

Parapelvic Renal Cyst causing Calyceal Obstruction and Stone Formation: From Obstruction to Relief with LASER assisted Retrograde Intrarenal Surgery

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ABSTRACT

Objectives: To summarize the clinical presentation, diagnostic challenges, and management strategies for symptomatic parapelvic renal cysts.

Purpose: This study highlights the importance of timely diagnosis and treatment of parapelvic renal cysts to prevent complications such as calyceal obstruction, stone formation, renovascular hypertension, haematuria either microscopic or macroscopic due to rupture of the cyst or abscess formation if infected and irreversible kidney damage due to neglected severe compression of pelvicalyceal system or associated severe hydronephrosis.[3,6].

Keywords: parapelvic renal cyst, retrograde intrarenal surgery (RIRS), flexible ureteroscopy, renal stone, laser lithotripsy

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INTRODUCTION

Epidemiological Data

Simple renal cysts affect approximately 50% of the population, with parapelvic renal cysts accounting for 1–2% of all renal cysts [1]. These cysts are rare but clinically significant when symptomatic, as they can cause obstruction, stone formation, and secondary complications.

Renal cysts discovered incidentally during imaging studies performed for unrelated reasons. Renal cysts may be multiple or single, unilateral or bilateral, simple or complicated. They arise from the renal parenchyma and are often typically asymptomatic. Parapelvic renal cysts

are benign, fluid-filled sacs located incontinuously with the renal pelvis. They primarily originate from lymphatic vessels within the renal sinus and, if large enough can compress or displace the renal pelvis and calyces and become symptomatic causing complication [4]. These cysts are usually discovered incidentally during imaging for unrelated conditions and are mostly asymptomatic. They may be congenital or acquired due to obstruction in the lymphatic vessels of the renal sinus.[3]

Diagnostic preferences

While MRI is an alternative imaging modality, CT imaging is often preferred in suspected case of parapelvic cysts due to its superior ability to detect stones and provide

detailed anatomical insights. Ultrasonography may also diagnose parapelvic cyst, but also it may be difficult in differentiating it from renal hydronephrosis. differential diagnosis is very important to distinguish parapelvic renal cyst from hydronephrosis, cystic renal tumours, and calyceal diverticulum. [5]

Various treatment options are available for symptomatic parapelvic renal cysts like ultrasound guided aspiration of its fluids with injection of sclerotherapy to reduce incidence of recurrence, percutaneous ablation but complication of bleeding or haemorrhage and perinephric abscess is considerable, open surgery and laparoscopic deroofing or robotic assisted laparoscopic deroofing but work in this anatomical area is difficult (renal sinus and vasculature). but with the new technology of endourology and in the armamentarium of successful retrograde intrarenal surgery and the availability of advanced flexible ureteroscopy and different kinds of laser therapy these complication can be avoided by using flexible ureteroscopy and doing endoscopic decortication (deflooring) of the cyst plus management of any associated secondary stones. [1,2,6]

CASE PRESENTATION

Background

Parapelvic renal cysts require treatment when symptomatic or causing complications. This case illustrates the clinical course of a patient with parapelvic renal cyst that resulted in significant calyceal obstruction and stone formation, ultimately treated with RIRS.

Patient Selection Criteria

RIRS was chosen for this patient due to the size of the

cyst (6.5 × 5 cm) with significant calyceal obstruction and associated secondary renal stones. Also The patient had no contraindications to retrograde intrarenal surgery.

Case

A 56-year-old male with no significant medical history presented with severe right flank pain, intermittent hematuria and dysuria. On presentation to the emergency unit, kidney function was normal and urinalysis showed microscopic hematuria. CT KUB as the gold standard investigation for renal colic revealed a large right parapelvic cyst measuring approximately 6.5 × 5 cm. The cyst caused calyceal obstruction with elongation and stretching of calyces, mimicking malignant effect. Multiple renal stones (12 mm, 8 mm and 9 mm) were identified in the obstructed calyces (Figures 1, 2).

Management

A decision was made to proceed with RIRS (retrograde intrarenal surgery) with Flexible ureteroscopy & laser.

Preoperative Preparation

full laboratory investigation with viral marker and ECG as pre-operative assessment for anaesthesia was performed which was normal.

Operative Steps

Patient in dorsal lithotomy position. After sterilization and draping. Diagnostic cystoscopy was performed, and guidewires were inserted through right ureteric orifice (two wires) under fluoroscopic control. check right ureter with semi-rigid ureteroscope was performed to ensure that the ureter was clear and for passive dilatation pre insertion of ureteral access sheath. .RGP (retrograd pyelography)

