Primary Adrenal Lymphoma: CT
and MRI findings

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Section: Uroradiology & genital male imaging
Area of Interest: Abdomen
Procedure: Imaging sequences
Procedure: Diagnostic procedure
Imaging Technique: MR
Imaging Technique: CT
Special Focus: Neoplasia Case Type: Clinical Cases
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Patient: 40 years, male

Clinical History:
Case 1: A 40-year-old male patient complained of abdominal pain.
Case 2: A 45-year-old female patient complained of weight loss.

Imaging Findings:

Case 1: CT examination of the abdomen and pelvis with sagittal and coronal reconstruction showing bilateral homogeneous enhancing adrenal mass lesion, larger on the left side, extending into the left perinephric space and renal sinus (Fig. 1 a-d). Associated discrete enlarged retro-peritoneal lymph nodes are noted (Fig. 1 e).

Case 2: MRI examination of the abdomen and pelvis showing bilateral adrenal lesions. They display hypointense signal on T1WI, slightly heterogeneous hyperintense signal on T2WI, with no signal drop in IP/OP imaging (Fig. 2 a-c). Upon contrast medium (CM) administration, they show faint enhancement (Fig. 2 d). Associated bilateral variable sized renal masses of similar signal intensity are noted (Fig. 2 e)

Discussion:
Lymphoma can involve the adrenal gland secondarily or arise as a primary adrenal tumour (uncommon). Primary adrenal lymphoma (PAL) is extremely rare [1]. It predominantly affects the elderly and men, with a male to female ratio of 2.2:1 [2]. It is mostly bilateral in 70 % of cases [2].
PAL represents less than 1% of non-Hodgkin's lymphomas [1, 3]. The most common subtype is diffuse large B-cell lymphoma [4, 5]. Non-Hodgkin's lymphoma affecting the adrenal glands is usually associated with other sites of disease, most usually the retro-peritoneal lymph nodes and ipsilateral kidney [6].
Patients with PAL typically present with a variety of complaints such as fatigue, weight loss, fever, or abdominal pain [7]. Adrenal insufficiency may be the primary presenting symptom in 50% of patients, especially if bilaterally involved [8]. Adrenocortical insufficiency shows no correlation with the tumour size [8, 9]. It occurs when there is more than 90% destruction in the adrenal parenchyma [5].
US, CT, and MRI can all detect the existence of an adrenal mass, but a confirmatory diagnosis of PAL is based on pathological examinations [10].

On CT adrenal lymphomas usually demonstrate complex masses with variable density by virtue of detecting necrosis and haemorrhage, but calcification is uncommon. Occasionally, the contour of the involved adrenal gland may be preserved [11].
Adrenal lymphomas have low signal intensity on T1WI and heterogeneous high signal intensity on T2WI, with
minimal progressive enhancement after CM administration [12]. When PAL has heterogeneous signal on T2WI, it is difficult to differentiate it from metastasis [13]. Unlike CT and MRI, 18F-FDG PET/CT is based on increased glucose metabolism in malignant lesions. PET/CT show intense FDG avid adrenal masses [14]. The degree of FDG avidity in adrenal lymphoma tends to parallel that in other involved areas. However, certain subtypes of lymphoma (e.g. marginal zone and peripheral T-cell) and low-grade lymphomas may not show reliable FDG uptake [15].

Prognosis of PAL is usually poor. Poor prognostic factors are advanced age, large tumour size, bilateral involvement, high LDH levels, involvement of other organs, and adrenal insufficiency at admission [5, 16]. Treatment includes surgery, combination chemotherapy and radiotherapy, but bilateral adrenalectomy with adjuvant radiotherapy is still controversial [2]. Although there are no specific imaging findings for PAL, if there is coexistence of bilateral adrenal masses with homogeneous density/signal intensity together with mild enhancement on CT/MRI examinations, as shown in our cases, PAL should be considered as a potential underlying disease.

**Differential Diagnosis List:** Primary adrenal lymphoma, Bilateral metastases, Bilateral pheochromocytoma

**Final Diagnosis:** Primary adrenal lymphoma

**References:**


Figure 1

**Description:** There are bilateral homogeneously enhancing adrenal lesions, larger on the left side. **Origin:** Department of Diagnostic and Interventional Radiology, Kasr Al-Ainy Hospital, Cairo University, Cairo, Egypt.

**Description:** The bilateral adrenal lesions are displacing both kidneys downwards. **Origin:** Department of Diagnostic and Interventional Radiology, Kasr Al-Ainy Hospital, Cairo University, Cairo, Egypt.
Description: The left adrenal lesion is extending into the perinephric space. **Origin:** Department of Diagnostic and Interventional Radiology, Kasr Al-Ainy Hospital, Cairo University, Cairo, Egypt.

Description: The left adrenal lesion is extending into the renal sinus. **Origin:** Department of Diagnostic and Interventional Radiology, Kasr Al-Ainy Hospital, Cairo University, Cairo, Egypt.
Description: Few discrete enlarged retroperitoneal lymph nodes are noted (arrow). Origin: Department of Diagnostic and Interventional Radiology, Kasr Al-Ainy Hospital, Cairo University, Cairo, Egypt.
**Figure 2**

**a**

Description: Axial T1WI shows bilateral adrenal lesions of homogenous hypointense signal. 

Origin: Department of Diagnostic and Interventional Radiology, Kasr Al-Ainy Hospital, Cairo University, Cairo, Egypt.

**b**

Description: Axial T1WI OP image shows no signal drop of both lesions. 

Origin: Department of Diagnostic and Interventional Radiology, Kasr Al-Ainy Hospital, Cairo University, Cairo, Egypt.
Description: Axial T2WI shows bilateral heterogeneous hyperintense T2 signal of both adrenal lesions.
Origin: Department of Diagnostic and Interventional Radiology, Kasr Al-Ainy Hospital, Cairo University, Cairo, Egypt.

Description: Post contrast axial T1WI shows faint slightly heterogenous enhancement of both lesions.
Origin: Department of Diagnostic and Interventional Radiology, Kasr Al-Ainy Hospital, Cairo University, Cairo, Egypt.
Description: Post contrast T1WI shows bilateral small fairly defined renal lesions of similar signal intensity of adrenal lesions (arrow). Origin: Department of Diagnostic and Interventional Radiology, Kasr Al-Ainy Hospital, Cairo University, Cairo, Egypt.