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CASE REPORT

Bilateral Renal Lymphangiectasia Resulting in Flank Pain, Acute Kidney Injury, and Page Kidney: A Case Report

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Abstract

A 22-year-old male presented with flank pain, hypertension, and acute kidney injury (AKI). Initial investigations revealed bilateral perinephric fluid collections with mass effect on the underlying renal cortices, suggestive of page kidney phenomenon. While initially suspected to be due to hematomas or urinomas, subsequent aspiration of the collections revealing serous fluid and retrograde pyelograms showing no extravasation of urine suggested a lymphatic etiology. The patient continued to experience bilateral flank pain and decreased kidney function despite conservative treatment. The patient underwent successful robotic bilateral capsulotomy, resulting in improved renal function and reduction of pain. This case highlights the importance of considering lymphatic anomalies in the differential diagnosis of perirenal fluid collections and the use of robotic-assisted laparoscopic bilateral capsulotomy as an effective surgical intervention when conservative measures are insufficient.

Keywords: Renal Lymphangiectasia, Robotic Capsulotomy, Page Kidney.

1. Introduction

Renal lymphangiectasia (RL) is a rare benign condition characterized by ectasia of perirenal, peripelvic, and intrarenal lymphatic vessels.[1] The condition has been referred to in the literature by various names including renal lymphangiomatosis and renal lymphangioma; clinical presentation ranges from incidental imaging findings to symptomatic disease with flank or abdominal pain, palpable mass, hematuria, and occasionally renal injury or elevated blood pressure from compressive effects.[1-3] Most reported cases are managed conservatively. Asymptomatic patients usually receive observation, while percutaneous aspiration is used for symptomatic collections. Laparoscopic ablation or nephrectomy is typically reserved for complicated or recurrent disease.[1,2] Bilateral symptomatic renal lymphangiectasia is less commonly reported than unilateral disease, although bilateral cases have been described in case series.[1,2]

In this case report, we describe a rare presentation of bilateral renal lymphangiectasia manifesting with flank pain, hypertension, and acute kidney injury (AKI) in a previously healthy young adult. To our knowledge, this case represents one of the few, if not only, documented instances where robotic-assisted laparoscopic capsulotomy was successfully utilized in a non-transplant setting for definitive management. Moreover, this case highlights possible diagnostic challenges as the patient's perinephric fluid collections were initially thought to be hematomas or urinomas while underscoring the importance of considering lymphatic anomalies in the differential diagnosis for perirenal fluid collections.

2. Case Presentation

A 22-year-old male presented to the ER with left flank pain, hypertension (blood pressure at presentation was 168/98), and acute kidney injury (creatinine on

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admission was 1.89 mg/dL compared to a baseline creatinine of 1.39 mg/dL two weeks prior). Left costovertebral angle (CVA) tenderness was present on physical examination. Urinalysis revealed no protein in the urine, and serum albumin was within normal limits at 3.8 g/dL, ruling out nephrotic syndrome. A non-contrast computed tomography (CT) of the abdomen and pelvis revealed bilateral perinephric fluid collections which were read by the radiologist as subcapsular hematomas with mass effect on the underlying renal cortices. These perinephric fluid collections in the context of the patient's hypertension and AKI were suggestive of Page kidney phenomenon.

Two days after admission, magnetic resonance imaging (MRI) showed enlarging perinephric collections, but renal function remained stable. While the initial CT imaging interpretations were suggestive of hematomas, this more recent MRI noted that the fluid was simple appearing, being uniformly T1 hypo-/T2 hyperintense, making it unclear whether these collections represented true hematomas or fluid of a different origin. The patient was managed conservatively with reno-protective measures and serial monitoring of hemoglobin, renal function, and blood pressure. Four days after admission, lack of clinical improvement and increasing pain prompted percutaneous aspiration with interventional radiology (IR) service. Approximately 200 cc of fluid was drained from each side, which was largely serous and mildly blood-tinged, and not consistent with hematoma. The patient's serum creatinine improved following the procedure, decreasing from 1.89 mg/dL to 1.63 mg/dL. Blood pressure also improved, going from 180s/90s to 130s/70s. The patient was discharged the day after the IR procedure to follow up with nephrology and urology as an outpatient.