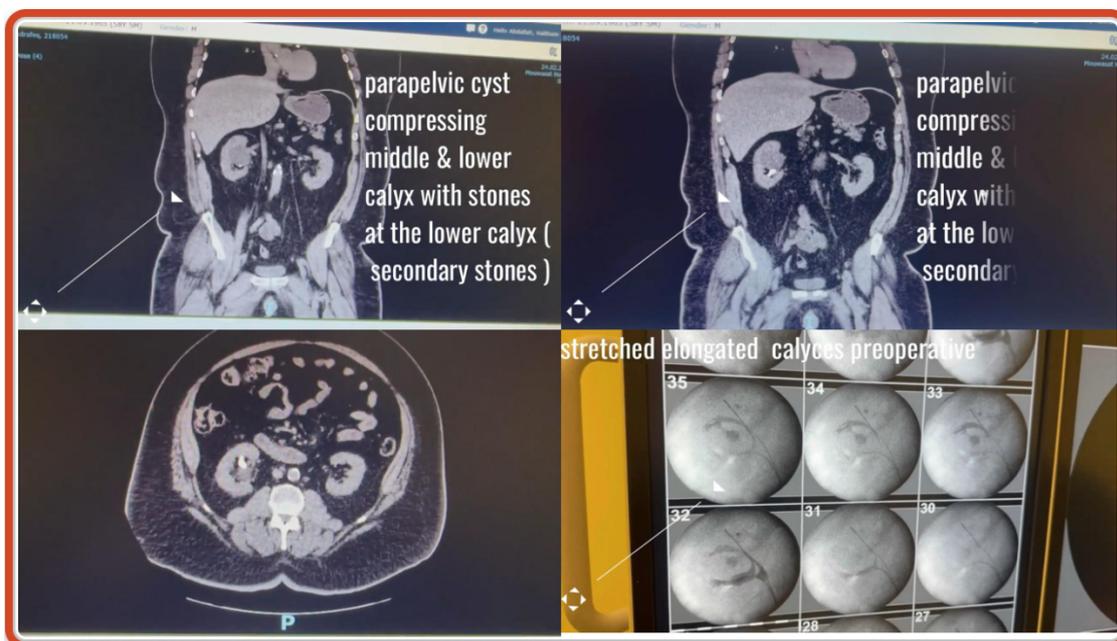


Figure 1. Showing parapelvic renal cyst & stones with stretched elongated calyces from obstruction

showing stretched elongated calyces (like tumour mass effect) (figure 2) .10/12 French ureteral access sheath was inserted under flouroscopy. A 7.5 French flexible ureteroscope (pusen) was used to assess the renal pelvis and calyces. showing compressed middle and lower calyces with negociaion of of both calyces hardly ,there is two

renal stone in middle calyx and one in lower calyx about (8 mm and 9 mm and 12 mm) respectively. [figuer3]

Stones was disintegrated with laser (combined fragmentation and dusting) technique followed by laser ablation of the cyst wall (decortication) with entrance and check the cyst post ablation [Figure 4]

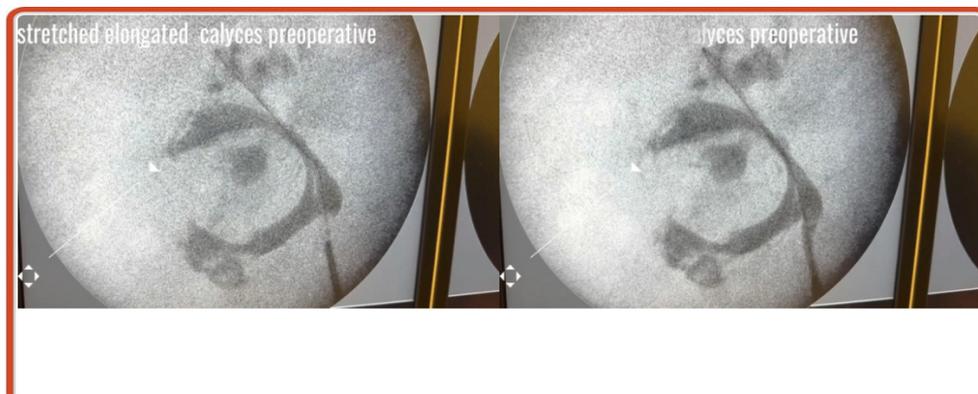


Figure 2. Stretched elongated calyces, picture of mass like effect due to parapelvic cyst

