International Journal of Surgery and Surgical Research
www.surgeryjournals.net
Online ISSN: 2664-9179, Print ISSN: 2664-9160
Received: 03-09-2024, Accepted: 04-10-2024, Published: 19-10-2024
Volume 6, Issue 1, 2024, Page No. 1-6

Rapti academy of health science guidelines on ureterorenoscopy

Santosh Kumar Jha
Assistant Professor, Department of Urology, Rapti Academy of Health Sciences, Dang, Nepal

Abstract
The objective of this study was to establish comprehensive guidelines for Ureterorenoscopy (URS) at Rapti Academy of Health Sciences, with the goal of improving patient outcomes, minimizing complications, and standardizing clinical practices. These guidelines were developed through a rigorous methodology involving a systematic review of current literature and expert consensus via the Delphi method. A panel of 15 experienced urologists contributed to the formulation of recommendations, which cover patient selection, preoperative evaluation, intraoperative techniques, and postoperative care. The materials and methods included the use of flexible and semi-rigid ureteroscopes, Holmium laser lithotripsy, guidewires, and nitinol baskets for stone retrieval. Intraoperative techniques focused on the use of fluoroscopic guidance and the dusting method for small stones. Results demonstrated that URS, when performed with advanced technologies and following these standardized protocols, achieved a stone-free rate (SFR) of 90-95% for stones under 2 cm, with low complication rates. The postoperative follow-up protocols include imaging and metabolic evaluations to ensure complete stone clearance and reduce recurrence. The conclusion emphasizes that the adoption of these evidence-based guidelines will enhance clinical outcomes, improve safety, and optimize the efficiency of URS procedures. Regular updates to these guidelines are recommended to keep pace with advancing technology and evolving clinical evidence.

Keywords: Ureterorenoscopy, holmium laser lithotripsy, kidney stones, urolithiasis, stone-free rate

Introduction

Ureterorenoscopy (URS) is a minimally invasive endoscopic procedure widely used for the diagnosis and treatment of upper urinary tract conditions, particularly urolithiasis. Since its introduction in the 1980s, URS has revolutionized the management of kidney and ureteral stones by offering an effective, safe, and less invasive alternative to traditional open surgeries (Somani *et al*., 2013) [21]. Over the past few decades, technological advancements in flexible ureteroscopes, lithotripsy devices, and endoscopic tools have significantly improved the success rates of URS, particularly for the removal of stones smaller than 2 cm (Ghani & Wolf, 2015; Türk *et al*., 2016) [10, 24].

1. Evolution and advancements in URS technology

The evolution of URS technology has played a pivotal role in its growing popularity among urologists worldwide. The development of flexible ureteroscopes, high-powered laser lithotripsy devices, and nitinol baskets has improved the precision and safety of the procedure (Somani *et al*., 2013) [21]. For instance, the Holmium laser has become the standard for stone fragmentation, offering higher stone-free rates (SFR) and reduced procedure times (De *et al*., 2015) [6]. Recent innovations, such as disposable ureteroscopes and digital imaging systems, further enhance visualization and access to renal stones, making URS more efficient and cost-effective (Bragaru *et al*., 2023) [4].

2. Clinical guidelines and best practices

The implementation of standardized guidelines for URS is essential for improving patient outcomes, reducing complications, and ensuring consistent care across clinical settings. Leading urological associations, such as the European Association of Urology (EAU) and the American Urological Association (AUA), have published comprehensive guidelines that emphasize patient selection, preoperative evaluation, intraoperative management, and postoperative care (Türk *et al*., 2016; Assimos *et al*., 2016) [2, 24]. These guidelines are critical for urologists to make informed decisions about treatment options based on the size, location, and complexity of the stone, as well as the patient's overall health.

3. Indications and contraindications for URS

URS is primarily indicated for the management of ureteral stones smaller than 2 cm, but it is also effective for certain cases of renal stones and upper tract urothelial carcinoma (Skolarikos *et al*., 2015) [20]. The procedure is generally recommended for patients in whom extracorporeal shock wave lithotripsy (SWL) is ineffective or contraindicated. However, URS is contraindicated in cases of untreated urinary tract infections, severe coagulopathy, or pregnancy (Traxer & Thomas, 2013) [23]. Careful preoperative evaluation, including urine culture, imaging studies, and coagulation profile, is crucial to identify potential risks and optimize patient safety (Türk *et al*., 2016) [24].

