Case Report: Page Kidney Secondary to Severe Ureterohydronephrosis and Perinephric Urinoma with Rupture of Renal Fornix Secondary to a Rare Complication of Ureteral Calculi

Jerne Kaz Niels B. Paber, MD* and Michael U. Abutazil, MD**

ABSTRACT

Obstructive uropathy is a common complication of renal calculi. In very rare cases, it causes extravasation of urine to the perinephric spaces causing urinoma and in rare occasions causes elevated blood pressure due to the derangement of the renin-angiotensin system in the kidney. The imaging used is CT urogram in the detection of the obstruction. Here we present a case of 21-year-old male with a rare case of ureteral calculi causing severe hydronephrosis and a rare complication of perinephric urinoma from a ruptured fornix and eventually developing a rare cause of secondary hypertension called page kidney. The extent of obstruction and the characteristic appearance and the possible imaging characteristics of Page kidney can be seen through contrast CT urogram.

Key words: Page Kidney, severe hydronephrosis, urinoma, ureteral calculi

INTRODUCTION

Urinoma is generally associated with non-obstructive causes most of the time due to trauma to the kidney or the collecting system. The cause is mostly iatrogenic following surgery, may it be genitourinary, retroperitoneal, pelvic or gynecologic. Obstructive causes with perforation or rupture from an impacted urinary calculus is a rare condition. Renal urine leaks mat result transmitted back pressure caused by obstruction causing the rupture in the renal fornix. This may lead to a phenomenon resulting from external compression of the kidney leading to a rare, but treatable cause of secondary hypertension that is mediated by activation of the renin-angiotensin-aldosterone system called page kidney. There is no current algorithm for adults for the treatment of spontaneous urinoma and the development of page kidney due to its' isolated case. The current recommendation is drainage of the obstruction either by tube drainage by nephrostomy or by stent placement for urine drainage. By relieving the obstruction, it solves both the hydronephrosis, the urinoma and the page kidney.

CASE REPORT
A 21-year-old, male, came with a chief complaint of left flank pain which started 8 days prior to admission sudden in onset, gnawing-ripping in description, with gradual progression in intensity and radiation to the back. The pain was aggravated by movement from lying to sitting position and upon standing and ambulation. Relief was seen when immobile and lying down. The patient took paracetamol with temporary relief of symptoms. Pain scale was 8/10. Two days prior, there was associated febrile episodes until the time of admission. There was no history of trauma. Past medical history was unremarkable. He denied illicit drug use, no previous unprotected sexual contact. He is an occasional alcoholic drinker and a 4 pack-year smoker. Family history was unremarkable.

Assessment
On examination, his vitals were unremarkable except for slight tachycardia at 108 bpm and blood pressure was normotensive at this time. The patient had no altered sensorium. The ENT findings were normal. No limb movement abnormalities were noted. The cardiovascular system and pulmonary was normal. The abdomen was flat and liver was not enlarged. Tenderness was present on the left flank area and costovertebral angle tenderness was present. There was a palpable mass on the left Flank Area with smooth borders and movable. Ultrasonography revealed Nephromegaly on the left (16.3x8.8x9.3x2.3 cm) with cystic consistency. The clinical suspicion was complicated urinary tract infection probably a renal abscess. During hospital stay, the patient was noted to have an elevated blood pressure of 140-150 systolic blood pressure and 90-100 diastolic blood pressure.

Laboratory Workup
The blood investigations revealed a total white cell count of 10,200 cells/mm3 and a hemoglobin of 13.1 g/dL. The random blood glucose was 120 mg/dL, while the serum electrolytes were within the normal range. Chest X-ray was unremarkable. Urinalysis revealed pyuria and hematuria. The patient was started on third-generation cephalosporin and paracetamol. Nephrology and urology consult were done for evaluation. Urine culture and CT urogram were requested.

Enhanced CT scan revealed severe ureterohypronephrosis left with secondary stricture at the ureterovesiccular junction probably distal ureter secondary to stone passage with perinephric fluid collection secondary to ruptured fornix considering infected urinoma (Figure 1). The right kidney was 12.3 x 4.5 x 4.6 cm parenchymal thickness 2.1 cm and the left kidney 15.2 x 7.3 x 4.9 parenchymal thickness 2.2. There was dilatation in the collecting system down to the distal ureter with large perinephric fluid collection measuring 17 x 6.8 x 8.2 cm (492 ccs). The left parenchyma is compressed anteriorly by this collection with the consideration of page kidney.

