

Case Report

SPONTANEOUS ACUTE RENAL FORNICEAL RUPTURE CAUSED BY A URETERAL CALCULUS- A CASE REPORT

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ABSTRACT

Rupture of the urinary collecting system associated with Peri-pelvic extravasation of the urine is an unusual condition and commonly associated with obstructing calculus. We are reporting a unusual case of left lower ureteric calculus causing upper pole calyx forniceal rupture associated with extravasation of the contrast into the Peri-renal space. Patient was intervened by ureteroscopic removal of stone, followed by stent lead to complete recovery of acute pain and followed up for stent removal.

Keywords: *Forniceal Rupture, Calculus, CT Urography*

INTRODUCTION

Spontaneous rupture of the pelvic collecting system or the ureter into the perirenal space or retroperitoneum is one of the uncommon complication of ureteric calculus. Other causes include trauma, and pelvic neoplasms. They usually present with sudden onset of abdominal pain, indistinguishable with renal colic. We are reporting an unusual case of left lower ureteric calculus causing upper pole calyx forniceal rupture associated with extravasation of the contrast into the Peri-renal space in 50 year old female patient who had come with acute left loin pain.

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A 50 year old female who had come with the acute left loin pain in the casualty, was referred to the radiology department for USG. USG showed mild left hydro nephrosis. Right kidney and urinary bladder were normal.



Figure 1; USG of the left kidney showing mild left hydro nephrosis

Patient was further investigated with CT urography, which showed a calculus in the left lower ureter of about 8 cm superior to the left UV Junction of size measuring 6mm causing mild left hydro-uretero-nephrosis with a Peri-renal and peri-urteric fat stranding. On delayed 15 mins film showed extravasation of the pelvic contrast by forniceal rupture of the upper pole calyx into the Peri-renal space and into the psoas muscle.

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Figure 2: Coronal reconstruction of plain CT-KUB shows left mild hydro-urtero-nephrosis with left peri-renal fat stranding

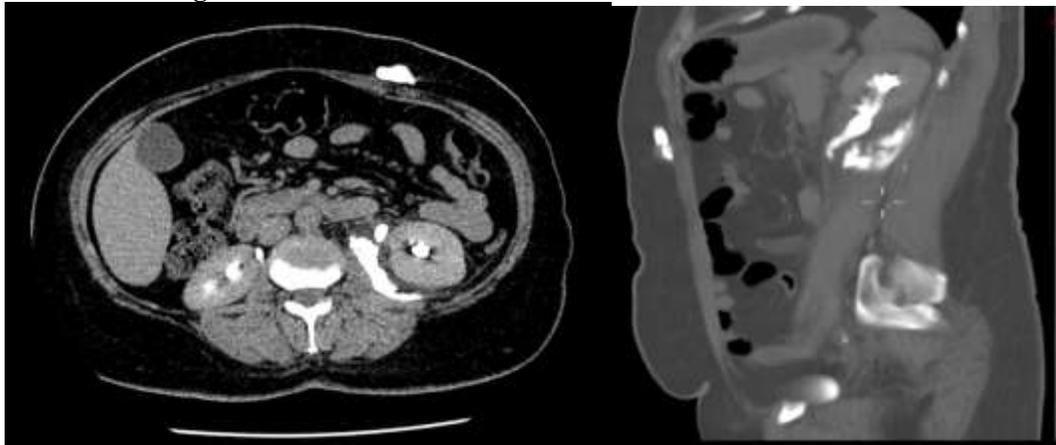


Figure 3: CECT IVU axial mediastinal and sagittal bone window shows extravasation of the IV contrast from the pelvis into the Peri-renal space and in the psoas muscle



Figure 4: MPR Sagittal reconstruction showing extravasation of IV contrast from the upper pole fornix and calculus in the left lower ureter (Arrow mark)

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Patient underwent ueterscope, with removal of ureteric calculus and DJ stent was placed. Follow USG after 2 days of ureteric stenting shows resolution of hydro nephrosis.



Figure 5: Fluoroscopic procedure of insertion of DJ stent after stone removal and plain abdominal radiograph on left side shows the correct position of DJ stent



Figure 6: Resolution of the left hydro nephrosis (Image in left side), with tip of DJ stent and Foley's catheter within the bladder (Image in right side)

DISCUSSION

Most common cause of the acute spontaneous forniceal rupture is by ureteric calculus. Other causes includes extrinsic ureteric compression by mass lesion, pelvic-ureteric junction obstruction, vesico-ureteric junction (VUJ) obstruction, bladder outlet obstruction and iatrogenic causes as described by Boris Gershman *et al.*, in 2010. Another rare but important cause in the antenatal women includes gravid uterus

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compressing on the uterus causing acute forniceal rupture, which will be present as the acute abdomen (Jennifer *et al.*, 2018). Rarely few cases had been reported due to the cervical carcinoma causing rupture. The level of obstruction was seen in proximal ureter in 24.3% of cases, distal ureter in 17.6% of cases and VUJ in 58.1% of cases. Mean stone size was 4.09 (2.0) mm. Mean (SD) stone size was 5.34 (1.87) mm for proximal stones, 4.08 (1.69) mm for distal Stones and 3.53 (1.96) mm for VUJ stones (P=0.005) (Gershman *et al.*, in 2010). In our case, the level of stone is at the distal ureter and size of the calculus is on the higher side (6mm) when compared to Gershman *et al.*, (2010) study. This difference may be due to the difference in studied population i.e., American population when compared to Arabian population. Further case series must be compared with respect to other populations. The mean size of stone was 6.2 ± 2 mm among the 57% percent of the patient who had been treated conservatively in a study done in Arabian Peninsula by Gabeer *et al.*, in 2017. They concluded that most common cause of forniceal rupture is due to distal ureteric stone rather than proximal. Further uncomplicated cases can be managed conservatively.

