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CASE REPORT

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# A 64-year-old male with primary diffuse renal large B-cell non-Hodgkin lymphoma: A rare case report

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## Key Clinical Message

In the context of lymphoma, it is of paramount importance to perform subsequent Positron Emission Tomography-Computed Tomography (PET-CT) scans to ensure the comprehensive eradication of neoplasms.

## Abstract

Primary renal diffuse tumors constitute less than 1% of all renal neoplasms. Among these, diffuse renal large B-cell lymphoma is an exceedingly rare extranodal lymphoma. A 64-year-old male presented to the Department of Urology with complaints of persistent left flank discomfort for a duration of 2 weeks. Additionally, he reported generalized weakness, fatigue, and symptoms indicative of lower urinary tract obstruction, such as discomfort in the left testicle and dysuria. Ultrasound imaging revealed an echogenic structure with thickened, reactive walls and a turbid fluid core, located in the left flank, proximal to the lower pole of the kidney. This structure was subsequently identified as diffuse renal large B-cell lymphoma. For the diagnosis of large B-cell lymphomas, it is imperative that a proficient hematopathologist performs a comprehensive examination of the tumor tissue, preferably utilizing an excisional biopsy. The categorization of lymphoma requires specialized tests such as immunohistochemistry, flow cytometry, fluorescence in situ hybridization (FISH), and molecular testing. In instances where a renal mass is detected, healthcare professionals should consider performing a biopsy. In lymphoma cases, follow-up Positron Emission Tomography-Computed Tomography (PET-CT) scans are crucial to confirm the complete eradication of the tumor.

**KEYWORDS**

diffuse large B-cell non-Hodgkin lymphoma, kidney, PET-CT, primary renal lymphoma, renal carcinoma, renal mass

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## 1 | INTRODUCTION

Renal involvement in lymphoma is typically associated with secondary renal lymphoma, also known as disseminated regional or extranodal lymphoma. Primary renal lymphoma (PRL) is a rare occurrence. PRL is distinguished by its exclusive impact on the kidneys without manifesting symptoms elsewhere.[1] Primary renal diffuse large B-cell lymphoma, an extraordinarily rare extranodal lymphoma, is estimated to constitute less than 1% of all renal malignancies. It is an aggressive neoplasm with distinct pathological and clinical features.

These tumors typically present as single nodules (10%–20%), multiple nodules (60%), contiguous retroperitoneal lesions with renal involvement (25%–30%), and perirenal involvement (10%). The kidney, being an extranodal organ, is devoid of lymph nodes.[1] It serves as the primary site of renal lymphoma. Various studies have identified risk factors for PRL, which include immunosuppressive drug use in transplant recipients and exposure to chemicals such as dyes and pesticides.[1] Pathologically, B-cell lymphoma is the most common type.[1]

In addition to specific symptoms of renal non-Hodgkin lymphoma such as fever, fatigue, anorexia, and night sweats, flank discomfort and an abdominal mass are frequently reported.[2]

The diagnosis of PRL and other renal tumors can pose challenges due to their shared significant characteristics. For PRL, the standard treatment approaches typically involve radiation or partial nephrectomy.[3–5]

Despite the aggressive nature of PRLs, they show a favorable response to rituximab when combined with vincristine, cyclophosphamide, doxorubicin, and prednisone (R-CHOP).[4,5]

In this case, we present a 64-year-old male patient, who experienced persistent left flank discomfort, generalized weakness, obstructive lower urinary tract symptoms, and urinary dysuria over a 2-week period, only to be later diagnosed with diffuse large B-cell non-Hodgkin lymphoma.

## 2 | PRESENTATION OF CASE

### 2.1 | Case history

A 64-year-old male patient, exhibiting symptoms indicative of lower urinary tract obstruction such as dysuria and discomfort in the left testicle, in addition to a general feeling of fatigue and weakness, was admitted to the Department of Urology. The patient had been experiencing unrelenting pain in the left flank region for a fortnight. Upon conducting a physical examination, a palpable mass was identified. The patient's medical history was significant for sinus tachycardia, hypertension, hemorrhoids, and diabetes mellitus. He had been prescribed Tamsulosin to manage these symptoms.

