Mohammed V University in Rabat, Morocco

Address for correspondence: Dr. Yassir Benameur, Department of Nuclear Medicine, Mohammed V Military Teaching Hospital, Mohammed V University in Rabat, Rabat, Morocco.
E-mail: benameur.yassir@gmail.com

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Peritoneal nodules with diffusely increased^{18}F-FDG and multiple hypermetabolic bones foci, including humeri, ribs, and pelvis uptake were also noted [Figure 1]. After 4 cycles of dose-adjusted EPOCH-rituximab, the patient was referred for^{18}F-FDG PET/CT for response evaluation. The^{18}F-FDG PET/CT showed a total regression of renal lesions suggesting good response to therapy [Figure 2].

DISCUSSION

DLBCL is the most common aggressive lymphoma.[2] The usual presentation of DLBCL is symptomatic enlarged lymph nodes; around 40% of patients have extranodal involvement, most commonly in the gastrointestinal tract (36%), ear, nose, throat (20%), and bone marrow (14%).[3] Renal parenchymal involvement is uncommon in DLBCL, it appears to be a secondary process, either by direct extension from a retroperitoneal mass or through hematogenous spread in the setting of disseminated disease.[4] In a study with 821 patients diagnosed with DLBCL, renal involvement was noted in 26 (3%) at the time of diagnosis, the majority of patients presented in advanced disease, 86% were Ann Arbor stage ≥III.[5] Infiltrative lymphomatous proliferation within the renal tissue is manifested as nephromegaly with the preservation of renal contour. The diagnosis, therefore, depends on the finding of global renal enlargement and poor renal function.[6]

More uncommon, primary renal non-Hodgkin's lymphoma is an extremely rare disease and only a few cases have been reported, accounting for <1% of all lymphomas.[7] The most common presentation is acute renal failure, proteinuria, microscopic hematuria, and renal enlargement.[7] Reuter *et al*. described a primary bilateral renal B-cell lymphoma; in this case, the patient had urinary symptoms and was in nonoliguric acute renal failure.[8] Renal failure was also found in secondary renal lymphoma, Navalkissoor *et al*. reported a patient with DLBCL and renal failure, with the particularity of being normalized after only one cycle of R-CHOP (Rituximab plus Cyclophosphamide, Doxorubicin, Vincristine, and Prednisolone).[9] The same features were also noted in the case reported by Kara *et al*. with bilateral renal involvement and renal impairment.[10] As opposed to our patient, who had no urinary symptoms and was not in renal failure at the time of diagnosis (glomerular filtration rate 85 mL/min, serum creatinine 13 μM).

Villa *et al*. demonstrated that patients with DLBCL and kidney involvement at diagnosis have a poor prognosis with CNS relapse incidence which occurs early.[4] Thus, the assessment for CNS involvement is highly recommended in patients with

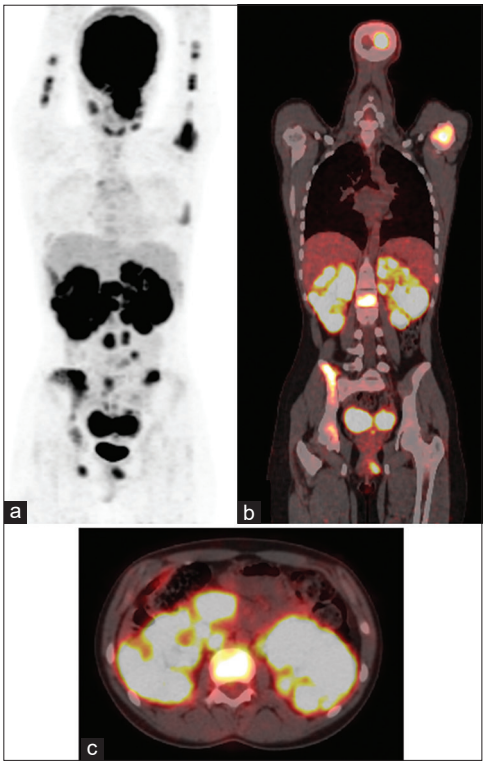

Figure 1: Maximum intensity projection (a), coronal 18F-fluorodeoxyglucose positron emission tomography/computed tomography fusion (b) and transaxial images (c) demonstrated very intense diffuse 18F-fluorodeoxyglucose uptake in bilaterally enlarged kidneys

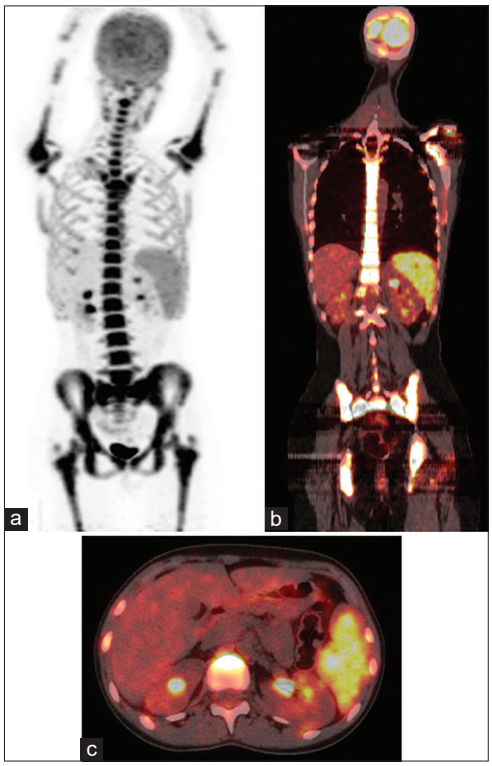

Figure 2: Resolution of the renal 18F-fluorodeoxyglucose uptake after 4 courses of dose-adjusted EPOCH-rituximab, on maximum intensity projection (a) image as well as on coronal (b) and transaxial images (c)

renal lymphomatous lesions at the time of diagnosis, even in the absence of neurological symptoms. In addition, the R-CHOP protocol is not a sufficient therapy in these patients with or without CNS disease.[4] However, randomized controlled trials are required to establish a standard treatment approach. Our patient had CNS involvement and was treated by dose-adjusted EPOCH-rituximab protocol and high-dose methotrexate with the complete resolution of the diffuse increased renal ^{18}F-FDG uptake after 4 courses of chemotherapy, but a partial response on FDG-avid bone lesions.

^{18}F-FDG PET/CT imaging has revolutionized the management of patients with lymphoma. It is now essential for accurate staging and has become the foundation of widely adopted response criteria. Currently, ^{18}F-FDG PET/CT is considered as the gold standard for response assessment.[11] Imaging procedures alone cannot differentiate between primary and secondary renal lymphoma as ^{18}F-FDG is excreted by the kidneys, this physiologic uptake in the renal collecting system can lead to false-positive and false-negative interpretations on PET-CT.[12] Renal involvement in lymphoma is seen as multiple focal areas of increased ^{18}F-FDG uptake mostly in renal cortices that may be unilateral or less commonly, bilateral.[13] As in our case, where multiple focal areas of increased FDG uptake were noted in both kidneys.

It is necessary to point out that when diffuse renal FDG uptake is observed on ^{18}F-FDG PET-CT, one of the most frequent differential diagnoses is renal sarcoidosis, as in the case described by Toyonaga *et al*. with the particularity of homogenous increased FDG uptake in both kidneys.[14]

CONCLUSION

Renal involvement in DLBCL is rare; however, it is associated with poor prognosis, and it includes an increased risk for CNS involvement.

This case supports the important clinical value of the ^{18}F-FDG PET/CT as a whole-body imaging modality in detecting unusual sites of involvement in DLBCL.

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.

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