

Worldwide survey of flexible ureteroscopy practice: a survey from European Association of Urology sections of young academic urologists and uro-technology groups

Amelia Pietropaolo¹, Ewa Bres-Niewada², Andreas Skolarikos³, Evangelos Liatsikos⁴, Panagiotis Kallidonis⁴, Omar Aboumarzouk⁵, Thomas Tailly⁶, Silvia Proietti⁷, Oliver Traxer⁸, Guido Giusti⁷, Nick Rukin⁹, Mehmet Özsoy¹⁰, Michele Talso¹¹, Sener Tarik Emre¹², Esteban Emiliani¹³, Gokhan Atis¹⁴, Bhaskar K. Somani^{1,15}

¹University Hospital Southampton NHS Foundation Trust, Department of Urology, Southampton, United Kingdom

²Roefler Memorial Hospital, Department of Urology, Pruszków, Poland

³University of Athens, 2nd Department of Urology, Athens, Greece

⁴University of Patras, Department of Urology, Patras, Greece

⁵NHS Greater Glasgow and Clyde, Department of Urology, Glasgow, United Kingdom

⁶Universitair Ziekenhuis Gent, Department of Urology, Gent, Belgium

⁷IRCCS San Raffaele Scientific Institute, Ville Turro Division, Department of Urology, Milan, Italy

⁸Tenon Hospital, Assistance Publique-Hopitaux De Paris, Pierre et Marie Curie University, Department of Urology, Paris, France

⁹Metro North Hospitals and Health Service, Brisbane, Australia

¹⁰Medical University of Vienna, Vienna General Hospital, Department of Urology, Vienna, Austria

¹¹ASST Vimercate Hospital, Department of Urology, Vimercate, Monza Brianza, Italy

¹²Marmara University, Department of Urology, Istanbul, Turkey

¹³Fundació Puigvert, Urolithiasis Division, Barcelona, Spain

¹⁴Istanbul Medeniyet University, Department of Urology, Istanbul, Turkey

¹⁵University of Southampton, Southampton, United Kingdom of Great Britain and Northern Ireland

Citation: Pietropaolo A, Bres-Niewada E, Skolarikos A, et al. Worldwide survey of flexible ureteroscopy practice: a survey from European Association of Urology sections of young academic urologists and uro-technology groups. Cent European J Urol. 2019; doi: 10.5173/ceju.2019.0041 [Epub ahead of print]

Article history

Submitted: Sept. 22, 2019

Accepted: Oct. 9, 2019

Published online: Oct. 14, 2019

Corresponding author

Bhaskar K. Somani
University Hospital
Southampton
NHS Foundation
Department of Urology
Southampton, UK
phone: 023 812 068 73
bhaskarsomani@yahoo.com

Introduction To understand the current practice of flexible ureteroscopy (fURS), we conducted a worldwide survey among urologists with a special interest in endourology.

Material and methods A 42-question survey was designed after an initial consultation with European Association of Urology young academic urologists (YAU) and uro-technology (ESUT) groups. This was distributed via the SurveyMonkey® platform and an ESUT meeting to cover practice patterns and techniques in regard to ureteroscopy usage worldwide.

Results A total of 114 completed responses were obtained. A safety guidewire was reportedly used by 84.5% of endourologists, an access sheath was always or almost always used by 71% and a reusable laser fibre was used by two-thirds of respondents. While a combination of dusting and fragmentation was used by 47% as a preferred mode of intra-renal stone treatment, some used dusting (43%) or fragmentation with basketing (10%).

Disposable scopes were only used by 40% and three quarters of them used it for challenging cases only. Antibiotic prophylaxis was limited to a single peri-operative dose by two-thirds (67%) of respondents. The procedural time was limited to between 1–2 hours by two-thirds (70%) of respondents and very rarely (7.4%) it exceeded 2 hours. The irrigation method varied between manual pump (46%), mechanical irrigation (22%) or gravity irrigation (27%).

Conclusions Our survey shows a wide variation in the available endourological armamentarium and surgical practice amongst urologists. However, there seems to be a broad agreement in the use of peri-operative antibiotics, access sheath usage, method of stone treatment and the use of post-operative stent.