Later that evening, the patient re-presented with recurrence of bilateral flank pain, new onset fever, and shortness of breath. His serum creatinine was again elevated to 1.82 mg/dL and blood pressure had risen to 172/103. Chest x-ray revealed small pleural effusions and patchy infiltrates, consistent with pulmonary edema. This was managed initially with intermittent diuresis using intravenous furosemide, however his shortness of breath persisted, and blood pressure continued to rise, reaching 213/106. A CT scan showed re-collection and enlargement of bilateral fluid collections. Bilateral perinephric drains were placed by IR under ultrasound guidance, resulting in immediate drainage of 300-400 cc of serosanguinous fluid from each side. Within 24 hours of drain placement, the patient's shortness of breath was improved and blood pressure had reduced to 128/77.

The drained perinephric fluids were sent for creatinine levels, which were elevated compared to serum creatinine levels (6.7 mg/dL and 11.3 mg/dL from the left and right kidney, respectively). This suggested possibility of urinoma, so bilateral retrograde pyelograms were performed. However, no extravasation of urine was noted. Despite the negative study, bilateral ureteral stents and a foley catheter were placed to promote maximal drainage of urine.

The following day, the percutaneous drain output was noted to be decreased. The day after, he underwent a clamp trial of the bilateral drains. Unfortunately, repeat CT imaging following the drain clamping showed re-accumulation of fluid despite the maximal urine drainage with stents in place. This, in addition to the negative retrograde pyelogram, suggested an etiology other than urinoma.

The patient continued to experience bilateral flank pain and decreased kidney function despite the previous measures. The decision was made to proceed with bilateral renal capsulotomy. A transperitoneal robot-assisted laparoscopic approach was undertaken for the procedure. The patient was placed right side up, in a modified flank position. Robotic ports were placed in the right paramedian line, and the peritoneal space was insufflated to 15 mm of pressure. With robotic assistance, the enlarged kidney was visualized, and the capsule was incised with immediate drainage of approximately 300 cc of serous fluid. A 4 cm section of renal capsule was excised and sent for pathology. The percutaneous drain was removed at this time. identical procedure undertaken on the left side as well, with similar findings. A Jackson-Pratt (JP) drain was placed in the peritoneum. Surgical time was 2 hours, 16 minutes and estimated blood loss was 50 cc.

The pathology report for the excised left renal capsule revealed fibroadipose tissue with foci of acute and chronic inflammation as well as reactive changes, while the excised right renal capsule showed only non-diagnostic cauterized fibrous tissue. Both specimens were negative for malignancy.

The foley catheter was removed on post-operative day 1. JP drain output was minimal post- op and removed on POD2. By post-operative day 3, the patient's creatinine had decreased to patient's baseline - 1.13 mg/dL, blood pressure remained improved at 138/77, his surgical pain was well controlled so he was discharged home. His ureteral stents were removed one week later at his follow-up appointment with

urology during which he expressed that he had been doing well post-operatively.

3. Discussion

Renal lymphangiectasia (RL) is a rare condition where the kidney's lymphatic channels become abnormally dilated. Despite the many names used in older reports such as renal lymphangioma, renal lymphangiomatosis, and renal peripelvic multicystic lymphangiectasia, the preferred modern term is "renal lymphangiectasia" since it best describes the appearance and underlying process rather than suggesting a tumor.[4] Most patients have only one kidney affected, and many cases are discovered incidentally and managed conservatively. Nephrectomy is typically discouraged, since removal of one kidney may lead to progression of cystic lymphatic dilation in the remaining kidney, particularly in asymmetrical bilateral disease. [12]

When renal function is preserved and symptoms are mild, conservative management is generally recommended with intervention reserved for complicated or recurrent cases. In a case series of five adult patients, Umapathy et al.[2] reported two bilateral and three unilateral cases of RL, all of which were successfully managed non-operatively with imaging surveillance and symptomatic treatment, while percutaneous aspiration was used selectively for symptomatic relief. In a case report by Rajasekaran et al.,[1] a 4-year-old boy had bilateral RL, with a large cystic mass encasing the left kidney. Due to the extent of involvement, a left nephroureterectomy was performed, and the diagnosis was confirmed on histopathological examination post op. Similarly, in a case described by Kaushal Kumar et al., [5] a 32-year-old woman with bilateral RL and hypertension was successfully managed with conservative therapy including ACE inhibitors and NSAIDs, without requiring surgical intervention.