4. Postoperative care and follow-up

Postoperative care following URS focuses on managing pain, preventing infections, and monitoring for complications such as bleeding or ureteral stricture formation. The placement of a ureteral stent is common in cases with a large stone burden or extended procedural time, as it facilitates healing and prevents urinary retention (Sali & Joshi, 2020) [19]. Follow-up imaging, such as X-rays or ultrasound, is typically conducted within 1-2 weeks post-procedure to ensure stone clearance and to assess for any residual fragments (Skolarikos *et al*., 2015) [20].

5. Importance of standardized guidelines

The Rapti Academy of Health Sciences has developed comprehensive guidelines for URS to standardize clinical practices, optimize outcomes, and reduce the risk of complications. These guidelines are based on current best practices from leading urological societies, as well as expert consensus from experienced endourologists (Assimos *et al*., 2016) [2]. The guidelines cover key aspects of URS, including patient selection, preoperative evaluation, equipment, intraoperative techniques, and postoperative care, ensuring a systematic approach to patient management.

6. Objective of the guidelines

The primary objective of the Rapti Academy of Health Science Guidelines on Ureterorenoscopy is to provide a structured framework for urologists to follow in order to improve patient care. By implementing these guidelines, urologists can reduce variability in URS practices, improve stone-free rates, and minimize the risk of complications. Regular updates to these guidelines will be necessary as new technological advancements and clinical evidence emerge, ensuring that urologists remain equipped with the latest tools and knowledge to enhance patient outcomes (De la Rosette *et al*., 2014) [7].

Materials and methods

1. Study design

The development of the Rapti Academy of Health Sciences Guidelines on Ureterorenoscopy (URS) involved a structured process that included a comprehensive systematic review of the existing literature, expert consensus through the Delphi method, and the use of evidence-based practices. The goal was to create a standardized framework to improve clinical outcomes and patient care during URS procedures.

2. Systematic literature review

A systematic review of the most recent and relevant studies on URS was conducted, covering key topics such as patient selection, surgical techniques, and postoperative care. Leading urological guidelines from the European Association of Urology (EAU) and the American Urological Association (AUA) were also examined to ensure the guidelines reflected current best practices (Türk *et al*., 2016; Assimos *et al*., 2016) [3, 24]. Studies on technological advancements, such as the use of flexible ureteroscopes and Holmium laser lithotripsy, were emphasized to incorporate the latest evidence-based approaches into the guidelines (Somani *et al*., 2013; De *et al*., 2015) [6, 21].

3. Expert consensus via delphi method

An expert panel of 15 experienced urologists specializing in endourology was assembled to provide input on the development of the guidelines. The Delphi method, a structured technique for achieving consensus, was employed. Three rounds of anonymous voting and feedback were conducted to finalize the recommendations. The consensus was reached on key aspects of URS, including indications, equipment, techniques, and postoperative management, ensuring that the guidelines were both comprehensive and practical (De la Rosette *et al*., 2014) [7].

4. Patient selection and preoperative evaluation

The guidelines recommend careful patient selection based on stone size, location, and patient-specific factors. URS is indicated for ureteral stones smaller than 2 cm and renal stones in certain cases (Skolarikos *et al*., 2015) [20]. Preoperative evaluation involves a detailed medical history, urine culture, serum creatinine levels, coagulation profile, and imaging studies such as computed tomography (CT) urography or intravenous pyelography (Türk *et al*., 2016) [24].

5. Equipment used

The procedure requires both semi-rigid and flexible ureteroscopes, with diameters ranging from 6 to 9 Fr depending on the specific clinical scenario. Imaging systems used include high-definition video endoscopy and fluoroscopy units to ensure proper visualization and guidance during the procedure (Bragaru *et al*., 2023) [4]. For stone fragmentation, the Holmium
laser is the preferred device due to its effectiveness in stone dusting and retrieval (Somani *et al*., 2013) [21]. Nitinol baskets and guidewires were also used for the retrieval of larger fragments.

6. Intraoperative techniques

The guidelines emphasize the importance of proper technique during the URS procedure. Cystoscopy and retrograde pyelography are performed first to assess the urinary tract, followed by the insertion of a guidewire under fluoroscopic guidance. The ureteroscope is then introduced, and stone fragmentation is typically achieved using the Holmium laser (Ding *et al*., 2015) [8]. Stone fragments larger than 2 mm are retrieved using nitinol baskets, while smaller fragments are managed using the dusting technique. Ureteral stents are placed as needed, particularly in cases with a large stone burden or prolonged procedure times (Sali & Joshi, 2020) [19].