Key Words: survey ↔ ureteroscopy ↔ endourology ↔ urolithiasis ↔ laser ↔ stone
↔ flexible ↔ access sheath ↔ fragmentation

INTRODUCTION

Flexible ureteroscopy (fURS) and laser lithotripsy is widely used by urologists for the management of urolithiasis with high success rate and low complications rates [1].

This has become the most common form of surgical stone management worldwide thanks to widespread availability of technology such as fibre optic and digital flexible ureteroscopes along with access sheath, accessories and new laser techniques [2–5]. In addition to this, the endourology armamentarium now has smaller instruments and better imaging, increasing the success of fURS. The introduction of disposable fURS has increased the possibility of training and the availability of scopes in smaller hospitals.

While the technique and technology has had a wider uptake, the overall cost of treatment is still unclear and often debatable [6]. Studies have proven the safety and cost-effectiveness of these disposable fURS although the long-term impact is still unknown. Despite a wider availability of fURS, not all urology departments have access to it. A lot of hospitals still rely on older equipment and are unable to keep up with progress due to economic or social reasons.

To understand the current practice of flexible ureteroscopy, we conducted a worldwide survey among urologists with a special interest in endourology.

MATERIAL AND METHODS

A 42-question survey was designed after an initial consultation with the European Association of Urology (EAU) young academic urologists (YAU) and uro-technology (ESUT) groups. Once approved, this was distributed via the SurveyMonkey® platform to cover practice patterns and techniques in regard to ureteroscopy (URS) usage worldwide. The questionnaire was also distributed during the bi-annual ESUT meeting in 2018. The design of the questionnaire covered the background and professional experience of respondents and consultants and the results were anonymously tabulated in order to determine practice patterns of ureteroscopy usage among endourologists.

RESULTS

A total of 114 completed responses were obtained with an average time of 5.4 minutes needed to complete the questionnaire. The majority of responses were from Europe. Of the respondents, 77% were endourologists and 23% were general urologists (Table 1). Included were 48.5% consultants of which 59% were from university hospitals, working in urology departments with 5–8 consultants or more. While a quarter of the centres performed in excess of 200

Table 1. Demographics of endourological responses

What is your subspecialty interest?							
General Urology – 22.8%				Endourology – 77.2%			
How many renal/ureteric stone cases does your unit deal with annually?							
<25	25–50	50–100	100–150	150–200	>200	not sure	
1.7%	3.5%	5.3%	13.2%	19.4%	55.5%	0.8%	
How many flexible ureteroscopes do you have in your unit?							
1	2	3	4	>5	>10	not sure	
5.2%	27%	22.2%	12%	23.1%	8.4%	1.9%	
How many of these flexible scopes are 'digital' scopes?							
1	2	3	4	>5	>10	not sure	
32%	29.5%	10.2%	8.2%	7.9%	1.1%	11.4%	
What is the estimated number of flexible ureteroscopies performed in your unit annually?							
<25	25–50	51–100	101–200	>201	not sure		
10%	15.4%	25.4%	25.4%	22.7%	0.9%		
Over the last year how many flexible ureteroscopes have been damaged?							
1	2	3	>5	>10			
36.6%	29.7%	9.9%	15.8%	7.7%			
Which is the most frequent damage to your scope?							
Laser damage	Loss of deflection	Optical damage	Don't know				
23.7%	22.7%	31.7%	21.7%				

flexible ureteroscopies annually, another 50% of the centres performed between 50-200 flexible ureteroscopies annually.

