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CASE STUDY

RARE CASE OF SPONTANEOUS RUPTURE OF RENAL PELVIS SECONDARY TO URETEROLITHIASIS

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ABSTRACT

Spontaneous renal pelvis rupture (SRPR) is extremely uncommon and thought as a nontraumatic leakage of the urine from the renal pelvis. It is usually secondary to calculus causing obstruction. A clear differentiation between the forniceal rupture and upper ureter/ renal pelvis becomes very important as both course and treatment are different. Around seventy percent of ureteric stones are present in the distal ureter. Effective treatment of distal ureteric stone is by keeping the patient under observation and medication. These stones usually pass spontaneously under observation: however, some causes complication like urinary tract infection, hydronephrosis and abnormal renal function. Spontaneous perforation of the renal pelvis is a rare condition that leads diagnostic and therapeutic problems. We present a case report of male patient who is under conservative treatment presenting as spontaneous rupture of the renal pelvis with urinoma formation.

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INTRODUCTION

The most frequent cause of renal colic is distension of the collecting system from obstructing calculi (Miller and Kane, 1999). Of those patients with ureterolithiasis, depending on stone size and location, approximately 80% will pass the stone spontaneously if managed conservatively (Carter and Green, 2011). Persistent renal colic leads to complications such as acute infection and renal insufficiency, and intervention may be required (Segura *et al.,* 1997). Collecting system rupture is an extremely rare outcome of the increased pressure in the pelvis during renal colic. To date, no explanation of the mechanism and causes of pelvic rupture have been reported in literature (Diaz and Buenrostro, 2011).

CASE REPORT

A 56 year old male patient presented with complaint of severe right sided back pain and 5 episodes of vomiting since 4 days. On examination there was tenderness in the right renal area. Blood investigation showed raised serum creatinine 1.7 mg/dl and blood urea 50mmol/L. On ultrasound (US) abdomen the right kidney showed increased cortical echogenicity with increased cortical echogenicity with accentuated cortico-medullary differentiation. There was mild to moderate hydronephrosis with proximal hydroureter associated with urinoma formation predominantly in the posterior para renal fossa extending down into right iliac region (Figure 1 and 2).

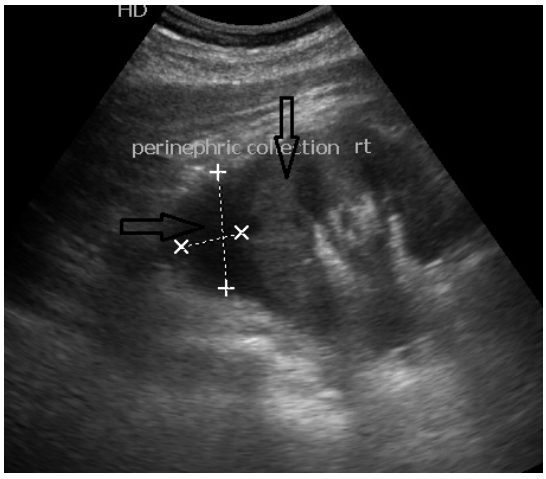

Figure 1. 56 year old male patient with spontaneous rupture of renal pelvis secondary to lower ureteric calculus Axial USG showing perinephric collection (right arrow) and Increased cortico-medullary differentiation (down arrow)

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The distal ureter could not be traced because of bowel gas obscuring the ureter. Later the patient is subjected to Computer Tomography (CT) urogram to evaluate the distal obstruction. On plain CT scan there was 4mm calculus in the distal ureter (figure 3) causing proximal back pressure changes. On injection of 100 ml of iodinated contrast intravenously both kidneys showed normal cortico- medullary enhancement pattern.

