

Spontaneous rupture of the renal pelvis due to obstruction of pelviureteric junction by renal stone: A case report and review of the literature

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Abstract

Spontaneous rupture of the urinary collecting system with extravasation of the urine is a very rare condition. This situation is commonly associated with an obstructing urinary stone. Herein, we report a case of an 86-year-old patient who has admitted to the emergency service with left flank pain continuing for 7 days and pain has exacerbated in the past 24 h. The patient had nausea, vomiting, and tenderness on the left side of the abdomen and left flank region. The patient was diagnosed with an 8 mm left kidney stone a month ago, and hydration and oral analgesics were recommended to the patient. Spontaneous rupture of the renal pelvis and urinary extravasation were detected by contrast-enhanced computed tomography scan. Double-J ureteral stent was placed to control symptoms and eliminate extravasation. In this paper, diagnosis and treatment options for spontaneous renal pelvis rupture are discussed.

Keywords: Complications, kidney calculi, rupture, spontaneous, urinoma

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Received: 05.02.2017, Accepted: 12.05.2017

INTRODUCTION

Spontaneous rupture of the renal pelvis (SRRP) is an underreported condition in the literature. An obstructing urinary stone is one of the causes for this condition. Infections and tumors may also lead to SRRP by increasing the renal pelvis pressure. Clinical manifestations of SRRP are diverse, yet SRRP generally presents as renal colic. Diagnosis of retroperitoneal urine extravasation by imaging studies suggests SRRP. On the other hand, rupture of the renal parenchyma is a different condition which results in massive blood loss and may lead to an acute abdomen.^[1]

CASE REPORT

An 86-year-old woman was admitted to the emergency department with a 7-day history of continuous left flank pain. She was diagnosed with a left kidney stone a month ago, and conservative management was recommended. At admission, she was complaining of steadily increasing pain over the past 24 h, nausea, and vomiting. On physical examination, tenderness on the left side of the abdomen and left flank region was detected. Laboratory tests revealed a leukocyte count of 14,900 cells/mm³, normal renal function tests, and microscopic hematuria on complete urinalysis.

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How to cite this article: Yanaral F, Ozkan A, Cilesiz NC, Nuhoglu B. Spontaneous rupture of the renal pelvis due to obstruction of pelviureteric junction by renal stone: A case report and review of the literature. Urol Ann 2017;9:293-5.

Access this article online

Quick Response Code:



Website:

www.urologyannals.com

DOI:

10.4103/UA.UA_24_17

An ultrasound revealed fluid collection in the left perirenal space and hydronephrosis in the left kidney. The right kidney was normal. Contrast-enhanced coronal and axial computed tomography (CT) scan revealed left hydronephrosis due to ureteropelvic junction obstruction by an 8 mm stone. Delayed phase CT images showed extravasation of the contrast media from the left renal pelvis [Figure 1a], suggesting rupture of the renal pelvis.

After induction of anesthesia, a double-J (JJ) ureteral stent was placed into the left ureter under fluoroscopic guidance. Postoperatively, her pain decreased and her general condition improved dramatically within a few hours. On the 3rd postoperative day, control CT scan showed the absence of extravasation of contrast media from the renal pelvis and regression in hydronephrosis [Figure 1b]. She was discharged on the 5th postoperative day with no complications. One month after the operation, the patient underwent a single shock wave lithotripsy (SWL) session, and complete stone clearance was achieved. JJ stent was removed two weeks after the SWL. Two weeks after the JJ stent removal, she had no complaints and ultrasound findings were normal.

DISCUSSION

Spontaneous rupture of the urinary collecting system is an underreported condition in the literature. There are several reasons why this condition is underreported. Contrast-enhanced imaging studies are not recommended as the first-line imaging methods for the evaluation of patients with acute flank pain and clinically insignificant ruptures are probably left diagnosed. Laminar fluid collection in perirenal space in patients with renal colic is probably underreported by radiologists, and this

finding is usually not associated with significant clinical consequences.^[2]

SRRP should always be a consideration in the differential diagnosis of complex symptoms after renal colic. The most common cause of SRRP is an obstructing urinary stone. Other causes include extrinsic ureteral compression by malignant or benign tumors, pelviureteric junction obstruction, and vesicoureteric junction obstruction.^[3] Traumatic rupture of the renal pelvis usually occurs at the region of ureteropelvic junction and more often on the right side.^[4]

Clinical presentation is diverse, ranging from mild flank pain, nausea, and vomiting to acute abdomen. Symptoms such as mimicking pyelonephritis, appendicitis, duodenal ulcer, biliary colic, and cholecystitis may be observed.^[5,6] The majority of the cases are primarily referred to ambulatory surgery for diffuse or even peritonitis-like symptoms of the abdomen.

