

Management of Renal Stone Burden in Horseshoe Kidney Using Flexible Scope Technology via Nephrostomy Tract: A Novel Approach

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Abstract

Renal stone burden in horseshoe kidneys presents unique challenges due to complex anatomy and altered urine flow patterns. We present a novel approach using flexible scope technology through a nephrostomy tract for managing such cases. A 33-year-old male patient with horseshoe kidney and large renal calculi was successfully managed using flexible scope technology with HOLMIUM LASER energy source via Nephrostomy tract in Modified Valdivia Position.

Keywords: Horseshoe Kidney with Renal Stone, Flexible Scope Technology, Nephrostomy Tract, Laser Lithotripsy.

Introduction

Horseshoe kidney, a congenital anomaly characterized by fusion of both kidneys at their lower poles, often leads to altered urine flow and increased susceptibility to renal stone formation. Treating renal stone burden in such anatomically complex cases demands innovative approaches. This case report details the successful management of a 33-year-old male patient with a horseshoe kidney presenting large renal calculi using flexible scope technology through a nephrostomy tract.

Case Presentation

A 33-year-old male patient presented with severe right flank pain, accompanied by hematuria. Imaging studies revealed a horseshoe kidney with a challenging stone burden. There was history of dysuria and hematuria. Clinical examination showed soft and non-distended abdomen with no tenderness, no palpable mass or organomegaly with intact hernial orifices. External genitalia examination revealed normal study. Investigations showed Hemoglobin of 16.4 gm%, Serum Creatinine 133mmol/L. WBC counts 11,390 cell/cmm and Urine analysis shows –, RBC 60-100/hpf. USG revealed Right renal pelvic calculus 20mm with

mild Hydronephrosis and lower pole calculus 13mm and CT KUB done showed Horseshoe kidney with both lower poles directed medially and united with each other anterior to aorta at L4 vertebra. The right moiety exhibited a large pelvic calculus measuring 20 mm and a lower pole calculus measuring 13mm. Mild right peri pelvic fat stranding noted. Due to the intricate anatomy and varied stone distribution, conventional endourological interventions were deemed high-risk and technically demanding.

Procedure

A team comprising two urologists collaborated to develop an innovative treatment strategy tailored to the patient's condition. The patient underwent percutaneous nephrostomy (PCN) placement under Fluoroscopic guidance. Subsequently, a nephrostomy tract was dilated to accommodate a flexible ureteroscope. Retrograde Intrarenal Scopy also done from below. Leveraging the maneuverability of a flexible scope equipped with laser lithotripsy capability, the medical team gained direct access to the stones within the pelvic region both from the antegrade and retrograde directions and via the nephrostomy tract to the lower pole region of the horseshoe kidney.

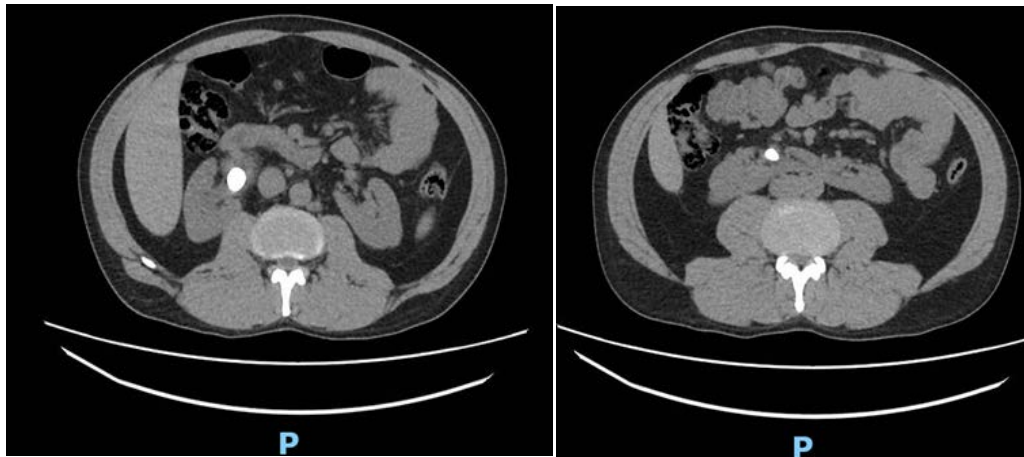


Figure A: CT KUB (axial sections) Showing Right Pelvic and Lower Pole Calculi with Fused Lower Poles - Isthmus