### 2.2 | Differential diagnosis, investigations, and treatment

The laboratory test results indicated that the complete blood count (CBC) was within normal limits, with a notable increase in monocyte levels to 11.6% (normal range: 3%–8%). Additional tests revealed the following: HbA1c at 6.9%, estimated average glucose (eAG) at 151 mg/dL, quantitative C-reactive protein (CRP) at 10 mg/L (normal <6), and fasting glucose at 113 mg/dL (normal range: 70–100). Urinalysis showed all parameters within normal ranges, except for the presence of mucus. Creatinine and urea levels were also normal.

Ultrasound imaging identified an echogenic structure with thick, reactive walls and a murky fluid core, located in the left flank near the lower pole of the kidney. A computed tomography (CT) scan of the left kidney revealed a heterogeneous mass measuring 9×12 cm with indistinct edges, containing multiple retroperitoneal nodes ranging from 10 to 25 mm. The mass appeared to penetrate the fat of Gerota's fascia. Multi-slice CT confirmed a large mass with ill-defined boundaries and varied density, suggesting potential penetration into Gerota's fascia (Figure 1A,B). The tumor had spread to the lymph nodes, perinodal tissue, and kidney. CT scans of the chest and neck were normal, and a bone marrow biopsy was performed and it was normal.

The CT findings were highly suggestive of renal cell carcinoma, which is the most common diagnosis; however, a kidney biopsy revealed the mass to be lymphoma. Cerebrospinal fluid aspiration was performed and its findings were within the normal ranges. Lactate dehydrogenase (LDH) levels were normal, and HIV tests were negative.

The patient is scheduled for a radical nephrectomy with curettage of all periaortic nodes, followed by chemotherapy. Hematoxylin and eosin staining of the kidney biopsy showed neoplastic proliferation of immature lymphocytes with abundant cytoplasm and large nuclei with occasional prominent nucleoli, along with some mitotic figures, suggesting high-grade Non-Hodgkin lymphoma (Figure 2). The surgical resection margins were clear. Immunohistochemistry (IHC) revealed diffuse positivity for the CD20 marker in proliferative cells, while the CD3 marker was negative, indicating Diffuse Large B-Cell Non-Hodgkin Lymphoma (Figure 3).

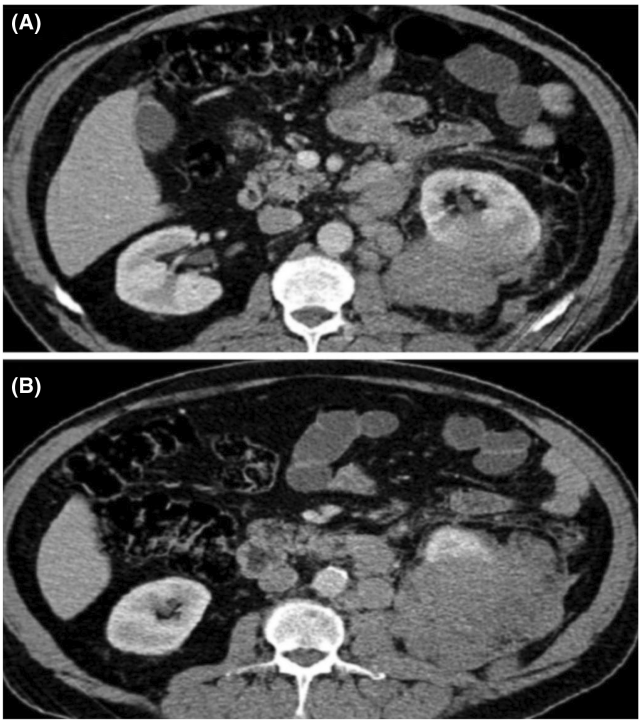


**FIGURE 1** (A) A computed tomography (CT) scan of the left kidney revealed a (9 × 12) cm heterogeneous mass with blurred borders, infiltrating the renal housing, along with numerous retroperitoneal nodes measuring 110-25mm. (B) Subsequent multi-slice CT illustrated a large mass with ill-defined borders and heterogeneous density, indicative of potential infiltration within the fat in Girotin's capsule.