A safety guidewire was reportedly used by 84.5% of endourologists, of which 44% preferred a fully

hydrophilic wire and 36.6% used a wire with hydrophilic tip (Table 2). An access sheath was always or almost always used by 71% of respondents, and the preference was for a 10/12F sheath (37.6%) and 12/14F sheath (30%). A reusable laser fibre was used

Table 2. Technique and armamentarium used by the respondents

Do you routinely use a safety wire?					
Yes – 84.5%			No – 15.4%		
What is your routine wire for stone surgery?					
Standard PTFE	Hydrophilic tip	Full hydrophilic wire	Super-stiff wire		
16.6%	36.6%	43.7%	4.5%		
Do you routinely use access sheaths?					
Always	Almost always	Wherever necessary	Almost never	Never	
21.8%	50%	23.6%	3.6%	0.9%	
Do you routinely leave in a safety wire when using an access sheath?					
Yes – 64.2%			No – 35.7%		
What is your preferred treatment option for intra-renal stones?					
Dusting		Fragmentation and basket extraction		Combination	
43.1%		10%		46.7%	
Do you routinely use semi-rigid ureteroscopy prior to flexible ureteroscopy for renal stones?					
Always	Almost Always	Wherever possible	Almost never	Never	
27.7%	23%	16.8%	25%	7.4%	
Which factor contributes most to scope damage?					
Laser use	Sterilisation technique	Storage	Use of baskets	Access sheaths	
52.6%	37.9%	4.2%	4.2%	1%	
What proportion of your patients has a post-operative JJ stent placement?					
0–20%	20–40%	40–60%	60–80%	>80%	
1.8%	3.7%	13.7%	27.4%	52.8%	
How often do you stent after UAS use?					
0–20%	20–40%	40–60%	60–80%	>80%	
2.7%	6.4%	9.5%	15.8%	65.7%	
What proportion of your cases is done using disposable (single use) ureteroscopes?					
None	0–20%	20–40%	40–60%	60–80%	>80%
59.4%	29.3%	4.6%	1.8%	1.8%	2.7%
If you use a single use ureteroscope, is it for:					
Regular use			Use in challenging cases only		
24.6%			75.3%		
How often do you perform bilateral ureteroscopy?					
Regularly		Occasionally		Never	
7.3%		67.8%		24.7%	
Regarding the irrigation, what do you use?					
Manual pump	Gravity	Mechanical pump	Syringe		
45.8%	26.6%	22%	5.2%		
Regarding the use of antibiotics, what do you use?					
Single dose during procedure		24 hours		Several days	
66.7%		11.6%		22.2%	

by two-thirds of respondents with most preferring a fibre size of between 200–272 micron. Scope reprocessing was done in dedicated sterilization units in 68% of cases and by off-site external companies in 25% of cases.

A pre-operative stent was used by more than half of respondents in three quarters of their cases. This increased to two-thirds of respondents when using an access sheath. A semi-rigid URS was routinely performed by more than half of the respondents for all patients. While a combination of dusting and fragmentation was used by 47% as a preferred mode of intra-renal stone treatment, some used dusting (43%) or fragmentation with basketing (10%). A post-operative stent was used by more than half of the respondents in three quarter of their cases and this increased to two-thirds of respondents with the use of an access sheath.

Ureteroscopy damage was reported as a single scope annually by 36.7% and 2 scopes annually by 30% of respondents. This damage involved fibre optics (32%), laser damage (24%) and loss of deflection (23%). The reason for damage was related to laser (53%), sterilization technique (37.5%) and due to storage and transport (38.2%). Disposable scopes were only used by 40% and three quarters of them used it for challenging cases only. Although bilateral ureteroscopy was a recognised technique for bilateral renal stones, it was regularly used by only 8% of respondents. Antibiotic prophylaxis was limited to a single peri-operative dose by two-thirds (67%) of respondents. The procedural time was limited to between 1–2 hours by two-thirds (70%) of respondents and very rarely (7.4%) it exceeded 2 hours. The irrigation method varied between manual pump (46%), mechanical irrigation (22%) or gravity irrigation (27%).

DISCUSSION

Kidney stone disease has been steadily rising over the last 2 decades due to climate changes associated with changes in diet and lifestyle, which results in a higher incidence of metabolic syndrome [7]. Flexible ureteroscopy is a recognised technique that balances a high stone-free rate with low complications rates. There has been a plethora of published papers in this area with recent data showing that fURS is comparatively cheaper than shock wave lithotripsy (SWL) [6].