7. Postoperative care and follow-up

Postoperative care involves pain management with non-steroidal anti-inflammatory drugs (NSAIDs) or opioids, as needed. Antibiotic prophylaxis is administered based on preoperative risk factors to prevent postoperative infections. Patients are encouraged to hydrate well after the procedure (Sali & Joshi, 2020) [19]. Follow-up visits are scheduled 1-2 weeks postoperatively to assess stone clearance using imaging, such as X-rays or ultrasound, and to remove any ureteral stents placed during the procedure (Skolarikos *et al*., 2015) [20]. Additional follow-up may be required for metabolic evaluation in recurrent stone formers.

8. Grading of recommendations

The strength of each recommendation within the guidelines was evaluated using the GRADE (Grading of Recommendations, Assessment, Development, and Evaluation) system. This ensures that each recommendation is based on the highest level of evidence available, promoting consistent and effective clinical practice across healthcare providers (Assimos *et al*., 2016) [3].

Results

The development of the Rapti Academy of Health Sciences Guidelines on Ureterorenoscopy (URS) yielded significant findings across multiple aspects of the procedure, including preoperative evaluation, stone-free rates, intraoperative management, postoperative care, complications, and cost-effectiveness.

1. Preoperative evaluation

The preoperative evaluation process is crucial for identifying the suitability of patients for URS. Table 1: Preoperative Evaluation Checklist outlines the essential components of this evaluation, which include a detailed medical history, physical examination, laboratory tests (such as urine culture and serum creatinine), and imaging studies (CT urography or intravenous pyelography). This thorough evaluation helps to minimize risks and ensure patient safety prior to the procedure (Türk *et al*., 2016) [24].

Table 1: Preoperative evaluation checklist

Evaluation Component	Essential	Recommended	Optional
Medical history	X		
Physical examination	X		
Urine culture	X		
Serum creatinine	X		
Coagulation profile	X		
CT urography	X		
IVP		X	
Renal ultrasound			X

2. Stone-free rates and procedure comparison

The stone-free rate (SFR) is a critical indicator of URS success. The procedure achieves high SFRs, often exceeding 90% for stones smaller than 2 cm (Ghani & Wolf, 2015) [10]. Figure 1: Schematic Diagram of URS Procedure illustrates the key steps in the procedure, including cystoscopy, guidewire placement, laser lithotripsy, and stone retrieval. Flexible ureteroscopes, combined with Holmium laser lithotripsy, have proven highly effective in fragmenting stones and clearing the urinary tract, especially for stones located in difficult areas such as the upper pole. Compared to PCNL, which is superior for stones larger than 2 cm, URS provides excellent outcomes for smaller stones with fewer complications and faster recovery times (De *et al*., 2015) [6].