Serial ultrasound evaluations show a high sensitivity for detecting a small amount of fluid extravasation but a low specificity for distinguishing urinoma from hematoma or abscess. Contrast-enhanced CT with nonenhanced images is the most sensitive and specific noninvasive imaging modality.^[7] Retrograde pyelography can also be used in patients whose diagnosis is left uncertain with other imaging methods.^[8]

Quantification of urine extravasation was classified in two grades, mainly based on ultrasound findings. Fluid collection in proximity to the pelvicalyceal system, which is not always dilated, and small amount of perirenal extravasation mainly limited around the lower renal pole is classified as grade 1. Large fluid collection in perinephric area with expansion along the ureter in the retroperitoneum is classified as grade 2.^[9] According to this urine extravasation grading system, our patient can be classified as grade 2.

Color duplex Doppler ultrasonography, in addition to conventional ultrasonography, provides information about the dynamic aspect of hydronephrosis. During the onset of fornix rupture, pulsatility index and resistance index of interlobular renal arteries are decreased.^[9] These findings in addition to that obtained from serial ultrasonography and other imaging modalities enable the physician to have a better understanding of the factors contributing to the dynamics involved in hydronephrosis and the onset of urine extravasation.

Intravenous pyelogram is a very sensitive and specific method to confirm the diagnosis of urine extravasation.

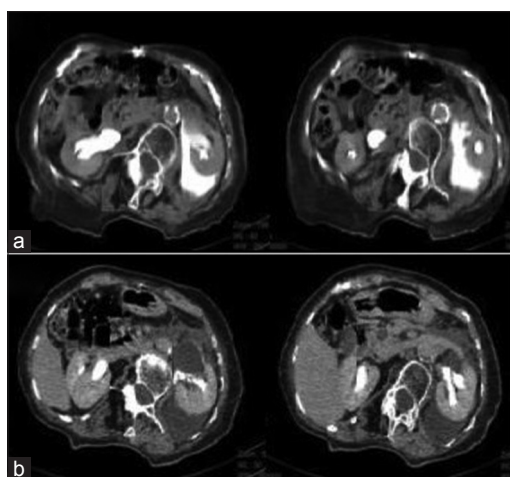


Figure 1: (a) Computed tomography images showing extravasation of contrast from the left renal pelvis. (b) Third postoperative day, no extravasation of contrast from the renal pelvis

However, it is accused of provoking, or at least of increasing, the extravasation from renal pelvis due to the diuretic effect of the contrast media.

The diagnosis of renal fornical rupture is made based on the presence of any one of the following criteria: irregularity of a single renal calyx, loss of the ability to discern renal sinus fat, asymmetrically distributed perinephric stranding, and a discreet perinephric fluid collection.^[3] In our case, delayed phase CT images revealed leakage of the contrast media from the left renal pelvis; therefore, our diagnosis was the rupture of renal pelvis.

The use of contrast media in the evaluation of urine extravasation in the perinephric area could lead to overdiagnosis and overestimation of the extravasation. Kalafatis *et al.* reported that the combination of scout radiography of the abdomen and serial ultrasonography scans of the kidney and retroperitoneum yielded comparable results with no clinically significant misdiagnoses.^[9] Therefore, this method can be used as an alternative when CT resources are limited.

Increased intraluminal pressure as a result of obstruction due to a stone is reflected in the renal pelvis. As a result of the sudden increase in the pressure, the collecting system may rupture and urine may leak into the retroperitoneal space. In acute urinary obstruction, the probability of urinary extravasation is 5%–17%.^[5]

Immediate urinary diversion, endoscopic or percutaneous, is prerequisite for successful treatment while definite stone treatment should be deferred until the rupture is completely healed. In one study, ureteroscopic lithotripsy and JJ stenting of the ureter are presented as an alternative treatment modality for obstructive ureteral stones with urine extravasation.^[9] Small urinomas can be treated conservatively as they are often spontaneously reabsorbed without the need of drainage. Open surgical procedures are seldom required for patients with SRRP due to stone disease and are mostly reserved for patients with an underlying oncologic cause of SRRP requiring amputation surgery.

CONCLUSION

Spontaneous renal pelvis rupture should be considered in the differential diagnosis of patients showing clinical deterioration under medical expulsive treatment for urinary stones. Contrast-enhanced CT with nonenhanced images is the best choice and the most reliable method of imaging. Caution should be taken for contrast media since it has a risk of provoking or increasing extravasation due to its diuretic effect. Immediate urinary diversion is prerequisite for successful treatment, and definite stone treatment should be deferred until complete healing of the rupture. Open surgical procedures are seldom required for patients with SRRP due to stone disease.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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