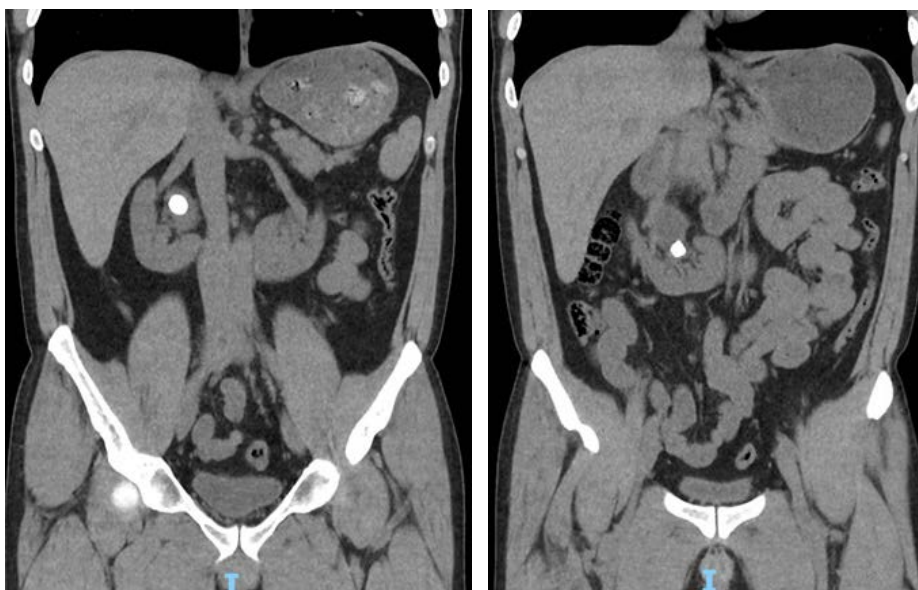


Figure B: Ct Kub Sagittal Image Showing Right Pelvic and Lower Pole Calculi with Medially Oriented Lower Pole.

Operation Performed: Cystoscopy + Right Mini Pcnl (Percutaneous Nephrolithotomy – Supine) + Rirs (Flexible Ureteroscopy + Laser Lithotripsy + Double J Stenting



Figure C: Intra-Op Picture of Lower Pole Calyx Impacted Stone Dusting Using Holmium Laser

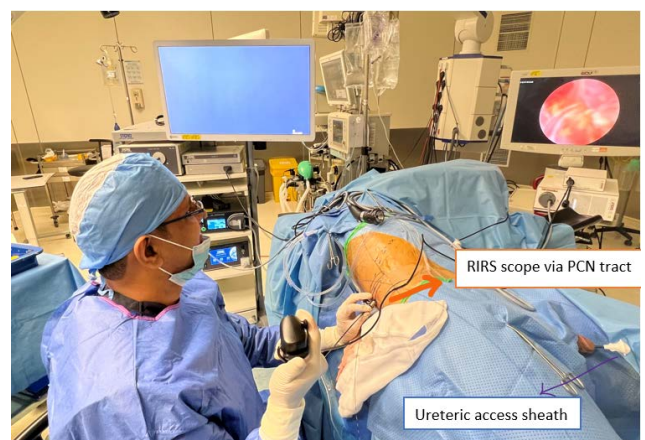


Figure D: Using Flexible Scope Via Mini Pen – Tract

The stones were meticulously fragmented and cleared using the laser lithotripsy technique. The inherent flexibility of the scope facilitated precise access to fragmented stones across various calyces. Throughout the procedure, the patient exhibited favorable

tolerance, and postoperative monitoring revealed no signs of complications. Postoperative recovery was uneventful. Patient improved well. Foleys catheter removal done on 1st day.

Figure B: Intraoperative Image Demonstrating the Utilization of Flexible Scope Technology Via Nephrostomy Tract

Outcome

Postoperative imaging confirmed a significant reduction in the stone burden within the horseshoe kidney's right moiety. The patient reported relief from pain and hematuria. Follow-up imaging conducted indicated minimal residual stone fragments, which were managed conservatively. Notably, the patient's renal function remained stable throughout the treatment process.

Discussion

Addressing renal stone burden in horseshoe kidneys necessitates innovative solutions owing to the unique anatomical complexities and stone distribution patterns. Conventional endourological interventions might prove inadequate or excessively invasive in such scenarios. The inventive application of flexible scope technology via a nephrostomy tract offers a viable, secure, and effective alternative for managing intricate stone burdens in horseshoe kidneys. This approach enables direct stone access, diminishes the risk of multiple punctures, and minimizes the need for extensive manipulation. ESWL (extracorporeal shock wave lithotripsy) though it is noninvasive is not an effective means of treatment of stone in congenital anomalies due to abnormal position of the kidney and inability to focus the Shockwaves.

Conclusion

The utilization of flexible scope technology through a nephrostomy tract presents a novel and promising strategy for managing complex renal stone burdens in horseshoe kidneys. By overcoming the challenges associated with this congenital anomaly's complex anatomy and stone distribution, this technique offers a valuable option for improved patient outcomes [1-4].

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