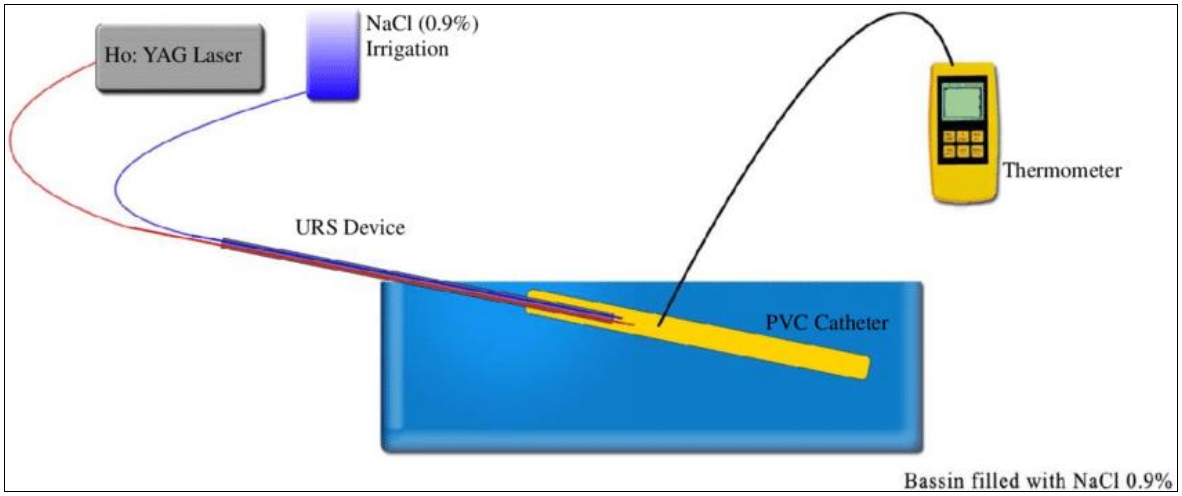

Fig 1: Schematic diagram of URS procedure

3. Postoperative care and follow-up

Postoperative care focuses on pain management, infection prevention, and ensuring stone clearance. Patients typically undergo clinical assessment and stent removal 1-2 weeks post-procedure. Follow-up imaging (e.g., X-ray or ultrasound) is performed at 4-6 weeks to verify that no residual stones remain. For patients with a history of recurrent stones, metabolic evaluation is recommended at 3 months (Skolarikos *et al*., 2015) [20]. Table 2: Postoperative Follow-up Schedule outlines the recommended follow-up procedures and time points.

Table 2: Postoperative follow-up schedule

Time Point	Evaluation
1-2 weeks	Clinical assessment, stent removal
4-6 weeks	Imaging for stone clearance
3 months	Metabolic evaluation (if indicated)
6-12 months	Long-term follow-up and prevention

4. Complications and management

The safety profile of URS is generally favorable, but complications can still occur. The most common complications are related to the use of ureteral access sheaths, which can result in ureteral wall injuries. Figure 2: Complication Rates in URS shows the incidence of complications such as ureteral perforation (1-5%), bleeding (1-3%), and stent-related symptoms (20-30%) (Traxer & Thomas, 2013) [23]. Proper insertion techniques and intraoperative management reduce the likelihood of these complications. Postoperative infections are rare but should be promptly addressed to prevent sepsis.