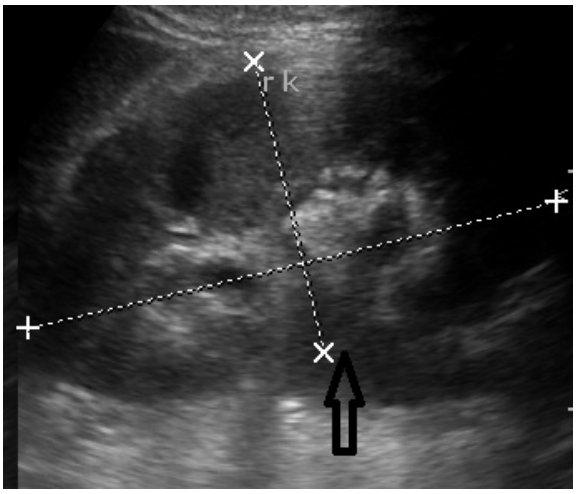

Figure 2. 56 year old male patient with spontaneous rupture of renal pelvis secondary to lower ureteric calculus Coronal USG view of right kidney showing hydronephrosis (up arrow)

Figure 3. 56 year old male patient with spontaneous rupture of renal pelvis secondary to lower ureteric calculus Plain CT axial view showing lower ureteric calculus (triangle) Normal distal ureter and vesicoureteric junction (left arrow)

Delayed scan obtained at 10 minutes revealed extravasation of contrast into the perinephric space from the rent in the posterior aspect of the renal pelvis (Figure 4a, 4b and 4c). Fluid-contrast level was visualized in the renal pelvis (Figure 4a) which is also an imaging feature of obstruction. There was no opacification of the ureter distal to the ruptured renal pelvis. However left kidney showed normal excretion of contrast (Figure 5). Finally we opined the diagnosis of right lower ureteric calculus with proximal hydroureter and hydronephrosis and perinephric urinoma formation secondary to renal pelvis rupture. Patient was immediately taken for surgical intervention; a double J stent was placed on the right side. His post operative pain was decreased.

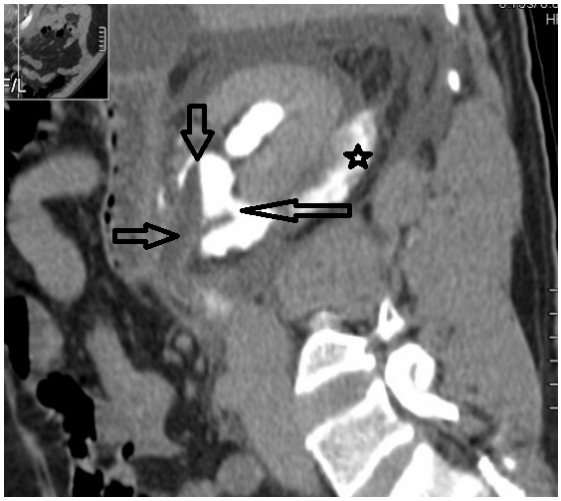

Figure 4a. 56 year old male patient with spontaneous rupture of renal pelvis secondary to lower ureteric calculus Delayed phase obatained at 10min, Oblique saggital CT view showing rupture of the renal pelvis (left arrow), non opacified ureter (right arrow), contrast fluid level in the pelvis(down arrow) and perinephric collection (five point star)

Figure 4b. 56 year old male patient with spontaneous rupture of renal pelvis secondary to lower ureteric calculus Delayed phase obatained at 10min, Oblique coronal CT view showing rupture of the renal pelvis (up arrow) and contrast along the inferior venacava (left arrow)

DISCUSSION

Clinical Features and Demography

Wunderlich in 1856 was the first to describe spontaneous pelvic rupture (Holmlund, 1983). Increase of the pressure in the collecting system and tension of the pelvis wall were proposed as the mechanisms of renal colic, and these mechanisms are likely to prevent the damage to the collecting system (Koktener *et al.,* 2007). In some cases, pelvic rupture can occur and it could be related to obstruction, trauma, previous urinary tract surgery, or other conditions like hydronephrosis, especially when the renal pelvis is fixed because of fibrosis (Diaz and Buenrostro, 2011).

