

Surveys in endourology over time: what are the urologist preferences? A trend review over a 24-year period (2000–2024)

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Introduction Surveys are a powerful tool to investigate practice patterns and preferences among health care practitioners. This narrative review aims to analyse the trends of publications on surveys related to endourological procedures in the new millennium, to highlight changes and preferences in urologists' practice of urolithiasis.

Material and methods A literature search was conducted in Google Scholar and PubMed focusing on English language surveys published between 2000 and 2024 (24 years). The SPICE (Setting, Perspective, Intervention, Comparison, Evaluation) framework was used to frame and answer the question (S: urology practice; P: senior or training urologists; I: surveys since 2000 C: none; E: pathways in the management of urolithiasis). The studies were divided into two 12-year periods: period 1 (2000–2011) and period 2 (2012–2024). The studied procedures were related to the management of stone disease including ureteroscopy (URS), percutaneous nephrolithotomy (PCNL), and shockwave lithotripsy (SWL).

Results Over a 24-year timeframe, 27 surveys were selected on the subject, with a relative increase from period one to period two (23.7%). Notably, the technique experiencing significant growth was URS, with just one survey published in the initial period compared to 11 in the subsequent period and a decrease toward less utilisation of SWL. The surveys showed that urologists are moving towards minimisation of both PCNL and URS, with greater use of access sheath and lasers for fragmentation, although variations in practice patterns are observed worldwide, especially related to the use and duration of both pre- and post-operative stent insertions. Most surveys suggest that the majority of urologists follow international guidelines during their clinical practice.

Conclusions Endourology surveys have experienced steady growth in publications. Instrumentation trends emphasise miniaturisation, stent indications, laser types, and disposable ureteroscopes. Recently, there has been a focus on endourological training, imaging, ergonomics, and guidelines to enhance patient and surgical outcomes.

Key Words: endourology <> surveys <> trend review <> ureteroscopy <> percutaneous nephrolithotripsy <> shock wave lithotripsy

INTRODUCTION

Since the inception of the new millennium, significant advancements have been made in endoscopic

technology, prompting debates regarding optimal management pathways. Although clinical guidelines for the management of urinary calculi have gained widespread acceptance in both the United States (US)

and Europe, considerable variation remains for urologists to exercise personal discretion. The selection of therapeutic interventions for individual patients is often influenced by the availability of emerging technologies and the surgeon's level of proficiency. Currently, the armamentarium of urolithiasis treatment encompasses shockwave lithotripsy (SWL), ureteroscopy (URS), and percutaneous nephrolithotomy (PCNL), with a discernible trend towards a preference for URS over SWL in recent years [1].

The review aims to identify the evolution of different endourological intervention and their influence on practice patterns as highlighted by surveys over 2 decades.

MATERIAL AND METHODS

This narrative review adhered to the Cochrane Review guidelines and followed the preferred reporting items for systematic reviews (PRISMA) statement. The literature search was confined to English-language articles published between 2000 and 2024. Two independent reviewers (DF, CN) screened the retrieved studies. Discrepancies in the screening process were resolved by a third senior author (BKS). The extracted variables from each study encompassed the year of publication, the country where the study was conducted, the response rate, and the outcome of the survey.

The literature search was performed in February 2024 in 2 major online databases (PubMed and Google Scholar). The following terms and Boolean operators were used: Surveys; urolithiasis, RIRS, URS, PCNL, and ESWL. The SPICE (Setting, Perspective, Intervention, Comparison, Evaluation) framework was used to frame and answer the question (S: urology practice; P: senior or training urologists; I: surveys since 2000 C: none; E: pathways in the management of urolithiasis).

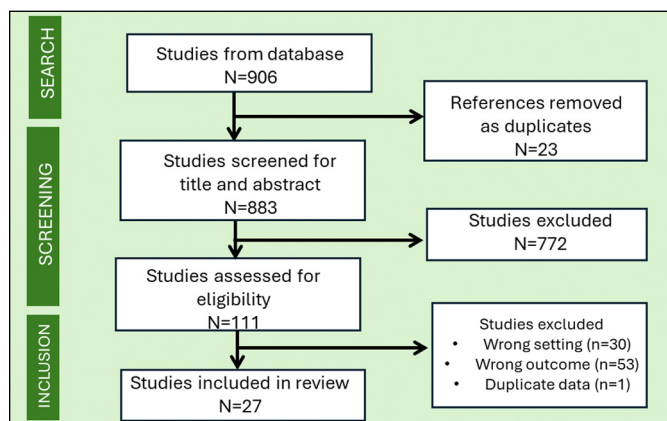


Figure 1. PRISMA flowchart of the included studies.