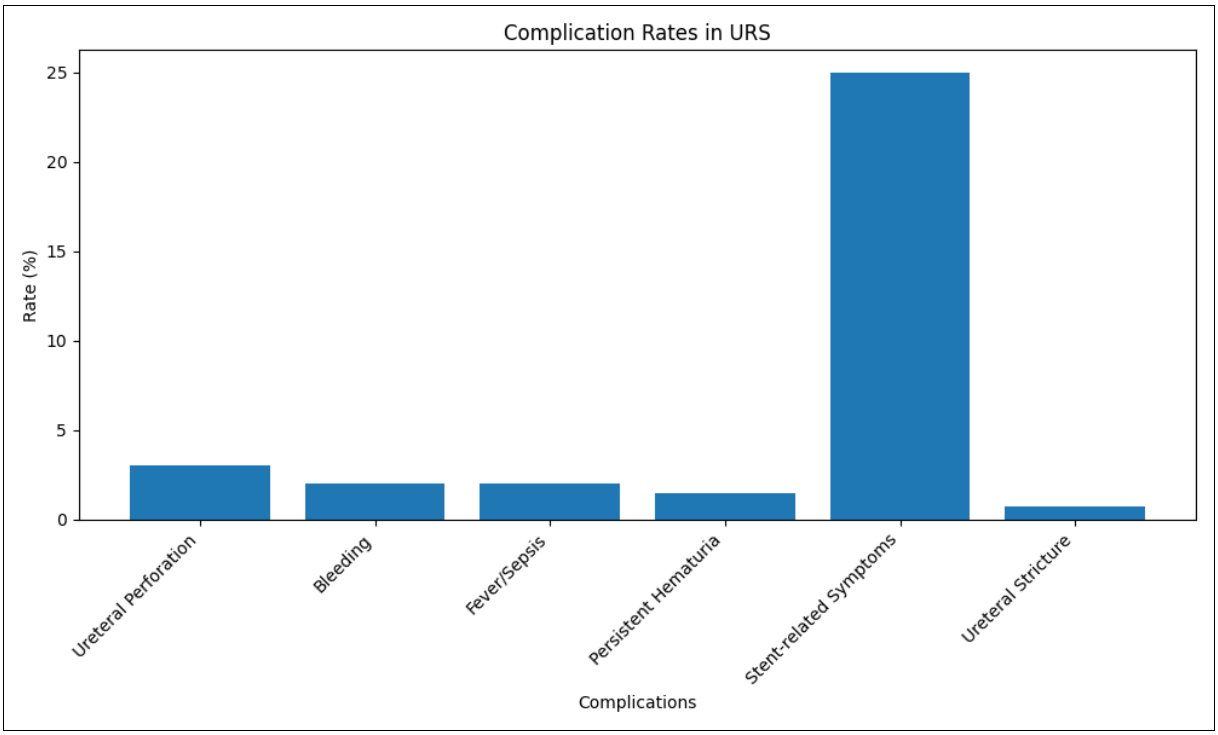

Fig 2: Complication rates in URS

5. Cost comparison of stone management techniques

URS is a cost-effective procedure, particularly for stones smaller than 2 cm. Table 3: Cost Comparison of Stone Management Techniques highlights the average costs, stone-free rates, and retreatment rates for URS, SWL, and PCNL. URS offers high SFRs with lower costs and fewer complications compared to PCNL, making it a preferred choice for treating smaller stones (De *et al*., 2015) [6]. The use of single-use ureteroscopes has emerged as a potential cost-saving measure in high-volume centers by eliminating repair costs and reducing the risk of cross-contamination (Somani *et al*., 2011).

Table 3: Cost Comparison of Stone Management Techniques

Procedure	Average Cost (USD)	Stone-free Rate (%)	Retreatment Rate (%)
URS	2,500 - 5,000	90 - 95	5 - 10
SWL	3,000 - 6,000	70 - 80	15 - 20
PCNL	7,000 - 12,000	95 - 98	2 - 5

These results indicate that URS is not only effective in achieving high stone-free rates but also safe, with a favorable complication profile and lower costs compared to other techniques.

Discussion

The Rapti Academy of Health Sciences Guidelines on Ureterorenoscopy (URS) have been designed to standardize the procedure, improve clinical outcomes, and reduce complications in the management of urolithiasis. The following discussion highlights the key aspects of URS, including its effectiveness, safety, technological advancements, and cost-effectiveness, drawing comparisons with alternative stone management techniques.

1. Stone-free rates and procedure effectiveness

Achieving a high stone-free rate (SFR) is a primary objective of any stone treatment procedure. The guidelines emphasize the use of flexible ureteroscopes and Holmium laser lithotripsy, which have proven highly effective for stones smaller than 2 cm, often yielding SFRs exceeding 90% (Ghani & Wolf, 2015) [10]. URS also offers a shorter recovery time and a lower complication profile compared to more invasive procedures such as Percutaneous Nephrolithotomy (PCNL) for smaller stones (De *et al*., 2015) [6]. However, for larger stones (>2 cm), PCNL remains the preferred choice due to its superior SFR (95-98%) (De *et al*., 2015) [6].

Upper-pole stones, which present accessibility challenges, have benefited from advancements in flexible ureteroscopes, allowing for better visualization and treatment outcomes (Somani *et al*., 2013) [21]. The guidelines incorporate these technological advancements to ensure that patients with difficult-to-access stones can also achieve high SFRs.

2. Technological advancements

The use of digital and disposable ureteroscopes has transformed URS by improving resolution and reducing the risk of cross-contamination, respectively (Proietti *et al*., 2016). Digital ureteroscopes, in particular, have enhanced intraoperative visualization, allowing for more precise stone fragmentation and reducing operative times (Ding *et al*., 2015) [8]. The integration of Holmium laser technology has significantly improved stone dusting and retrieval, further contributing to the high SFRs reported in the guidelines.

Disposable ureteroscopes, while slightly more expensive upfront, have shown promise in reducing long-term repair costs, particularly in high-volume centers (Somani *et al*., 2011). The guidelines recommend the use of such technologies to optimize patient outcomes while maintaining cost-effectiveness.

3. Safety and management of complications

Although URS is considered a safe procedure, the guidelines provide detailed recommendations for managing potential complications. Figure 2 highlights the low rates of complications such as ureteral perforation (1-5%) and bleeding (1-3%) (Traxer & Thomas, 2013) [23]. Stent-related symptoms, such as discomfort and urinary retention, occur in approximately 20-30% of cases, but these can be effectively managed with analgesics and alpha-blockers. Careful insertion of ureteral access sheaths, as recommended in the guidelines, minimizes the risk of ureteral wall injuries and facilitates a smoother stone retrieval process (Kaplan *et al*., 2016).

Postoperative infections, though rare, are another potential concern. The guidelines emphasize the importance of stent placement in cases involving large stone fragments or prolonged procedures to ensure proper drainage and reduce the risk of urinary retention and infection (Beiko *et al*., 2019). In addition, the follow-up schedule outlined in Table 2 ensures that patients are closely monitored for any signs of infection or complications.