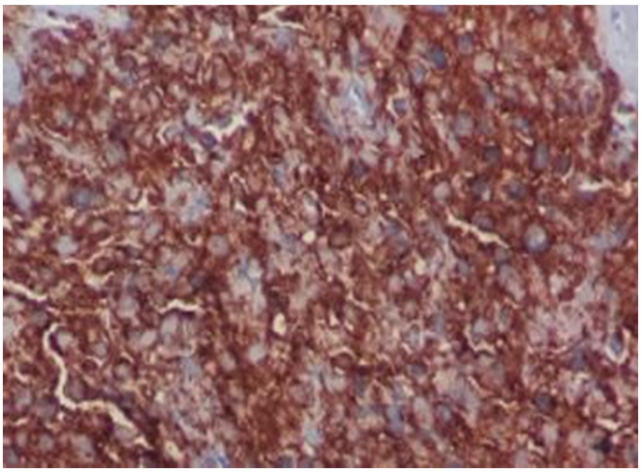

**FIGURE 3** Immunohistochemical staining showing high CD 20 positivity.

Post-surgery, the patient underwent chemotherapy, which included Rituximab (375 mg/m$^2$ intravenously [IV] on Day 1), Doxorubicin (50 mg/m$^2$ IV on Day 1), Vincristine (1.4 mg/m$^2$ IV on Day 1), Cyclophosphamide (750 mg/m$^2$ IV on Day 1), and Prednisone (100 mg orally daily on Days 1–5), administered in six cycles.

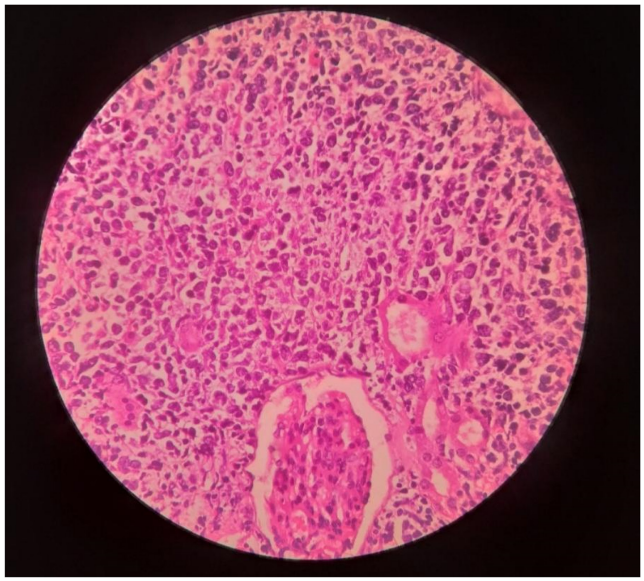

**FIGURE 2** A biopsy confirmed diffuse large B-cell non-Hodgkin lymphoma involving the kidney, adjacent aortic lymph nodes, and the surrounding tissue (H&E, ×20 magnification).