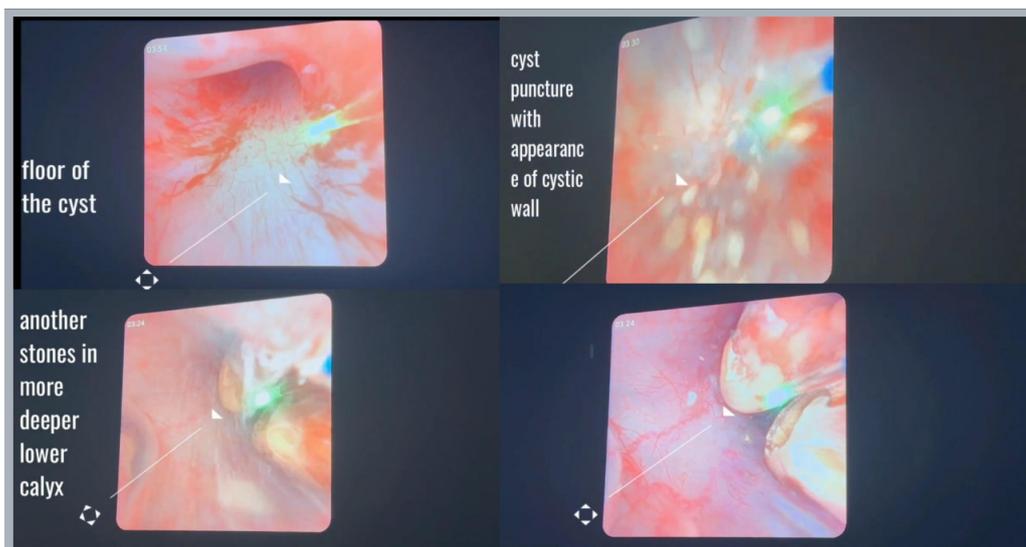


Figure 3. Cyst wall with transparent bluish discolouration ,multiple calyceal stones



Figure 4. laser ablation of cysts wall with view of cyst from inside

Laser Setting

- we used these setting of laser during the operation
- fragmentation of renal stones: 1.5 joule and 15 HZ(hertz)
- For dusting renal stone :0.5 joule and 20 HZ.
- For cyst ablation: 2 Joules and 10 HZ.
- Stones were fragmented using fragmentation and dusting techniques [figure 3]. Followed by complete ablation (decortication) of renal cyst wall which was detected by bluish discoloration of its transparent wall, the cyst was entered and explored.
- Retrograde pyelography showed resolution of calyceal compression. A double J stent was inserted for drainage (Figures 5).
- Postoperative :The patient tolerated the procedure well only mild hematuria which was resolved conservatively. He was discharged the following day and resumed normal activities within 2 days. The double J stent was removed two weeks postoperatively.

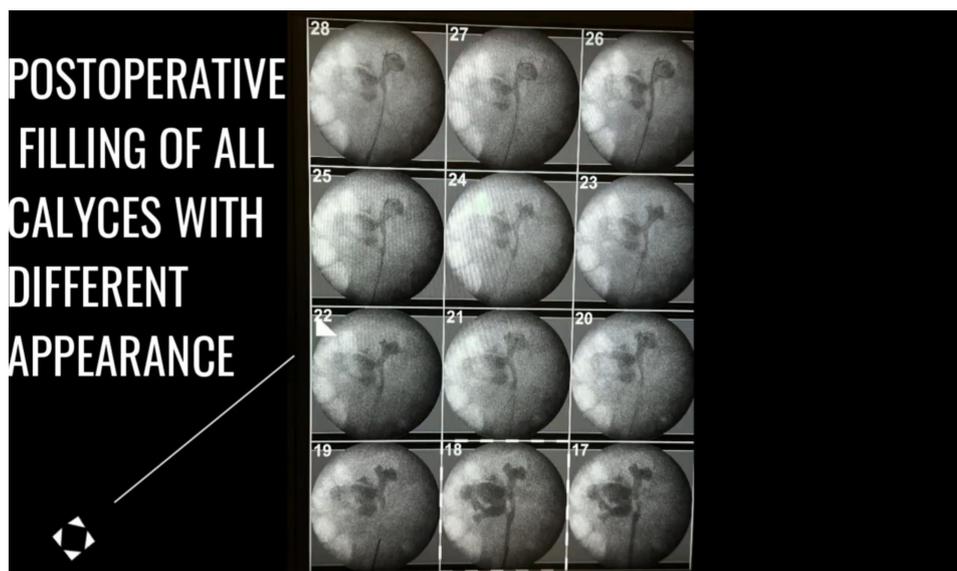


Figure 5. Retrograde pyelography post-operative showing filling of all calyces & disappearance of cyst

RESULTS

Outcomes were evaluated through follow-up imaging and clinical assessments. Three months postoperatively, ultrasound confirmed resolution of the cyst and calyceal obstruction, with no residual stones or recurrence.

DISCUSSION

This case emphasizes the need for heightened awareness among clinicians regarding the potential complications of symptomatic parapelvic cysts. That requiring prompt evaluation and intervention.

LITERATURE REVIEW

Parapelvic renal cysts have been treated through various modalities, including percutaneous aspiration with sclerotherapy, laparoscopic deroofing, and percutaneous ablation [2–4]. However, these techniques are associated with complications such as bleeding, infection, and difficulty in anatomical access.

RIRS vs. other Modalities

RIRS offers a minimally invasive solution with reduced recovery time and lower complication rates compared

to open surgery or laparoscopic methods. This approach effectively addresses both the cyst and associated stones, as demonstrated in this case.

Long-term follow-up

Efforts were made to track the sustainability of treatment outcomes through ultrasound and clinical evaluations at three-month intervals. Longitudinal data collection is ongoing to assess recurrence rates and renal function over time.

CONCLUSION

Advanced imaging techniques and minimally invasive procedures like RIRS are effective in managing symptomatic parapelvic renal cysts. Early intervention prevents complications and ensures favorable outcomes.

Consent: was signed by the patient for agreement of publication

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