The introduction of modern high-power lasers with newer lasertripsy methods has allowed treating large renal stones in complex patients with a reduced operating time [8]. The safety in high-risk patient groups is now well established and the use

of an access sheath allows for a reduction in intra-renal pressure.

The available equipment and expertise for fURS varied across various centres. A previous survey showed the endourological panorama in Italy [9]. Online surveys allow overseeing the availability and comparison of clinical practices. In a previous study by Zibelman and colleagues [10], they looked at the use of access sheaths amongst endourologists. An access sheath was used in 46% and 76% for ureteral and renal stones of the 216 respondents, with 12/14F as the most commonly used access sheath. Furthermore, 79% of respondents did not think that an access sheath increased the post-operative complications rate. For example, a recent study showed that high-grade injuries of the ureter due to the access sheath were not related to stricture formation [11]. Thus, the use of access sheath embraced by the majority of the respondents seems to show that the clinical practice reveals similar experience. Different irrigation techniques may result in different pressures and different thermal effect. The use of an access sheath may allow the combination of different irrigation techniques in the clinical practice as reflected in the survey. A similar study on URS complications was conducted by Cindolo et al. [12], who reviewed cases of life-threatening complications after semirigid or fURS. Data for URS outcomes was collected by individual centres. A survey by Pereira and colleagues [13] investigated the use of stenting after URS, with 75% of respondents admitting to inserting a stent after URS.

Our survey was conducted via the EAU section of uro-technology (ESUT) and SurveyMonkey®. This allowed a combination of expert endourologists as well as general urologists giving a wider view of the endourological practices, considering that stone surgery has a wide network of practicing clinicians. In a fast-changing field of endourology the survey results are pertinent to the current era but this might change in the future with growing armamentarium, technique and technology associated with fURS [14]. As the technique evolves, it is increasingly being used in pregnant patients and in the paediatric population [15, 16]. Although the procedure is standardised, future challenges includes optimisation of radiation exposure, decreasing stent usage and the cost associated with fURS and other endourological procedures [17–22]. SurveyMonkey® was chosen as the best method to distribute the questionnaire to participants. We acknowledge the limitations with internet based questionnaires, but it was felt this platform offered maximum participation across countries. As with all online questionnaires, there is some degree of selection bias for

participation. Despite this, the completion rate for the whole questionnaire questions were 100% as the survey cannot be partially completed online, a potential benefit of the SurveyMonkey® system.

CONCLUSIONS

Our survey shows a wide variation in the available endourological armamentarium and surgical practice amongst urologists. This includes the access or use of digital or disposable ureteroscopes. However, there seems to be a broad agreement in the

use of peri-operative antibiotics, access sheath usage, method of stone treatment and the use of post-operative stent.

CONFLICTS OF INTEREST

The authors declare that there is no conflict of interest from any of the co-authors.

No funding was received for this work.

ETHICAL APPROVAL

As this is a survey, no formal ethical approval was necessary.