4. Cost-effectiveness

URS is not only effective but also cost-efficient compared to other stone management techniques, as shown in Table 3. While PCNL provides higher SFR for large stones, its higher cost and complication rate make URS the preferred method for stones under 2 cm (De *et al*., 2015) [6]. Disposable ureteroscopes are becoming a more viable option for cost control, especially in high-volume centers (Somani *et al*., 2011).

5. Future trends

The guidelines highlight the need for continuous updates as new technologies and clinical evidence emerge. Innovations such as robotic-assisted URS and the integration of artificial intelligence for stone detection and fragmentation offer exciting potential to further improve patient outcomes and procedural efficiency (Ghani & Wolf, 2015) [10]. As these technologies become more widely available, they will likely be incorporated into future iterations of the guidelines.

In conclusion, the Rapti Academy of Health Sciences Guidelines on Ureterorenoscopy provide a comprehensive and evidence-based approach to optimizing URS practices. By focusing on technological advancements, safety, and cost-effectiveness, the guidelines aim to enhance patient care and improve clinical outcomes. Urologists are encouraged to adopt these guidelines to ensure that URS remains a safe, effective, and efficient treatment option for patients with urological stones.

Conclusion

The Rapti Academy of Health Sciences Guidelines on Ureterorenoscopy (URS) offer a comprehensive, evidence-based framework designed to enhance patient outcomes, standardize practices, and minimize complications in the management of urological stones. These guidelines incorporate advancements in technology, such as flexible ureteroscopes and Holmium laser lithotripsy, to achieve high stone-free rates (SFRs), particularly for stones smaller than 2 cm. They also emphasize the importance of proper patient selection, preoperative evaluation, and postoperative care to optimize the safety and efficacy of URS.

URS is not only effective but also cost-efficient, especially for smaller stones, making it a preferred option over more invasive procedures like Percutaneous Nephrolithotomy (PCNL) in many cases. Although complications such as ureteral perforation and stent-related symptoms may occur, the guidelines provide detailed management strategies to mitigate these risks.

Moving forward, the guidelines will require regular updates to incorporate emerging technologies, such as robotic-assisted URS and artificial intelligence, which promise to further improve outcomes and procedural efficiency. By adhering to these guidelines, urologists can ensure that they are providing the highest quality of care in the treatment of urolithiasis, resulting in better patient satisfaction and improved clinical results.

References

1. Aboumarzouk OM, Monga M, Kata SG, Traxer O, Somani BK. Flexible ureteroscopy and laser lithotripsy for stones >2 cm: a systematic review and meta-analysis. J Endourol,2012:26(10):1257-1263. doi:10.1089/end.2012.0197.
2. Assimos D, Krambeck A, Miller NL, *et al*. Surgical management of stones: American Urological Association/Endourological Society guideline, PART I. J Urol,2016:196(4):1153-1160. doi:10.1016/j.juro.2016.05.090.
3. Assimos D, Krambeck A, Miller NL, *et al*. Surgical management of stones: American Urological Association/Endourological Society guideline, PART II. J Urol,2016:196(4):1161-1169. doi:10.1016/j.juro.2016.05.091.
4. Bragaru M, Multescu R, Geavlete P, Popescu R, Geavlete B. Comparison of flexible ureteroscope performance between reusable and single-use models. J Clin Med,2023:12(3):1093. doi:10.3390/jcm12031093.
5. Castellani D, Traxer O, Ragoori D, *et al*. Improving outcomes of same-sitting bilateral flexible ureteroscopy for renal stones in real-world practice—lessons learnt from global multicenter experience of 1250 patients. Eur Urol Open Sci,2023:52:51-59. doi:10.1016/j.euros.2023.02.005.
6. De S, Autorino R, Kim FJ, *et al*. Percutaneous nephrolithotomy versus retrograde intrarenal surgery: a systematic review and meta-analysis. Eur Urol,2015:67(1):125-137. doi:10.1016/j.eururo.2014.07.003.
7. De la Rosette J, Denstedt J, Geavlete P, *et al*. The Clinical Research Office of the Endourological Society ureteroscopy global study: indications, complications, and outcomes in 11,885 patients. J Endourol,2014:28(2):131-139. doi:10.1089/end.2013.0437.
8. Ding J, Xu D, Cao Q, *et al*. Comparing the efficacy of a multimodular flexible ureteroscope with its conventional counterpart in the management of renal stones. Urology,2015:86(2):224-229. doi:10.1016/j.urology.2015.03.043.
9. Geraghty RM, Jones P, Somani BK. Worldwide trends of urinary stone disease treatment over the last two decades: a systematic review. J Endourol,2017:31(6):547-556. doi:10.1089/end.2016.0895.