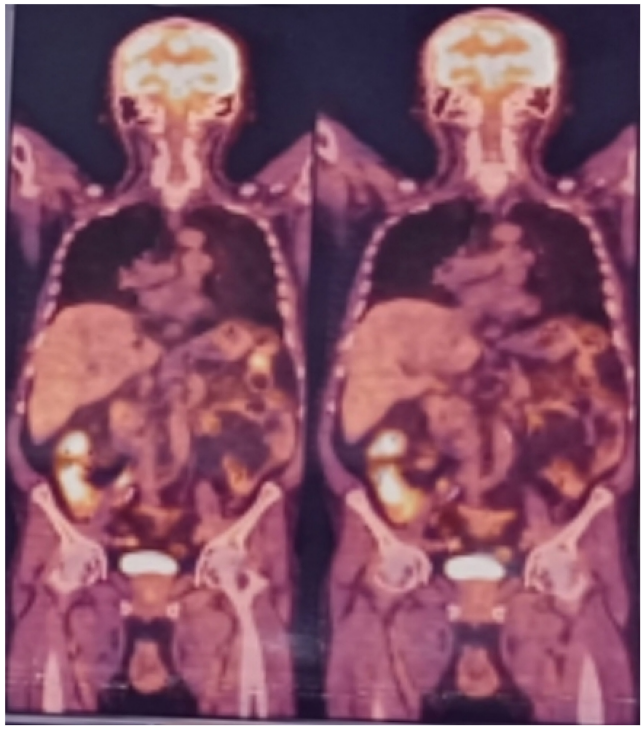

**FIGURE 4** No pathological nodal or visceral metabolic activity on a PET-CT multislice.

### 2.2.1 | OUTCOME AND FOLLOW-UP

Upon a 2-year follow-up evaluation, a Positron Emission Tomography-Computed Tomography (PET-CT) scan was conducted. The result indicated that all parameters were

within the normal range, with no detectable anomalies (Figure 4).

## 3 | DISCUSSION

The kidneys are the most common abdominal organ affected by lymphoma, but PRL is rare (<1%), and less than 70 cases have been reported in the literature so far.[4–10]

Lymphoma is characterized as a malignancy originating from lymphocytes, also referred to as natural killer (NK) cells, which undergo maturation at distinct stages. This condition can be segregated into two categories: Hodgkin and non-Hodgkin lymphoma (NHL), with the latter accounting for approximately 80% of all lymphoma cases. B cells, due to their functional versatility, possess the ability to diverge into various pathways.[10]

In the United States, the annual incidence rate of non-Hodgkin lymphoma is approximately 7 per 100,000 individuals. Diffuse Large B-Cell Lymphoma (DLBCL) constitutes about 25% of all non-Hodgkin lymphoma cases on a global scale.[4]

The prevalence of the disease is notably higher in individuals of Caucasian descent, followed by those of African American and Asian ethnicities. It exhibits a male predominance and a median onset age of 64 years. The overall incidence of the disease escalates significantly in individuals aged 75 years and older. Diffuse Large B-Cell Lymphoma (DLBCL) commonly affects individuals in their mid-sixties, with approximately 30% of DLBCL cases stemming from a low-grade B-cell lymphoma, irrespective of the patient's prior lymphoma history. Epidemiological research proposes that the etiology of DLBCL is multifactorial, involving a complex interplay of genetic, clinical, and immunological factors, as well as potential viral, environmental, or occupational exposures.[5]

For the diagnosis of large B-cell lymphomas, it is imperative that a proficient hematopathologist conducts a comprehensive examination of the tumor tissue, preferably utilizing an excisional biopsy. The categorization of lymphoma necessitates specialized tests such as IHC, flow cytometry, fluorescence in situ hybridization (FISH), and molecular testing. Specimens obtained from fine-needle aspiration biopsy are typically not suitable for pathological evaluation. Core biopsy specimens, while generally insufficient for an exhaustive examination, should only be employed when an excisional biopsy is not feasible.[6]

In the context of our patient, a renal function test was performed, revealing an elevated level of Blood Urea Nitrogen (BUN). Symptoms presented included increased creatinine levels, bilateral ureteral obstruction, and numerous lymph nodes in the retroperitoneum. Consequently, a biopsy was conducted. Gross examination of the surgical kidney, measuring 28 cm, revealed a large tumor mass of 18 cm at its greatest dimension, exhibiting a gray coloration. Multiple lymph nodes were identified, with the largest measuring 6 cm in length. Several areas, including the surgical resection margins, were sampled. Microscopic examination of sections from the renal masses and lymph nodes revealed immature cells with abundant cytoplasm, large nuclei, occasional prominent nucleoli, and mitotic figures. The surgical resection exhibited no designated boundaries. Immunostaining was deemed necessary for the final diagnosis.