Surveys on other urological or non-urological conditions, surveys on other populations (i.e. nurses, urological-practitioners, clinicians from other specialisations, patients), non-English language papers, meeting abstracts, reviews, letters to the editor, pre-clinical studies, and surveys published before 2000 were excluded.

The obtained data encompassed information on ureteroscopy (URS), shockwave lithotripsy (SWL), percutaneous nephrolithotomy (PCNL), stents, and nephrostomy. The studies were divided into two 12-year periods: period 1 (2000–2011) and period 2 (2012–2024).

RESULTS

The literature search found 906 papers. Automated detection of duplicates removed 23 papers, leaving 883 for screening. Then 772 papers were further excluded during screening against title and abstract as irrelevant to the purpose of this review. Of the 111 studies deemed eligible for full-text screening, other 84 were further excluded. Finally, 27 papers were accepted and included [2–29]. The flow diagram of the literature search is shown in Figure 1.

Over the past 2 decades, 27 surveys were published on pathways in the management of urolithiasis (Table 1). For non-surgical management, 2 surveys focused on identifying the stone composition using endoscopic images, one discussed analgesic treatment for acute renal colic, and another examined preferred imaging modalities for investigating acute flank pain.

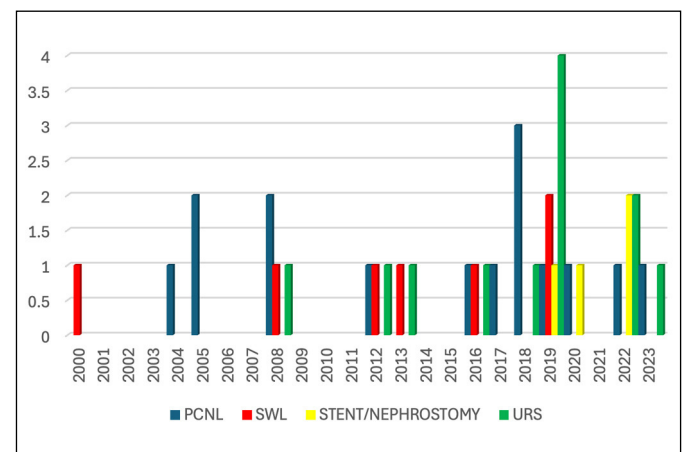


Figure 2. Evolution of survey publication trends over 24 years with different subgroups as PCNL, SWL, stent nephrostomy, and URS.

PCNL – percutaneous nephrolithotomy; SWL – shockwave lithotripsy; URS – ureteroscopy

Table 1. Survey characteristics encompassing response rate, participants, and endourological fellowship