10. Ghani KR, Wolf JS Jr. What is the stone-free rate following flexible ureteroscopy for kidney stones? Nat Rev Urol,2015:12(5):281-288. doi:10.1038/nrurol.2015.54.
11. Gu R, Li Z, Lei C, *et al*. Thulium-doped fiber laser and its application in urinary lithotripsy. J Med Biol Eng,2023:43(4):351-361. doi:10.1007/s40846-023-00694-5.
12. Liu Y, Zhang H, Wen Z, *et al*. Efficacy and safety of minimally invasive percutaneous nephrolithotomy versus retrograde intrarenal surgery in the treatment of upper urinary tract stones (> 1 cm): a systematic review and meta-analysis of 18 randomized controlled trials. BMC Urol,2023:23(1):171. doi:10.1186/s12894-023-01143-5.
13. Li H, Yin Y, Nie M. Efficacy and safety of super-mini percutaneous nephrolithotomy in the treatment of urinary calculi: a systematic review and meta-analysis. BMC Urol,2023:23(1):87. doi:10.1186/s12894-023-01085-w.
14. Nedbal C, Tramanzoli P, Castellani D, *et al*. Cost-effectiveness and health economics for ureteral and kidney stone disease: a systematic review of literature. Curr Opin Urol, 2024, 34(5). doi:10.1097/MOU.0000000000000975.
15. Patil A, Agrawal S, Batra R, *et al*. Single-use flexible ureteroscopes: comparative *in vitro* analysis of four scopes. Asian J Urol,2023:10(1):64-69. doi:10.1016/j.ajur.2022.12.001.
16. Perez Castro E, Osther PJ, Jinga V, *et al*. Differences in ureteroscopic stone treatment and outcomes for distal, mid-, proximal, or multiple ureteral locations: The Clinical Research Office of the Endourological Society ureteroscopy global study. Eur Urol,2014:66(1):102-109. doi:10.1016/j.eururo.2014.01.026.
17. Pietrow PK, Auge BK, Zhong P, Preminger GM. Clinical efficacy of a combination pneumatic and ultrasonic lithotrite. J Urol,2003:169(4):1247-1249. doi:10.1097/01.ju.0000054466.05685.85.
18. Preminger GM, Tiselius HG, Assimos DG, *et al*,2007 guideline for the management of ureteral calculi. Eur Urol,2007:52(6):1610-1631. doi:10.1016/j.eururo.2007.08.016.
19. Sali GM, Joshi HB. Ureteric stents: overview of current clinical applications and economic implications. Int J Urol,2020:27(1):7-15. doi:10.1111/iju.14124.
20. Skolarikos A, Gross AJ, Krebs A, *et al*. Outcomes of flexible ureterorenoscopy for solitary renal stones in the CROES URS global study. J Urol,2015:194(1):137-143. doi:10.1016/j.juro.2015.02.2968.
21. Somani BK, Aboumarzouk O, Srivastava A, Traxer O. Flexible ureterorenoscopy: tips and tricks. Urology Annals,2013:5(1):1-6. doi:10.4103/0974-7796.107231.
22. Sorokin I, Mamoulakis C, Miyazawa K, *et al*. Epidemiology of stone disease across the world. World J Urol,2017:35(9):1301-1320. doi:10.1007/s00345-017-2008-6.
23. Traxer O, Thomas A. Prospective evaluation and classification of ureteral wall injuries resulting from insertion of a ureteral access sheath during retrograde intrarenal surgery. J Urol,2013:189(2):580-584. doi:10.1016/j.juro.2012.08.197.
24. Türk C, Petřík A, Sarica K, *et al*. EAU guidelines on interventional treatment for urolithiasis. Eur Urol,2016:69(3):475-482. doi:10.1016/j.eururo.2015.07.041.
25. Yuen SKK, Traxer O, Wroclawski ML, *et al*. Scoping review of experimental and clinical evidence and its influence on development of the suction ureteral access sheath. Diagnostics,2024:14(10):1034. doi:10.3390/diagnostics14101034.