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

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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.
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                               | 1.7%                    | 5.3%                |
| 25–50                             | 3.5%                    | 5.3%                |
| 50–100                            | 13.2%                   | 19.4%               |
| 100–150                           | 19.4%                   | 55.5%               |
| 150–200                           |                        |                     |
| >200                              |                        |                     |
| not sure                          |                        |                     |
| How many flexible ureteroscopes do you have in your unit? |                       |                     |
| 1                                 | 5.2%                    | 27%                 |
| 2                                 | 22.2%                   | 12%                 |
| 3                                 | 23.1%                   | 8.4%                |
| >5                                |                        |                     |
| >10                               |                        |                     |
| not sure                          |                        |                     |
| How many of these flexible scopes are ‘digital’ scopes? |                       |                     |
| 1                                 | 32%                     | 10.2%               |
| 2                                 | 29.5%                   | 8.2%                |
| 3                                 | 7.9%                    | 1.1%                |
| >5                                |                        |                     |
| >10                               |                        |                     |
| not sure                          |                        |                     |
| What is the estimated number of flexible ureteroscopies performed in your unit annually? |                       |                     |
| <25                               | 10%                     | 15.4%               |
| 25–50                             | 15.4%                   | 25.4%               |
| 51–100                            | 101–200                 | 25.4%               |
| >201                              | 22.7%                   | 0.9%                |
| not sure                          |                        |                     |
| Over the last year how many flexible ureteroscopes have been damaged? |                       |                     |
| 1                                 | 36.6%                   | 29.7%               |
| 2                                 | 9.9%                    | 15.8%               |
| 3                                 | 15.8%                   | 7.7%                |
| >5                                |                        |                     |
| >10                               |                        |                     |
| Which is the most frequent damage to your scope? |                       |                     |
| Laser damage                      | 23.7%                   | 22.7%               |
| Loss of deflection                | 22.7%                   | 31.7%               |
| Optical damage                    | 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

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

PTFE – polytetrafluoroethylene; UAS – ureteral access sheath
by two-thirds of respondents with most preferring a fibre size of between 200–272 µm. 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. Ureteroscope 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.

ETHICAL APPROVAL

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

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