Our case differs in that a previously healthy young adult presented with symptomatic bilateral RL complicated by Page kidney. Page kidney refers to high blood pressure caused by extrinsic pressure on the kidney, mediated by increased renin release.[6] This is classically due to a subcapsular hematoma, however, Page kidney can develop secondary to any mass or subcapsular fluid collection that compresses the renal parenchyma.[7] Renal subcapsular collections can be caused by a variety of fluid sources including hemorrhage, pus, effusion, urine, or lymphatic fluid. In our review, hematoma or hemorrhage is the most commonly reported cause, while non-hemorrhagic etiologies include renal abscess, neoplasm, urinoma, pancreatic cysts or pseudocysts, nephrotic syndromes, and RL. Table 1 highlights reported clinical findings for different reported causes of spontaneous renal subcapsular fluid collections:

Table 1. *Causes of subcapsular fluid collections and their distinguishing clinical findings*

Cause of Subcapsular Fluid Collections	Distinguishing Findings
Hematoma	History of trauma, recent renal surgery,[8] or underlying malignancy.[9] Possible drop in hemoglobin,[10] bloody drainage fluid[11]
Renal Abscess	Positive blood or urine cultures[12,13]
Neoplasm	Renal masses seen on CT[14,15]
Pancreatic cyst/pseudocyst	Pancreatic cyst or pseudocyst visible on CT, elevated amylase or lipase[16-20]
Nephrotic Syndrome	Proteinuria, hypoalbuminemia[21-25]
Urinoma	Renal trauma or genitourinary obstruction, fluid with elevated creatinine.[26] Symptoms relieved with stent placement[27]
Lymphangiectasia	Clear drainage fluid, presence of cysts,[28] fluid with high lymphocytes, protein, and triglycerides[29]

Schwarz et al. [30] demonstrated that bilateral pararenal lymphatic cysts can cause Page kidney, with hypertension resolving following marsupialization. This supports that lymphatic fluid accumulation can cause Page kidney physiology, even in the absence of hemorrhage, and that surgery can resolve symptoms. Surgical marsupialization has been used when intervention for RL is necessary. Marsupialization involves opening the cyst and suturing its wall to an adjacent epithelial surface to establish a permanent drainage pathway.[31,28] Ekici et al. [28] described a patient with bilateral pararenal lymphatic cysts and hypertension. Percutaneous drainage didn't help, but after marsupialization, the pressure and fluid buildup completely resolved. While marsupialization does help redirect fluid drainage, it does not remove the renal capsule so it may not fully relieve pressure in Page kidney.[28] When pressure-related hypertension persists, removing or cutting open the capsule, a procedure called decapsulation or capsulotomy, to directly decompress the kidney may be required.[32]

In our case, we performed robot-assisted bilateral capsulotomy, which allowed us to directly remove the renal capsule and relieve pressure on both kidneys. The utilization of robotic-assisted bilateral capsulotomy to treat RL-induced Page kidney in a native (non-transplant) setting makes our case a unique contribution to the growing spectrum of management strategies for RL, as shown in table 2.

Table 2. *Summary of reported cases with patient characteristics, management, and outcomes.*

Case	Author (Year)	Age/Sex	Laterality	Presentation	Management	Outcome
1	Ekici (2000)	35/M	Bilateral	Abd pain, HTN, recurrent fluid collections	Marsupialization after failed drainage	Complete resolution on follow-up
2	Kaushal Kumar et al. (2015)	32/F	Bilateral	Flank pain, hypertension	Conservative: ACE inhibitors, NSAIDs	Symptom improvement without surgery
3	Pandya (2016)	34/M	Bilateral	Asymptomatic, flank heaviness	Conservative with monitoring	No progression, stable on follow-up
4	Rajasekaran et al. (2022)	4/M	Bilateral	Abdominal distension, fatigue, flank pain	Left nephroureterectomy	Post-op monitoring, right kidney preserved
5	Ricardo Ossio (2024)	67/F	Unilateral (Left)	Incidental finding on imaging	Conservative with urology follow-up	No symptoms, stable on imaging
6	Umapathy et al. (2020)	Adult cohort	2 Bilateral, 3 Unilateral	Flank pain, HTN, ascites, renal vein thrombosis	Conservative only	Symptomatic improvement without surgery
7	Present Case (2025)	22/M	Bilateral	Flank pain, HTN, AKI, Page kidney	Robotic-assisted bilateral capsulotomy	Resolution of symptoms, kidney function preserved

4. Conclusion

This case illustrates a rare instance of bilateral renal lymphangiectasia presenting as Page kidney. Patient failed conservative management requiring robotic bilateral capsulotomy, resulting in normalization of blood pressure and renal function, with resolution of symptoms. This case emphasizes the importance of considering renal lymphangiectasia in the differential diagnosis of unexplained perinephric fluid collections, hypertension, and flank pain, and demonstrates the effectiveness of surgical intervention when conservative measures are insufficient.

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