Mechanism of forniceal rupture

Most common cause of rupture is due to acute complete obstruction by sudden blockage of ureter by calculus. Time is not sufficient to reduce the urine production by reducing the renal flow or increase the resistive index of the kidney. By applying Laplace's Law (tension = pressure \times radius), if a pressure exceeds the tensile strength of the renal fornix, this will lead to forniceal rupture and extravasation of urine as this phenomenon is Reno -protective by decreasing the collecting system pressure (Gabeer *et al.*, 2017). In this case series by Gabeer *et al.*, (2017) most common gender affect is male, right kidney is more affected than left, collection is most commonly seen in the perinephric space rather than sub-capsular or para-nephric or retroperitoneal space. Our case is a female patient, left kidney is affected and collection is seen in the perinephric space with normal serum creatinine – which is similar to study by Gabeer *et al.*, (2017).

Regarding management of the spontaneous forniceal rupture, either patient can be managed conservatively depending upon the renal parameter, like amount of perirenal collection. But the best is by means of intervention. As suggested by Sallami *et al.*, Ureteroscopic lithotripsy followed by double-J stenting of the ureter appears to be a quick, safe, and effective management approach.

Late complications of the forniceal rupture includes perirenal abscess in 10%. Cases of Urinomas with small diameter can be spontaneously reabsorbed without need of drainage. Recently, conservative treatment of spontaneous renal pelvis rupture is successfully performed using ureteral stents. More than 50% patients require additional interventional treatments such as stone crushing treatment and ureteroscopic lithotripsy. Surgical treatment of this clinical picture has been reported to be successful particularly in late diagnosis or cases with large urinoma and in other accompanying pathologies requiring surgical intervention (Gökkaya *et al.*, 2014).

Based upon the location of the calculus, management also varies as described by Kalafatis *et al.*, in 2004 - Sole stenting of the ureter is reserved for infected Forniceal rupture or for stones of the upper ureter or the Ureteric pelvic junction. Ureteroscopic lithotripsy followed by double-J stenting of the ureter may offer a quick and safe therapeutic alternative for distal and middle obstructive ureteral stones with Forniceal rupture. In our case since the calculus is in the distal ureter, calculus was removed and stent was placed as described by Kalafatis *et al.* (2004).

Conclusion

One of the rare cause of acute abdominal pain in patient with history of renal stones is acute forniceal rupture, which should be kept in mind by both urologist and radiologist for time specific management of the patient to prevent future adverse outcome. It must be remembered that, “Every renal colic is not always simple”. So be open to see the adverse complication in some cases - to save the patient and to prevent complication.

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REFERENCES

- Ahmed Gaber Al-mujalhem, Mohammed Sayed Ahmed Aziz, Mohammed Farag Sultan, Ahmed Mohammed Al-maghraby and Mohammed Abdelmonem (2017).** Spontaneous forniceal rupture: Can it be treated conservatively? *Urology Annals* **9**(1) 41–44. doi: 10.4103/0974-7796.198883PMCID: PMC5308037 PMID: 28216928.
- Cevdet Serkan Gökkaya, Mehmet Murat Baykam, Sedat Yahşi, Süleyman Bulut, Binhan Kağan Aktaş and Ali Memiş (2014).** Spontaneous Fornix Rupture Due to Obstructive Ureteral Stone. *Erciyes Medical Journal* **36**(2) 91-3. doi: 10.5152/etd.2013.48
- Gershman, Naveen Kulkarni, Dushyant V Sahani and Brian H Eisner (2011).** Causes of renal forniceal rupture. *BJU International*, **108**(11)1909-1911. Doi: <https://doi.org/10.1111/j.1464-410X.2011.10164.x>
- Jennifer Travieso1 and Omar M Young (2018).** Antenatal Spontaneous Renal Forniceal Rupture Presenting as an Acute Abdomen. *Case Reports in Medicine*, **2018** Article ID 8596491, 3 pages <https://doi.org/10.1155/2018/8596491>.
- Kalafatis, P, Zougkas K and Petas A (2004).** Primary ureteroscopic treatment for obstructive ureteral stone-causing fornix rupture. *International Journal of Urology* **11**(12) 1058-1064.
- Sallami Sat (2009).** Spontaneous Rupture of the Upper Urinary Tract Caused by Ureteral Calculi: Effectiveness of Primary Ureteroscopic Treatment. *UroToday International Journal* **2**(6) doi:10.3834/uij.1944-5784.2009.12.07
- Singh I, Joshi M and Mehrotra G (2009).** UCMS and GTBH, University of Delhi, India, Spontaneous renal forniceal rupture due to advanced cervical carcinoma with obstructive uropathy. *Gynecology and Obstetrics* **279**: 915. <https://doi.org/10.1007/s00404-008-0817-y>