**Dates**  
**Relevant past medical history and interventions**

<table>
<thead>
<tr>
<th>Date</th>
<th>Summaries from initial and follow up visits</th>
<th>Diagnostic Testing (including dates)</th>
<th>Interventions</th>
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<tbody>
<tr>
<td>Jan 2017</td>
<td>Left flank Pain</td>
<td>Ultrasonography of the kidney ureter, bladder, urine culture</td>
<td>meds Ceftriaxone 2 gm IV OD Paracetamol 500 mg tab q4 for fever Tramadol 50 mg IV as needed for pain Procedures Left Nephrostomy tube insertion</td>
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<tr>
<td>1st week</td>
<td>Fever</td>
<td></td>
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<td></td>
<td>Palpable Mass Left Flank area</td>
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<td>Elevated of blood pressure</td>
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January 2017  
**Urine Culture:** E. coli and Shifted Ceftriaxone to
Treatment Plan

The goal is to relieve the patient from obstruction and to treat the infection and monitor elevated blood pressure. Infection was controlled with the culture result noting E. coli and sensitive to quinolones. The patient was then scheduled to nephrostomy tube insertion to divert urine production. Percutaneous ultrasound-guided nephrostomy tube drain was placed, an initial output 1000 cc bloody then eventual yellow tinged urine color. TB PCR of the urine was negative and culture of the nephrostomy drain had no growth. Metronidazole 500 mg TID and Ciprofloxacin 500 mg BID was continued for 2 weeks.

Outcomes

The patient was discharged but was noted to have 500-800 cc daily output from the nephrostomy tube. There was also no episode of elevated blood pressure. The patient then underwent ureterocystoscopy with ureteral tailoring and double J stent insertion for urine diversion. Upon follow up of the patient, there was decreasing drainage from the nephrostomy tube and there was a gradual reduction of the hydronephrosis and stent removal was done after 2 months. There was no presence of
urinoma on repeated ultrasonography and no episodes of elevated blood pressure on frequent follow-ups.

DISCUSSION

The initial evaluation of a patient suspected of having a urinoma includes renal ultrasonography, followed by a CT KUB with contrast. Computed tomography is the gold standard as it is able to demonstrate the extent of hydronephrosis, characteristics of urinoma and the possible etiology of renal fornix rupture and extravasation of urine. The kidney, the ureter, and the fascial planes are better seen and compression of these structures is better visualized.

The cause of urinomas can be obstructive and non-obstructive in nature. Trauma or non-obstructive causes are the most common cause of urinoma in patients. Obstructive causes caused by renal calculi is a rare complication for renal fornix rupture leading to urinoma. Other obstructive causes include lymph node enlargement, congenital abnormalities, post-irradiation scarring, and masses.

In one study, obstructive causes with spontaneous perforation of the urinary tract as an impacted urinary calculus is a rare condition that poses diagnostic and therapeutic problems. In cases of non-traumatic calyx rupture, the cause of the obstruction is most often a distal obstructing ureteral stone. The median size of the obstructing stone was only 4 mm. The same study also noted that proximal ureteral obstruction occurred when larger stones were present.

Urine leaks and urinomas are sometimes misdiagnosed as hematomas, abscesses, and cystic masses. The role of the radiologist is the prompt diagnosis of urinoma and the decision to treat either conservatively or surgically.

Urinoma maybe the result of transmitted back pressure caused by obstruction of the genitourinary system due to a ureteral stone or pelvic mass, pregnancy, retroperitoneal fibrosis, posterior urethral valves, or bladder outlet obstruction. The increase in pressure and size of the urinoma may compress the renal parenchyma leading to changes in the renin-angiotensin mechanism causing secondary hypertension.

Large urinomas with continued urine leakage tend to treated by imaging-guided drainage. The drainage of the urinoma has shown to hasten the healing and preservation of renal function. There is no absolute quantity from urinoma drainage that indicates persistent urine leakage although there is an expectation of decreasing output from drainage.

In one case report, persistent leakage from the collecting system, placement of a nephrostomy catheter, usually in combination with placement of a ureteral stent or nephroureterostomy catheter, is warranted. The combined use of a percutaneous drainage catheter with either a nephrostomy catheter or a ureteral stent or with a nephroureteral catheter diverts the urine away from the area of the leak and promotes primary healing of the collecting system.

The relief of obstruction by urine diversion via nephrostomy and stent placement eventually will promote spontaneous healing of the kidney and resolution of page kidney.
CONCLUSION

Imaging plays a key role in diagnosing urinoma and determining their cause and extent as well as visualization of compression of adjacent structures. Imaging-guided interventions play a crucial role in the management of urinoma. Percutaneous diversion via nephrostomy tube insertion and stent placement may divert urine away from the site of the leak is often required to facilitate spontaneous healing within the genitourinary system and treat secondary hypertension. Percutaneous diversion via nephrostomy tube insertion and stent placement may divert urine away from the site of the leak is often required to facilitate spontaneous healing within the genitourinary system and eventually treat Page kidney.

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Ethical Consideration
Patient form was secured before submission of the manuscript.

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REFERENCES