Author	Year	Journal	Technique	Setting	Response rate % (people)	Participants	Participants with endourology fellowship	Conclusions
Hollowell et al. [12]	2000	J Urol.	SWL	AUA, USA	60% (601) postal, 14% (428) internet	1,029 physician	NA	Most urologists follow the AUA guidelines for patients with distal ureteral calculi and staghorn stones, there is a significant difference of opinion regarding the use of stent with SWL
Lee et al. [10]	2004	J Urol.	PCNL	Minnesota, USA	77% (48)	48 residents	74%	There is a relationship between training in percutaneous renal access and subsequent use of percutaneous renal procedures in the urologist's practice
Skenazy et al. [8]	2005	J Endourol.	PCNL/SWL	Minnesota, USA	49% (85)	85 physicians	NA	Initial therapy for nephrolithiasis differs significantly according to geographic location, years of residency completion, and the percentage of managed-care patients in a urologist's practice
Kauer et al. [2]	2005	Eur Urol.	PCNL/URS	ENDO-world wide	695 people	50% staff urologists; 29% chief urologists; 21% residents	NA	URS and PCNL are performed more frequently outside Europe, whereas laser lithotripsy is frequently used in Northern European countries
Otite et al. [24]	2005	J Endourol.	Renal colic	UK and Ireland	54% (293)	69% district general hospitals; 29% university hospitals; 2% independent/private hospitals	NA	Urography is the preferred modality to investigate acute flank pain
Engeler et al. [25]	2007	Scand J Urol Nephrol.	Renal colic	Switzerland	58.2% (99)	NA	NA	First-line therapy for renal colic is a non-opioid analgesic
Bandi et al. [11]	2008	J Endourol.	SWL	North central America	23% (167)	28% academic practice, 8% solo practitioners, 67% private group practice	12%	Practice patterns for treatment of stone disease match the treatment approach recommended in the published literature
Childs et al. [16]	2012	Urology.	SWL	USA	30% (180)	180 physicians	10% fellowship, mini fellowship (5%)	Surgeon factors significantly affected urolithiasis treatment selection. SWL was associated with community urology practice
Ulvik et al. [18]	2013	Scand J Urol.	URS	Norway	74.2% (92)	69 specialists, 23 residents	NA	Variations in the urologists 'personal preferences found in this study may negatively influence the outcome for patients
Ates et al. [14]	2016	Urolithiasis	SWL	Turkey	24.8% (149)	4 urology residents, 32 inexperienced specialists (<5 years), 39 experienced specialist (≥5 years), 22 assistant professors, 31 associate professors, and 21 professors	NA	The most preferred option for small lower calyceal stones was follow-up and medical treatment

Table 1. Continued

Author	Year	Journal	Technique	Setting	Response rate % (people)	Participants	Participants with endourology fellowship	Conclusions
Schoenthaler et al. [3]	2017	World J Urol.	PCNL; miniaturized PCNL	German speak country	4% (266)	Resident, senior resident, consultant, head of department	NA	German-speaking urologists performed PNL as primary treatment for large renal stones although they are not averse to open surgery and SWL
Batagello et al. [6]	2018	Int Braz J Urol.	PCNL	Latin America	40% (100)	NA	2.50%	Brazilian urologists usually gain their own access for PCNL guided by fluoroscopy
Zanetti et al. [9]	2018	PloS One	Regular PCNL; mini PCNL; UltraMini PCNL; Micro-PCNL; RIRS	EULIS (European association of urology section of urolithiasis)	24% (88)	NA	NA	Mini-PCNL is the most effective and safe procedure among PCNL techniques. Mini-PCNL and RIRS are growing popularity for stones >2 cm
Manzo et al. [7]	2018	Int Braz J Urol.	PCNL; miniPERC	Latin America	16% (331)	Endourology-trained urologists (257); nontrained urologists (74)	66.70%	Statistically significant differences were observed in PCNL practice patterns of Latin American urologists with and without training in endourology
Pereira et al. [21]	2019	World J Urol.	URS	Worldwide	13.5% (233)	Academic 138; private 51; hospital 44	58.40%	Ureteral stenting after URS is over-utilised in the USA compared to other countries
Betschart et al. [13]	2019	Urol Int.	URS/RIRS/SWL	Switzerland	38% (105)	39% hospital consultant, 61% employed in a hospital	NA	The choice of treatment among Swiss urologists shows a high accordance with evidence-based guidelines with a preference for retrograde endoscopic surgery in most stones scenarios
Pietropaolo et al. [19]	2019	Cent European J Urol.	URS	Worldwide	114 respondents	77% endourologists, 23% general urologist, (48,5% consultant)	NA	Survey shows a wide variation in the available endourological armamentarium and surgical practice among urologists
Zilberman et al. [20]	2019	BMC Urol.	UAS	Worldwide	10.8% (216)	99.53% endourologists (73.2% practice academic facility)	2/3 of endourologists, 74.4% 6 years post-fellowship	UAS is commonly used by highly skilled endourologists during ureteroscopy. 12/14 UAS is mostly used
Alathel et al. [15]	2019	J Endourol.	SWL	Endourological society	8.3% (165)	55,5% in practice for less than 15 years, 43,3% in practice between 5 and 10 years, 12,2% less than 5 years. 70,1% urologists in academic practice	69.5%	A large percentage of endourologists do not offer SWL to patients who are taking NOACs. Among those that offer SWL, there is a lack of consensus on optimal duration of discontinuation
Kamal et al. [5]	2020	Urol Ann.	PCNL	Saudi Arabia	132 people	Resident 26.6%; specialist 5.3%; fellow 2.1%; consultant 66%	19.70%	The majority of Saudi Arabia urologists perform PCNL, usually learned during residency. The predominantly prefer prone position and use fluoroscopy to gain PCNL access

