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Renal infiltration presenting as acute kidney injury in Hodgkin lymphoma – A case report and review of the literature

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ABSTRACT

Renal involvement in Hodgkin lymphoma (HL) is rare, although extralymphatic disease is usually found. Acute kidney injury is a recognized presentation of non-Hodgkin lymphoma, with bilateral kidney involvement, promptly requiring specific treatment. Regarding to HL, this manifestation is extremely rare and lacks pathologic description and management experiences. Herein, we describe a case of HL with atypical presentation as well as its management, current evaluation by PET-scan and histologic findings. This case report highlights clinical presentation and a successful experience on managing these cases. Moreover, it is important to drive biologic insights for understanding of kidney infiltration mechanism in HL.

1. Introduction

Hodgkin lymphoma (HL) is a B-cell neoplasm usually presented with lymphadenopathy [1]. At presentation, HL is usually supradiaphragmatic, with contiguous spread often occurring predictably from one nodal group to the next along the lymphatic pathways. Extralymphatic involvement is much less common in HL than in non-Hodgkin lymphoma (NHL), and commonly includes liver, lungs, and bone marrow [1–3]. Kidneys are commonly affected in patients with hematolymphoid neoplasms by various mechanisms including paraneoplastic glomerulopathy, acute tubular necrosis (ATN), chronic interstitial nephritis (CIN), post-renal causes and lymphocytic infiltration of kidney parenchyma (LIK) [4–6]. However, LIK associated with HL is extremely rare being rather perirenal without parenchymal involvement [5]. Herein, we present a case of severe renal impairment attributed to extensive infiltration documented by renal biopsy in a patient with HL.

2. Case presentation

A 22 years-old male patient had been presenting small painless bilateral cervical lymphadenopathy for approximately nine months. In this period, other symptoms appeared - weight loss, recurring fever, night sweats and lower back pain. At that time, he was misdiagnosed as sciatic pain and treated with analgesics. As the symptoms were worsening, he consulted another physician who suspected of lymphoma and performed a lymph node biopsy. Microscopic evaluation showed a cellular infiltrate expressing CD15, CD30 and PAX-5, with negative CD20 and LMP-1, strongly suggestive of Classical HL. The patient was referred to our center and sought medical help in emergency room due to dyspnea at rest in the last week. An extensive bilateral pleural effusion was diagnosed and relieved by a prompt thoracentesis. Pleural fluid analyses revealed a chylothorax and a drain was placed in this occasion.

He presented extremely thin and sick. Multiple anterior and posterior cervical and inguinal lymph nodes were palpable, the largest with 2 × 2 cm. There was no dehydration on physical exam. His blood exams at admission showed an elevated urea (84 mg/dl) with a yet normal creatinine (1.01 mg/dl). There was no medical history of diarrhea, nausea/vomiting, bleeding, reduced fluid intake, exposure to iodinated contrast, use of nonsteroidal anti-inflammatory drugs, antibiotics or any other nephrotoxic medications. Over the next six days, his renal function exponentially deteriorated reaching a serum creatinine of 3.57 mg/dl, urea of 181 mg/dl and significant oligoanuria with hypervolemia

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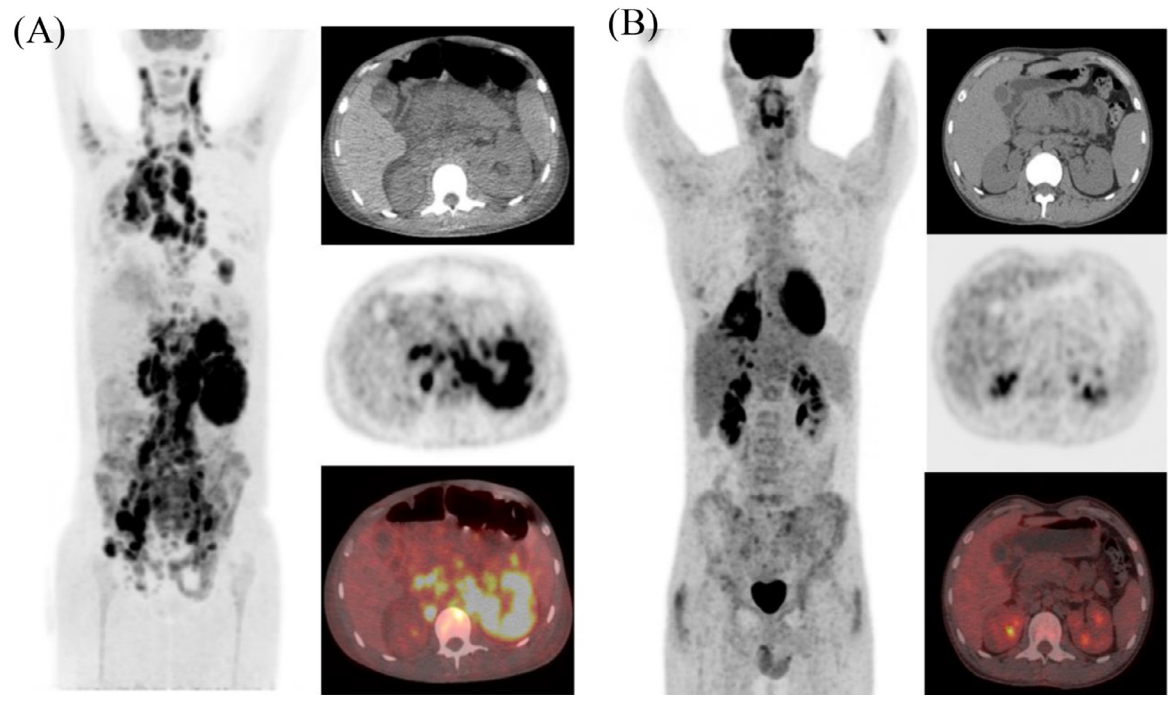