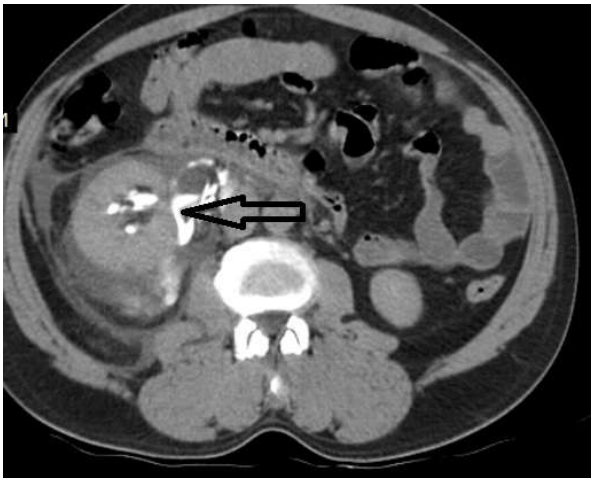

Figure 4c; 56 year old male patient with spontaneous rupture of renal pelvis secondary to lower ureteric calculus. Delayed phase obtained at 10min, axial coronal CT view showing rupture of the renal pelvis (left arrow)

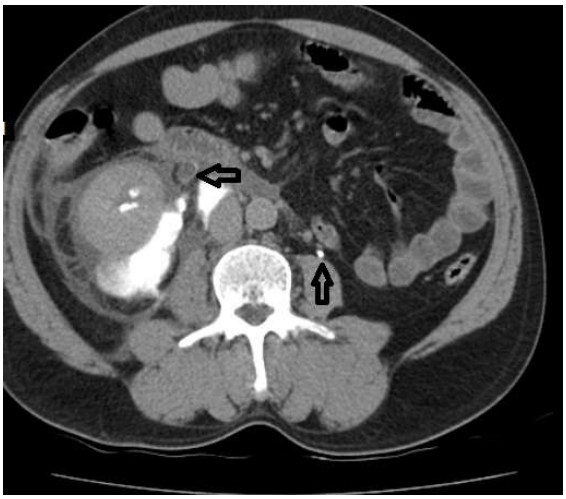

Figure 5. 56 year old male patient with spontaneous rupture of renal pelvis secondary to lower ureteric calculus. Axial CT view obtained at 10 min delay showing non opacified ureter (left arrow) and normal opacification of left ureter (up arrow)

Lymphoma and chemotherapy have been described as a cause of spontaneous rupture of the renal pelvis (Koktener *et al.,* 2007). In the present case, nothing of the aforementioned was evident. The description of "spontaneous" in some papers should be applied in the following conditions: no external trauma, no previous surgery on adjacent structures, no recent ureteric instrumentation and excluding external compression during the excretory urography (Pabitra Kumar Saha *et al.,* 1989; El-Boghdadly, 1985). With these criteria, spontaneous rupture usually results from ureteral calculus (Richard, 1974; Leuthardt *et al.,* 1994). SRPR is an extremely rare condition. SRPR has the same symptoms as renal colic. The most common symptom in SRPR is renoureteral colic, flank pain, nausea, and vomitting. Treatment is according to underlying pathology. Double J catheter or percutaneous nephrostomy is urinary diversion method to be used especially in the presence of small ruptures. Open surgery can be an option in difficult cases associated with extensive rupture of renal pelvis (Bogdanovic *et al.,* 2011).

Imaging Features

In the diagnosis of renal rupture, initially radiography and serial USG and subsequently intravenous urography (IVU) and CT are most beneficial tools. The plain abdominal radiography is readily available. Plain film of the abdomen may show a loss of retroperitoneal landmark (obliteration of the ipsilateral psoas shadow or renal outline), stone, and signs of paralytic ileus. However, most of these findings are nonspecific and bowel gas may obscure these findings (Huri *et al.,* 2007). If a urine leak is suspected, IVU may indicate the site and provide an estimate of the rate of leakage. US can be used to confirm the diagnosis of kidney stones, hydronephrosis, the site of obstruction, and extravasated fluid; however ureteral stones may be missed due to the presence of obscuring bowel gas. US can be used in patients with an allergy to intravenous contrast, and is also useful in pregnancy, since there is no radiation to the patient or fetus.

