PRIMARY ADRENAL LYMPHOMA (PAL) ON ^{18}FDG PET/CT IMAGING: RARE CASE

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ABSTRACT

Primary adrenal lymphoma (PAL) is a rare entity (<250 cases reported in literature) which should be considered in the differential diagnosis of bilateral adrenal lesions with or without associated adrenal insufficiency (AI). We present a case of 63-year-old man having 6 month s history of weakness, weight loss and bilateral dull lumbar aches. Contrast enhanced CT of abdomen and pelvis revealed isolated bilateral adrenal masses. His serum metanephrine, normetanephrine and cortisol levels were normal but serum aldosterone level was significantly low (<0.97 ngm/ml; Normal <46 ngm/ml). CT-guided biopsy of the right adrenal gland was consistent with high grade B-cell lymphoma. ^{18}F-fluorodeoxyglucose (^{18}FDG) positron emission tomography (PET/CT) done as part of staging revealed isolated hypermetabolic adrenal masses but no other lesion and a diagnosis of PAL was concluded.

Key Words: Lymphoma; primary adrenal lymphoma; adrenal insufficiency; ^{18}FDGPET/CT

Introduction

Adrenal involvement in advanced non-Hodgkin s lymphoma is common with a reported incidence of about 24%.[1] However, primary adrenal lymphoma (PAL) is quite rare and so far less than 250 cases have been reported. We report a case of 63-year-old male from northern Pakistan, presented with fatigue, weight loss and bilateral dull lumbar pain who subsequently found to have primary adrenal high grade B-cell lymphoma.

Case

A 63-year-old male from northern part of Pakistan presented with six months history of fatigue, weight loss (about 11 kilogram) and bilateral flank pain of dull nature. His was a known ex-smoker, hypertensive, diabetic with coronary artery disease (CAD) and has had coronary artery by-pass graft (CABG) surgery 06 years back. On examination he was found to have mild hypertension (140/89 mm Hg -on medications) with mild anemia but otherwise gastrointestinal, cardiorespiratory and neurological examination were unremarkable. His investigations revealed hemoglobin (11.2 gm/dl), normal liver function tests, normal serum creatinine but raised serum lactic dehydrogenase level (LDH; 549 IU/ml: Normal - 135 -225). A CT contrast enhanced abdo-minopelvic CT scan done on 6.6.2023 revealed bilateral adrenal masses (Right: 45 x 35 x 39 mm, AP, TV, CC and pre-contrast mean HU 32; Left: 38 x 26 x 28 mm AP, TV, CC, mean pre-contrast HU

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37). No other morphological abnormality was seen in CT scan. His metanephrine, normetanephrine and serum cortisol levels were within normal limits. He had serum renin level of >500 ulu/ml (Normal: <46) but low serum aldosterone level (<0.97 ngm/ml; Normal - < 46). On 3.7.2023, a CT guided right adrenal mass biopsy was done which revealed high grade B-cell lymphoma (Cytokeratin-20 +ve; CD3 ve; Ki-67 (Mib-1) 80%; c-Myc +ve; CD10 ve; BCL-2 +vE; MUM-1 +ve; BCL-6 +ve). On 20.7.2023, bone trephine was performed which revealed no evidence of marrow infiltration by lymphoma. On 26.7.23, ^{18}F (Flouro-deoxyglucose) PET/CT (positron emission tomography / computerized tomography) was performed for staging of lymphoma. Scan redemonstrated hypermetabolic bilateral adrenal masses with interval progression in sizes (Right: 45 x 40 x 64 mm Vs 45 x 35 x 39 mm AP, TV, CC: SUVmax 24.5; Left: - 45 x 34 x 53 mm Vs 38 x 26 x 28 mm AP, TV, CC, SUVmax 22.6) but no significant interval change in CT density (HU: Right 35 Vs 32; Left 38 Vs 37) (Fig.1a-e). Since there was no other hypermetabolic nodal or extra-nodal disease was appreciated, a diagnosis of primary adrenal lymphoma (PAL) was made.

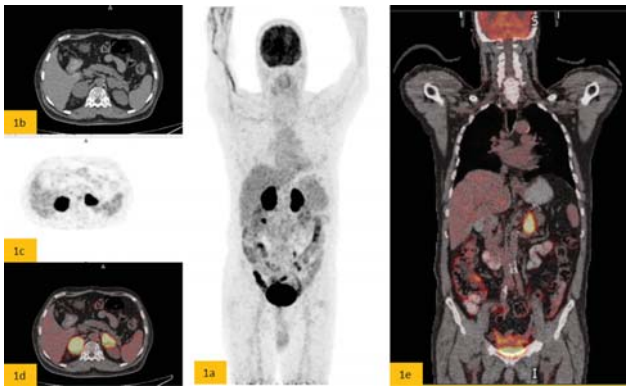

Figure 1(a-e): ^{18}FDG PET/CT imaging. **(a)** Maximum intensity projection (MIP) image showing bilateral hypermetabolic adrenal lesions. Axial CT **(b)**, PET **(c)** and fused **(d)** and fused coronal image **(e)** show isolated bilateral hypermetabolic adrenal masses but no other ^{18}FDG avid disease.

Discussion

Isolated involvement of adrenal(s) by lymphoma is rare and predominantly involve elderly male in 6th decade like in present case.[3] PAL has non-specific symptoms and in a retrospective multicenter study, the most common presenting complaints were weakness and weight loss like in our patient.[4] PAL is commonly associated with adrenal insufficiency (AI; approximately 60%) which was also present in this patient due to low serum aldosterone level. It is considered to be caused by cytokine-driven paracrine effects of lymphoma cells on adrenals.[5] Reddy et al., postulated that high prevalence of AI in PAL could also be explained by pre-existing autoimmune adrenalitis in these patients which predispose them to develop PAL.[6]

As pathophysiology of PAL is not clearly agreed, few mechanisms have been presented. Since human adrenal gland is devoid of lymphoid tissue, PAL is thought to originate from hematopoietic cells residing in one adrenal and gravitational migration of tissue to contralateral adrenal explains bilaterality.[7] Another postulation is immune dysregulation and autoimmunity which predispose the development of polyclonal lymphoid infiltrates in adrenal which than evolve into PAL.[8] Since high rate of Epstein Bar Virus (EBV) genome sequences and gene expression have been found in PAL cell, role of this virus in pathogenesis cannot be excluded.[9]

Both morphological and metabolic imaging findings in PAL are non-specific. CT scan is the most commonly performed imaging method but has no pathognomonic features of adrenal lymphoma. Adrenal masses greater than 4 cm with non-homogenous texture (HU > 10 on unenhanced image) are highly suggestive of malignancy.[10] On magnetic resonance imaging (MRI) lymphomas typically have a low signal intensity in T1-weighted but non-homogenous high signals on T2-weighted images.[11] On ^{18}FDG PET/CT imaging, adrenal lymphomas (both secondary and PAL) are hypermetabolic with bilateral involvement in 60% cases of PAL with bulky masses at time of imaging.[12] ^{18}FDG PET/CT imaging plays a pivotal role in establishing isolated unilateral or bilateral adrenal involvement and precise metabolic response assessment to treatment.

Primary adrenal lymphoma (PAL) is a rare but aggressive entity which should be considered in the differential diagnosis of bilateral nodular lesions especially when there is evidence of associated adrenal insufficiency. ^{18}FDG PET/CT imaging plays

an important role in establishing isolated unilateral or bilateral involvement and metabolic response assessment to treatment.

Conflict of Interest: No financial or institutional conflict of interest.

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