References

- Somani BK, Giusti G, Sun Y, et al. Complications associated with ureterorenoscopy (URS) related to treatment of urolithiasis: the Clinical Research Office of Endourological Society URS Global study. *World J Urol.* 2017; 35: 675-681.
- Kronenberg P, Somani BK. Advances in Lasers for the Treatment of Stones- a Systematic Review. *Curr Urol Rep.* 2018; 19: 45.
- Rukin NJ, Siddiqui ZA, Chedgy ECP, Somani BK. Trends in Upper Tract Stone Disease in England: Evidence from the Hospital Episodes Statistics Database. *Urol Int.* 2017; 98: 391-396.
- Pietropaolo A, Proietti S, Geraghty R, et al. Trends of 'urolithiasis: interventions, simulation, and laser technology' over the last 16 years (2000-2015) as published in the literature (PubMed): a systematic review from European section of Uro-technology (ESUT). *World J Urol.* 2017; 35: 1651-1658.
- Somani BK, Robertson A, Kata SG. Decreasing the cost of flexible ureterorenoscopic procedures. *Urology.* 2011; 78: 528-530.
- Geraghty RM, Jones P, Herrmann TRW, Aboumarzouk O, Somani BK. Ureteroscopy is more cost effective than shock wave lithotripsy for stone treatment: systematic review and meta-analysis. *World J Urol.* 2018; 36: 1783-1793.
- Ishii H, Couzins M, Aboumarzouk O, Biyani CS, Somani BK. Outcomes of Systematic Review of Ureteroscopy for Stone Disease in the Obese and Morbidly Obese Population. *J Endourol.* 2016; 30: 135-145.
- Pietropaolo A, Jones P, Whitehurst L, Somani BK. Role of 'dusting and pop-dusting' using a high-powered (100 W) laser machine in the treatment of large stones (≥ 15 mm): prospective outcomes over 16 months. *Urolithiasis.* 2019; 47: 391-394.
- Proietti S, Somani BK, Pietropaolo A, et al. Italian endourological panorama: results from a national survey. *Cent European J Urol.* 2018; 71: 190-195.
- Zilberman DE, Lazarovich A, Winkler H, Kleinmann N. Practice patterns of ureteral access sheath during ureteroscopy for nephrolithiasis: a survey among endourologists worldwide. *BMC Urol.* 2019; 19: 58.
- Stern KL, Loftus CJ, Doizi S, Traxer O, Monga M. A prospective study analysing the association between high-grade ureteral access sheath injuries and the formation of ureteral strictures. *Urology.* 2019; 128: 38-41.
- Cindolo L, Castellan P, Primiceri G, et al. Life-threatening complications after ureteroscopy for urinary stones: survey and systematic literature review. *Minerva Urol Nefrol.* 2017; 69: 421-431.
- Pereira JF, Bower P, Jung, et al. Ureteral stenting practices following routine ureteroscopy: an international survey. *J Urol.* 2019; doi: 10.1007/s00345-019-02660-7 [Epub ahead of print].
- Al Janabi HF, Aydin A, Palaneer S, et al. Effectiveness of the HoloLens mixed-reality headset in minimally invasive surgery: a simulation-based feasibility study. *Surg Endosc.* 2019; doi: 10.1007/s00464-019-06862-3. [Epub ahead of print].
- Ishii H, Aboumarzouk O, Somani BK. Current status of ureteroscopy for stone disease in pregnancy. *Urolithiasis.* 2014; 42: 1-7.
- Esposito C, Masieri L, Bagnara V, Tokar B, Golebiewski A, Escolino M. Ureteroscopic lithotripsy for ureteral stones in children using holmium: yag laser energy: results of a multicentric survey. *J Pediatr Urol.* 2019; 15: 391.e1-391.e7.
- Rob S, Bryant T, Wilson I, Somani BK. Ultra-low-dose, low-dose, and standard-dose CT of the kidneys, ureters and bladder: is there a difference? Results from a systematic review of the literature. *Clin Rad.* 2017; 72: 11-15.
- Tzelves L, Somani B, Knoll T, et al. Level of knowledge on radiation exposure and compliance to wearing protective equipment: where do endourologists stand? An ESUT/EULIS survey. *World J Urol.* 2019; doi: 10.1007/s00345-019-02807-6 [Epub ahead of print].
- Bayne DB, Chi TL. Assessing. Cost-Effectiveness of New Technologies in Stone Management. *Urol Clin North Am.* 2019; 46: 303-313.
- Yoshida T, Inoue T, Taguchi M, et al. Efficacy and Safety of Complete Intraureteral Stent Placement versus Conventional Stent Placement in Relieving Ureteral Stent Related Symptoms: A Randomized, Prospective, Single Blind, Multicenter Clinical Trial. *J Urol.* 2019; 202: 164-170.
- Oliver R, Wells H, Traxer O, et al. Ureteric stents on extraction strings: a systematic review of literature. *Urolithiasis.* 2018; 46: 129-136.
- Wright A, Rukin N, Smith D, De la Rosette J, Somani BK. 'Mini, ultra, micro'- nomenclature and cost of these new minimally invasive percutaneous nephrolithotomy (PCNL) techniques. *Ther Adv Urol.* 2016; 8: 142-146. ■