Fig. 1. (A) Staging (at diagnosis) ^{18}FDG-PET/CT demonstrated extensive cervical, thoracic and abdominal lymph nodes, spleen and bone involvement characterized by a high ^{18}FDG uptake. The left renal mass also presented a high diffusely increased ^{18}FDG uptake suggesting renal lymphoma involvement. (B) Post-treatment ^{18}FDG-PET/CT demonstrating remission of previous lesions and a symmetrical ^{18}FDG uptake by the kidneys. Late images showed reduction of both renal uptakes, suggesting physiological urinary clearance of the radiotracer.

signs. Urinalysis showed hematuria (9 red blood cells per high power field) and no leukocyturia. Proteinuria was 0.7 g in a 24 h urine exam, without any monoclonal component by electrophoresis. Serum total protein and albumin/globulin ratio were also normal. All the following blood exams resulted negative: Antinuclear Factor (ANF), serologic tests for HIV, hepatitis B and C as well as VDRL. Potassium, phosphorus and ionized calcium were 4.7 mEq/L, 5.2 mg/dl and 5.0 mg/dl, respectively. A non-contrast CT-scan of the abdomen was done and showed a large mass of 14.2 × 3.7 × 4.5 cm involving the left kidney and the para-aortic node chain; the right kidney measured 11.8 × 5.8 × 5.2 cm. There were no signs of hydronephrosis by both CT and renal ultrasound. ^{18}F-FDG PET/CT demonstrated highly diffuse increased ^{18}F-FDG uptake of the left renal mass (Fig. 1A). Pleural thickening with increased ^{18}F-FDG uptake was also demonstrated and is possibly related to the thoracic duct obstruction due to HL (Fig. 1A).

After consultation with a nephrologist, it was decided to start the patient on hemodialysis and a left renal percutaneous core biopsy was performed, showing the destruction of the renal histoarchitecture due to marked infiltration of the interstitium by lymphohistiocitic cells and scattered atypical cells with lobulated nuclei. Some glomeruli were enlarged with endothelial swelling, mesangiolysis besides hypercongestive pattern. There were also lymphoepithelial damage and coagulative necrotic tubules with obliteration of the lumens by cellular debris. Some arteries showed intimal lymphohistiocitic infiltration narrowing the lumens. Immunohistochemical stains were performed and resulted positive to CD30 and CD15, but negative to adenovirus on atypical cells, consistent with HL infiltrating the kidney parenchyma (Fig. 2). After this procedure, he received ABVD (doxorubicin, bleomycin, vinblastine and dacarbazine) regimen, with adjustment for renal impairment (50% of bleomycin and 70% of dacarbazine). After six days of the beginning of chemotherapy and after four dialysis sessions, the diuresis increased again and his renal function markers started to decrease with no need for further dialysis. After two weeks of treatment, the patient had total recovery of renal function reaching a creatinine of 0.87 mg/dl. After two cycles of chemotherapy, a new ^{18}F-FDG PET/CT showed regression of the renal left mass with symmetrical ^{18}F-FDG uptake by the kidneys and both measured normal at CT-scan (Fig. 1B). Renal function remained stable during follow-up, with a complete remission status being achieved after six cycles of ABVD.