Unenhanced helical CT has been shown to be more sensitive in detecting and characterizing ureteral calculi and at least as sensitive in demonstrating the presence of obstructive uropathy (Mostafavi *et al.,* 1998). Additionally, CT may be performed rapidly, in approximately one third the time of an IVU study. Contrast enhanced CT with delayed images (obtained 5-20 min after contrast medium injection) shows contrast medium extravasation in the peripelvic, perinephric, or retroperitoneal spaces (Koktener *et al.,* 2007; Titton *et al.,* 2003).

Moreover, coronal and sagittal three-dimensional (3D) reformatted images defines the site of the tear and the extent of the collection. There is some confusion between the backflow extravasation and true rupture of the ureter or renal pelvis in the medical literature. Some cases reported as spontaneous rupture of renal pelvis or ureter actually presented spontaneous extravasation of the fornix, while some cases reported as backflow extravasation characteristically showed rupture of the renal pelvis or the ureter (Schwartz *et al.,* 1966). Differentiation between these two conditions may be made by some observations. The presence of contrast material around the calyx highly suggests the forniceal rupture [16, 17]. Non-visualization of the ureter on the affected side usually indicates rupture of the ureter or renal pelvis (Schwartz *et al.,* 1966). Which is seen in our case.

If the radiological picture remains unchanged for a long period of time, it always points to the possibility of the ureteral rupture, while in cases of the forniceal rupture, contrast extravasation usually disappears in 24-48 hrs after the onset of an attack (Schwartz *et al.,* 1966; Lachrekar, 1990). Furthermore, most patients with actual rupture of ureter are more unwell with a high temperature and leukocytosis than those with backflow extravasation (Schwartz *et al.,* 1966). Like spontaneous rupture of the ureter, forniceal extravasation is also secondary to ureteral calculi in most cases (Herzlia Hadar, 1979; Lachrekar, 1990). Less common causes including tumor, pregnancy, enlarged lymph nodes, ruptured renal cysts, post irradiation scars, retroperitoneal fibrosis and enlarged

prostate gland have been reported (Hannu Paajanen *et al.,* 1993). Forniceal rupture is thought to be a safety valve for alleviation of the increased intrapelvic pressure in an acute obstructive uropathy. It has been classified into 4 categories: pyelosinus, pyelolymphatic, pyeloveno us and pyelotubular backflow (El-Boghdadly, 1985; Schwartz *et al.,* 1966).

Treatment

Ninety-five percent of 2–4mm ureteral stones treated under observation treatment may pass spontaneously in 40 days. In cases of stones larger than 5 mm, 50% may need intervention (Miller and Kane, 1999). In medical expulsive treatments in cases of distal ureteral stones with median sizes of 4.7–6.7 mm, 80% passage rate has been reported (Porpiglia *et al.,* 2004 Agrawal *et al.,* 2009). Recommended period to wait for stones to pass under observation or medical expulsive treatment is 2 to 6 weeks (Autorino *et al.,* 2005). More distally located stones, smaller and right side located stones, are more likely to pass spontaneously and require less intervention. Medical expulsive therapy is part of the established therapeutic means for ureteric calculi alongside observation, shock wave lithotripsy, ureteroscopy, and ureterolithotomy (Giannarini and Autorino, 2009). The best treatment choice in distal ureteral stones is still controversial. Choice depends on some factors including stone size, stone passage history, experience of the clinician, the patient's choice, available equipment, and cost.

Abbreviations

SRPR- spontaneous renal pelvis rupture
CT-computer tomography
US/USG- ultrasound/ ultrasonography
IVU-intravenous urography

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