

Case Report

Challenging retrograde intrarenal surgery in a pelvic ectopic kidney- an institutional case report and review of literature

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ABSTRACT

Retrograde intrarenal surgery (RIRS) has been increasingly used as an effective treatment modality for treatment of stones in anatomically abnormal kidneys. A challenging RIRS in a 27-year-old man, done for a 1 cm calculus in a pelvic ectopic kidney is being presented here in order to highlight the technical difficulties encountered, safety and outcome of RIRS for pelvic ectopic kidneys. A 27-year-old man presented with the chief complaints of left sided flank pain of one year duration. He was discovered to have a left pelvic ectopic kidney 7 years back and later discovered to have a calculus within it 1 year back. He had a history of an attempted rigid ureteroscopy 2 months back at another hospital where they were unable to reach the stone, so they placed a Double J stent over a guidewire. The patient was worked up and taken up for surgery at our institution. Intraoperatively there was a kink at the PUJ, below which the access sheath was placed under C arm guidance and with the flexiscope, the kink was negotiated to reach the stone. Holmium laser was used to disintegrate the stone and DJ stent was placed. Post operatively patient was stable and discharged on day 2. RIRS is a safe and effective modality for the treatment of calculi in pelvic kidneys as seen, technical difficulties like kinks can be overcome by flexiscopy.

Keywords: Case report, Flexiscopy, Holmium laser, Pelvic ectopic, Stone

INTRODUCTION

One of the commoner kidney malformations is the pelvic ectopic kidney occurring at an incidence of 1:2200 to 1:3000 live births.¹ The kidneys normally develop from the metanephros which is present in the pelvis opposite the sacral somites. During the 8-9th week of life, the kidneys ascend into the retroperitoneal renal fossa deriving its blood supply from the neighbouring vessels as it climbs. Any disruption in the normal ascent can lead to ectopic kidneys. They may be pelvic, crossed fused ectopia or ectopic thoracic kidney of which a single pelvic kidney with opposite normal kidney is the most common.² Ectopic kidneys are generally asymptomatic and usually detected incidentally.³

Retrograde Intrarenal Surgery (RIRS) is a novel technique, initially performed in 1983 mainly used for

renal pathologies like, but not limited to, stones. It involves the access of kidney via the ureters as opposed to directly puncturing it (Percutaneous nephrostomy, PCN) or by opening the abdomen.⁴ It is rarely done with a rigid ureteroscope as standard ureteroscopes cannot reach the deeper portions of the kidney; and usually requires the use of a Flexible Ureteroscope to facilitate the visualisation of all the calyces. RIRS has been shown to be an effective primary treatment for stones less than 2 cm.⁵

CASE REPORT

A 27-year-old male presented to the out-patient department with chief complaints of pain in the left side of abdomen near the iliac fossa for the last 1 year. The pain was low intensity, dull aching, intermittent, non-radiating and not associated with fever, chills or

vomiting. He also had a history of gross hematuria 2-3 episodes around 7 years back where he was tested and found to have a pelvic ectopic kidney on the left side. He was a known patient of hypothyroidism on thyroxine tablets and currently euthyroid. He had been evaluated elsewhere for the pain and advised an ultrasound when a one cm calculus was detected in the renal pelvis of the left ectopic kidney. A contrast enhanced CT scan was also done which showed the malrotated left kidney within the pelvis extending into the hypogastrium and a left renal pelvic calculus of size 1 cm with mild hydronephrosis.

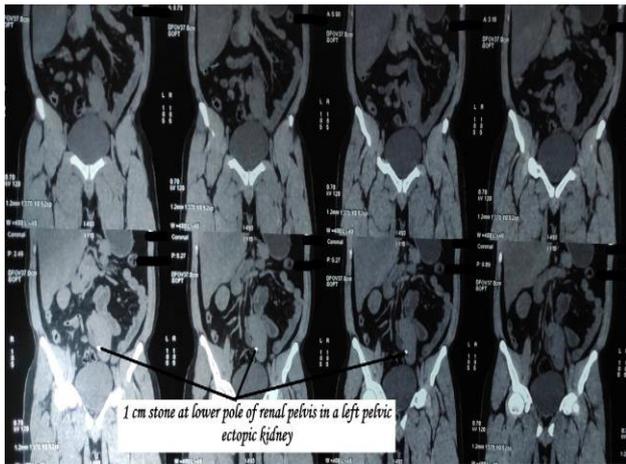


Figure 1: Plain CT film showing the left ectopic pelvic kidney and 1 cm calculus at the lower pole.

The patient initially went to another hospital where they attempted a ureteroscopic lithotripsy with a rigid ureteroscope but they were unable to negotiate the scope into the pelvis and decided to put a double J stent (DJ stent) and abandon the procedure. He then arrived at our institution for removal of the stone. All the necessary blood tests and workup was conducted and once the patient was declared fit for surgery, he was taken up for RIRS after taking consent.