Furthermore, a kidney along with renal hilar and surrounding aortic lymph nodes were observed; upon resection, a diagnosis of diffuse large B-cell non-Hodgkin lymphoma was established. This neoplasm encompassed renal tissue, perineal tissue, and lymph nodes. The differential diagnoses included conditions such as infectious mononucleosis, Hodgkin lymphoma, T-cell lymphomas, and other large cell malignancies such as carcinomas, melanoma, and Kikuchi disease. Although melanomas can also involve lymph nodes, they can be differentiated from DLBCL by positive staining for markers like S100, Human Melanoma Black-45 (HMB-45), and Melan A.[7]

The initial presentation of DLBCL typically involves a rapidly enlarging, painless mass in the neck, groin, or abdomen, which is usually indicative of lymph node enlargement. Additional symptoms may include fever, weight loss, intense night sweats, among others.[8]

In the case of our patient, the presenting symptoms included hematuria, elevated serum creatinine, a palpable abdominal mass, fever, night sweats, and discomfort in the flank region.

The global trend towards utilizing multidisciplinary teams (MDTs) in managing complex medical conditions is gaining momentum. Empirical studies suggest that MDTs confer benefits to both patients and healthcare practitioners. Our MDTs serve as an effective platform for collaborative group discussions, facilitating the management of intricate issues and formulation of strategic decisions. The establishment of MDTs yields multiple advantages for patients.[9]

In terms of treatment for primary diffuse large B-cell lymphoma, the usual course involves a radical nephrectomy followed by systemic chemotherapy. Evidence from various studies suggests that multi-agent chemotherapy is often required to treat high-grade lymphoma prior to surgical intervention. The combination of Rituximab, Cyclophosphamide, Doxorubicin, Vincristine, and Prednisone, collectively known as R-CHOP, has been examined in preclinical models.

Many patients experience enhanced comfort levels following eight cycles of conventional treatment, as

indicated by multiple studies. Combination and intensive therapy strategies, such as chemotherapy succeeded by radiation therapy, may potentially extend the lifespan of patients diagnosed with PRL.[10,11] Those who do not receive regular cycles of chemotherapy and/or radiation therapy may face significant challenges, potentially leading to reduced life expectancy prior to the onset of the disease.[12] In this particular case, the patient underwent chemotherapy, a comprehensive periaortic lymphadenectomy, and a radical nephrectomy as part of the surgical treatment plan.

Chemotherapy, in conjunction with surgery, can serve as an effective therapeutic intervention and plays a pivotal role in combined treatment strategies. As per existing literature, the R-CHOP regimen, which integrates rituximab with high-dose chemotherapy, may potentially enhance progression-free survival. Furthermore, the combination of hematopoietic stem cell transplantation and chemotherapy may improve prognosis and reduce the likelihood of recurrence.[9]

The administration of CHOP constitutes a crucial component of the patient's MDT management following surgery.[9,10] A year-long follow-up utilizing PET-CT multislice imaging revealed no abnormal nodal or visceral metabolic activity.

## 4 | CONCLUSION

In conclusion, this case report presented a rare instance of a 64-year-old male patient diagnosed with Primary diffuse renal large B-cell non-Hodgkin lymphoma. This case underscores the complexity and rarity of such a diagnosis, particularly considering the initial presentation and symptoms were suggestive of a more common renal cell carcinoma. The diagnostic journey, involving a range of imaging and laboratory tests, as well as the patient's response to a tailored treatment plan, further highlights the importance of comprehensive evaluation and personalized care in managing such rare cases. This case report contributes to the limited body of literature on Primary diffuse renal large B-cell non-Hodgkin lymphoma, and it is hoped that it will aid clinicians in future diagnosis and management of this rare condition.

### AUTHOR CONTRIBUTIONS

**Hasan Haydar:** Writing – review and editing. **Mouhammed Sleiay:** Writing – review and editing. **Hadi Alabdullah:** Writing – review and editing. **Rouba Al-alloush:** Writing – review and editing. **Nour Al_alloush:** Writing – review and editing. **Mohamad Yasin Lutfi:** Writing – review and editing. **Simon Youssef:** Writing – review and editing. **Suaad Hamsho:** Writing – review and editing.

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### CONFLICT OF INTEREST STATEMENT

No conflict of interest.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

### ETHICS APPROVAL

Not applicable.

### CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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