3. Discussion

Acute kidney injury is a serious complication of malignancy occurring in 12–49% of critically ill cancer patients [7]. Concerning to hematologic malignancies, renal failure is commonly attributed to dehydration, hypercalcemia, ureteral obstruction, renal vascular compromise, paraproteinemia, glomerulonephritis and therapy-related side effects such as tumor lysis syndrome [8]. In this case, all these possibilities were carefully excluded. PET-SCAN uptake and kidney histology were compatible with renal infiltration. The prompt resolution of kidney dysfunction after chemotherapy corroborates that lymphoma infiltration was the cause of kidney dysfunction. The fact that the PET-SCAN did not demonstrated uptake of right kidney does not exclude that lymphoma infiltration was not present due sensitivity limitations to detect focal or small abnormalities in the scans [9]. In addition to the limited sensitivity of PET-SCAN to detect small infiltration foci because of intrinsic spatial resolution constraints, another possible cause is that the reduced bioavailability of radiopharmaceutical due to the high uptake of other foci may also impair the ability to diagnose microscopical infiltration by HL.

LIK was found in 33.5% of the autopsies performed by Richmond et al. in 690 patients with malignant lymphoma [10]. When it comes to patients with LIK and NHL, the incidence varies from 46% to 49%. However, in patients with Hodgkin disease, the incidence of renal parenchymal involvement seen in autopsies was as low as 13%. Only 14% of the cases of LIK were recognized antemortem and were associated with widely disseminated disease [10]. Our case also had a widespread disease (spleen, bone and renal involvement). Normally, patients are asymptomatic and renal infiltration is discovered on staging radiography or at autopsy while severe kidney dysfunction

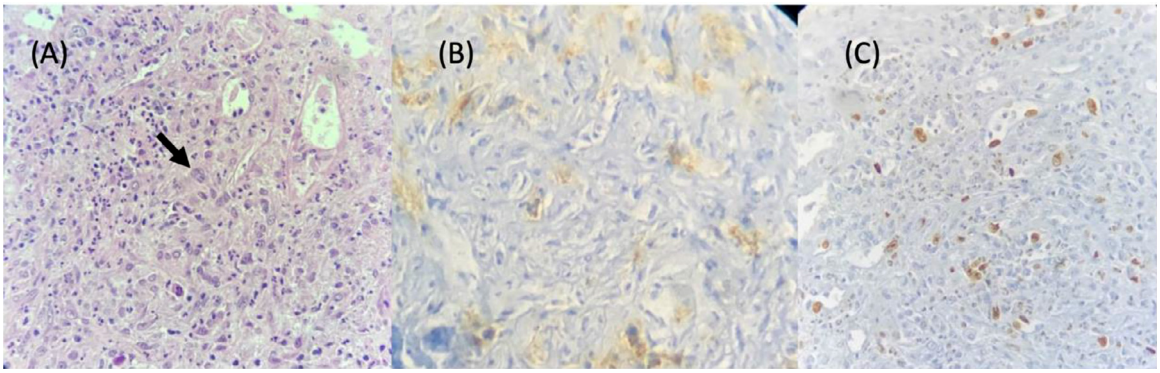

Fig. 2. Histopathology of kidneys – (A) Lymphoid infiltrate consisting of large and small cells with associated fibrosis and scattered Reed-Sternberg cells (arrow). Immunostaining for CD30 (B) and Ki-67 (high-index) (C), respectively.

secondary to diffuse LIK is distinctly uncommon [8]. McLaren and Papac reported, in a series of 117 patients, kidney involvement in only one (not biopsy proven) [11]. In literature, there are few reports of symptomatic kidney involvement in HL and most of them lack pathologic description. In our case, there was severe renal impairment and dialysis requirement. The possible explanation for kidney dysfunction is an elevated pressure in renal parenchyma caused by lymphocytic infiltration leading to compression of tubules and modifications in microvascular structure [4–6]. Another hypothesis suggests that cytokines produced by lymphoma cells may cause tubular injury and interstitial fibrosis [12].

To the best of our knowledge, there is only one case report of renal failure by lymphomatous infiltration in a patient with Hodgkin´s lymphoma. Kayataş et al. reported a case of a 22-year-old male patient with nodular sclerosing-type classic HL and acute kidney injury caused by concurrent membranous glomerulonephritis and interstitial CD20 positive lymphoid infiltration [5]. In our case, there was no evidence of glomerular involvement in optical microscopy and the immunofluorescence was negative for IgA, IgG, IgM, C3 and C1q. Analysis by electronic microscopy was not performed because glomeruli were severely infiltrated by lymphomatous tissue as well as the tubule compartment resulting in a significant distortion of their architecture.

According to literature, kidney failure due to LIK typically improves after specific treatment for lymphoma – however, full recovery of kidney´s function is infrequent [6]. Our patient had an outstanding renal recovery with chemotherapy. It seems that the promptness in providing specific treatment was crucial to allow the kidney function recovery.

In conclusion, although rare, LIK may occur in HL and should be included in the differential diagnosis of kidney function impairment in these patients. PET scan is a useful tool to quickly evaluate this possibility, even though kidney biopsy still might be necessary to confirm the involvement. Prompt evaluation and early treatment seem to be essential for renal recovery and avoiding long-term sequelae in kidney function.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.lrr.2018.07.003.

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