Intraoperatively since the patient was already on a stent, the ureter was dilated. Initially a rigid ureteroscopy was done which showed a kink at the pelvic ureteric junction (PUJ) beyond which the rigid ureteroscope could not proceed. A retrograde pyelography was done to look for any anatomical abnormalities and the stone and a hydrophilic guidewire was placed into pelvis. Then, a ureteric access sheath (25 cm 9-11) was inserted over the guidewire, facilitated with the use of C arm, to the point right below the kink at PUJ. The flexible ureteroscope was introduced and the kink was bypassed with the malleable tip to see the stone lying in the renal pelvis. Holmium laser (at 8Hz frequency and 0.8 KJ energy) was used to disintegrate the stone into dust. All the calyces were checked with the full range of the flexible ureteroscope to ensure full clearance and then a DJ stent (16 cm 4 Fr) was placed and patient was catheterised with a 16 Fr Foley's catheter.

The entire procedure took around 1 and a half hour and the patient was then shifted to the ward. The post operative period was uneventful, the Foley's catheter was removed on post op day 1 and patient discharged on the second post op day.



Figure 2: Retrograde pyelography to look for anatomic abnormalities and calculus.



Figure 3: Intra operative image of stone disintegration by Holmium laser.

DISCUSSION

Ectopic kidneys are seen in 1 in every 2200 to 3000 births. The insertion of the ureter is high, the calyx drainage is affected by the renal vasculature and the renal pelvis is anterior which leads to an increased risk of stone formation.⁶ Injury risk of aberrant veins, neighbouring abdominal organs and nerves make surgery difficult in patients with ectopic kidneys. In the pelvic ectopic kidney since the ureter is developed from the ureteric bud, if there is no abnormality in the ureteric bud, the ureter may become tortuous and make the approach to the kidney is a bit difficult through the ureteric route.

The options for surgery of a calculus in pelvic kidney includes extra corporeal shockwave lithotripsy (ESWL), mini-PCNL (Percutaneous nephrolithotomy) and laparoscopic or open pyelolithotomy. ESWL may achieve a good stone free rate in select cases of calculi in ectopic kidneys especially if the instruments required for RIRS or the PCNL are not available at the hospital.⁷ Demirkesen et al however reported only a 38% stone-free rate in ectopic kidney patients after 3 session of SWL and had a high recurrence rate, they therefore recommend other endourological treatments especially for larger stones.⁸ Earlier in 1996, Talic reported 82% stone-free rate in 14 ectopic kidney patients, where ESWL was used as monotherapy.⁹

In anomalous kidneys, PCNL gives excellent results for large or extracorporeal shock wave lithotripsy-refractory stones, but it is extremely demanding of the surgeon skills, and also it needs to be performed very carefully otherwise it can lead to life threatening complications.¹⁰

The other methods like open and laparoscopic pyelolithotomy and laparoscopy-assisted PCNL are more invasive than endoscopic methods and thereby have more complications like delayed urine leakage.¹¹

RIRS provides a very good option for minimally invasive surgery of stones in normal as well as abnormal anatomy kidneys. The main advantage of RIRS compared to the other alternatives like mini-Perc and open surgery is related to the shorter hospital stay, absence of any external markings, lower rate of complications and lesser need for analgesia.¹² However, it is a bit time consuming to fragment the stone especially when the stones are of larger sizes and in some cases the ureters may not be dilated enough to allow the access sheath placement. In this case the patient already had a DJ stent placed which allowed for easy placement, also it was only a 1 cm sized stone so RIRS was the ideal option. Since the flexible ureteroscope was used, kinks like the one described above were easily negotiated. RIRS can also be considered as a treatment when the patient is contraindicated for PCNL, Lap or open surgery like when the patient is suffering from a bleeding diathesis or the patient is on antithrombotic therapy. In our case, the kidney was malrotated as well which would have made it difficult to puncture and create the tract for PCNL.

RIRS was successful in 22 out of 26 patients with pelvic ectopic kidneys, in one study done by Omer Faruk Bozkurt et al with minor post operative complications in only 5 patients seen, cementing the fact that RIRS is a safe and effective treatment for patients of pelvic ectopic kidneys.¹³ A systematic review done in 2020 by Lisa Lavan et al studied 117 cases of ectopic kidney along with other anomalies of the kidneys and showed that the advancements in endourological techniques made ureteroscopy an effective procedure, even though it may be challenging in patients with anomalous kidneys.¹⁴

CONCLUSION

Thus, from this case report and review of literature, it seems that RIRS is a safe and effective procedure with minimal complications in pelvic ectopic kidneys, despite the anatomical challenges that are encountered.

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