

Retrograde intrarenal surgery

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Abstract

Retrograde intrarenal surgery (RIRS) performed using a flexible instrument passed through the lower urinary tract and ureter in the retrograde fashion led to beginning of a new era in urology. RIRS has been used to treat small kidney stones and upper urinary tract tumours in minimally invasive method. RIRS allows complete visualization of the entire renal collecting system and it is a safe, technically feasible and effective treatment modality for upper tract stones. RIRS is associated with less complication, less morbidity, lower hospitalization, earlier return to work and good stone free rate.

Introduction

Retrograde intrarenal surgery (RIRS) performed using a flexible instrument passed through the lower urinary tract and ureter in the retrograde fashion led to beginning of a new era in urology [1]. RIRS has become possible resulting from the development of miniaturized flexible ureteroscopes with improved optics, better deflection mechanism and appropriate accessory instruments for stone retrieval and fragmentation [1,2]. RIRS is minimally invasive method with fewer complications, and it is especially useful in patients with various co morbidities, patients with complex renal anatomy, patients taking anticoagulants, and patients with bleeding disorders [3].

Indications for RIRS

RIRS has been used to treat small kidney stones and upper urinary tract tumours in minimally invasive method [3].

Therapeutic indications for stone disease [4]

- <1.5 cm radiolucent stones
- Failure of ESWL
- Stone in calyceal diverticula
- RIRS as an adjunct to ESWL or PCNL
- Concomitant renal and ureteral stones

Other therapeutic indications [4,5]

- Treatment of upper urinary tract cancer
- Endopyelotomy of PUJ obstruction
- Endoscopic management of ureteric strictures
- Endoscopic management of upper tract bleeding vessels
- Retrograde assisted percutaneous renal puncture in difficult cases

Diagnostic indications [4,5]

- Evaluation of filling defects on imaging
- Evaluation of haematuria

- Evaluation of positive upper tract urinary cytology
- Follow up after conservative treatment of upper tract tumour

Contraindication of RIRS [6]

- Active untreated urinary tract infection (UTI)
- Anaesthetic contraindications

Instruments used in RIRS [7]

- Flexible ureterorenoscope and semi-rigid ureterorenoscope
- Cystoscope
- C-arm fluoroscope
- Contrast
- Guidewires
- Ureteral catheter
- Ureteral dilatator
- Ureteral access sheath
- Holmium: YAG laser with laser fibres
- Stone basket

Technique

The procedure is done under general anaesthesia in the dorsal lithotomy position. The cystoscope is introduced in bladder and a guidewire is placed in the ureter till pelvicalyceal system under fluoroscopic guidance [8]. If needed, a ureteric dilator can be passed over guidewire to dilate the ureter for easy passage of flexible ureteroscopes. A 10 Fr infant feeding tube can be placed in the bladder for the drainage to prevent overdistention during the surgery [9].

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Flexible ureteroscope is advanced either over a guidewire directly or via a Ureteral access sheath under fluoroscopic control. Entire pelvicalyceal system is visualized and stone is searched. After the stone is visualized, it is fragmented using laser till clinically unimportant residual fragments. Double j stent can be placed, if needed after the completion of procedure [8,9].

Complications of RIRS [4,8]

- Hemorrhage
- Intrapelvic hematoma
- Mucosal injury
- Ureteral perforation and avulsion
- UTI and sepsis
- Urinoma

Conclusion

RIRS allows complete visualization of the entire renal collecting system and it is a safe, technically feasible and effective treatment modality for upper tract stones. RIRS is associated with less complication, less morbidity, lower hospitalization, earlier return to work and good stone free rate. With further improvement of technology and increasing experience, use of RIRS has been increased in various centres.

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