Table 1. Continued

Author	Year	Journal	Technique	Setting	Response rate % (people)	Participants	Participants with endourology fellowship	Conclusions
Leong et al. [26]	2020	Arab J Urol.	Stent	Mid-Atlantic USA	12.2% (105)	Academic 27.9%; solo practice 11.5%; <5 years of practice 9.6%; >20 years of practice 46.2%	9.6% (10)	Most urologists utilise double pigtail ureteric stent and inaccurately identified them as double J
Güven et al. [22]	2022	Cent European J Urol.	URS	Europe	209 respondents	NA	NA	Urologists generally decide the management of renal colic according to local or international guidelines although there are deviations in clinical practice due to doctor preference and bed availability
Pietropaolo et al. [21]	2022	World J Urol.	URS	Worldwide	40% (366)	84.7% urologists, 15.3% radiologists	NA	The decision of the type of drainage of a stone-obstructing hydronephrosis should be individualised
Randall et al. [27]	2022	World J Urol.	Stone composition	Endourological society	26.7% (366)	Academic practice 69% (253), experience <5 years 6% (22)	57% (209)	Endoscopic stone recognition can be an important tool for surgeons, urologists need to refine their ability to recognize it intraoperatively
Lim et al. [29]	2022	J Endourol.	PCNL	Worldwide	303 respondents	91.7% attended PCNL-specific webinars; 8.3% attended endourological webinars that discussed some aspects of PCNL	NA	Webinars are a valid medium of education potentially benefit practicing urologists in knowledge and clinical practice domains
Sahin et al. [4]	2023	Urolithiasis	PCNL	Turkey and Europe	222 people	Resident 25.2%; no resident 74.7%	NA	Non-contrast CT images for urolithiasis are mainly evaluated by urologists themselves
Rodriguez-Alvarez et al. [28]	2023	Urology	Stone composition	Endourological society	63.1% (118)	NA	NA	Stone identification by urologist is marginally improved with videos rather than pictures alone

NA – not applicable; NOACs – non-vitamin K antagonist oral anticoagulants; PCNL – percutaneous nephrolithotomy; RIRS – retrograde intrarenal surgery; SWL – shockwave lithotripsy; UAS ureteral access sheaths; URS – ureteroscopy

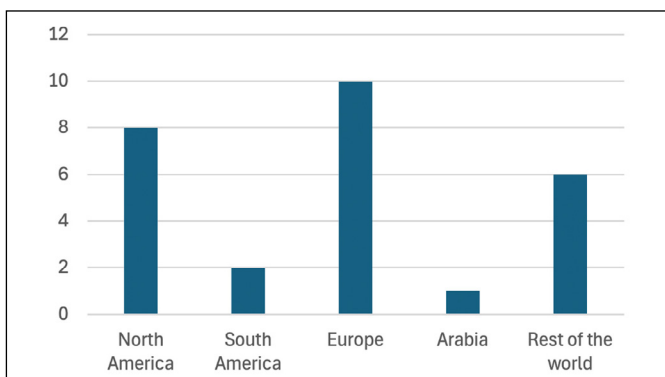


Figure 3. Geographic distributions of the considered surveys in the different continents.

Surgical management surveys were analysed with respect to publication years and practice patterns. Surveys on surgical procedures included papers on PCNL (n = 15), URS (n = 12), SWL (n = 7), and stent/nephrostomy procedures (n = 4). The number of published surveys increased from period 1 to period 2 for all subgroups (Figure 2): +100% for PCNL (from 5 to 10), +150% for SWL (from 2 to 5), and +1000% for URS (from 1 to 11). During both periods, most surveys were conducted by European and North American urologists, with 10 and 8 published papers, respectively (Figure 3). Surveys distributed via e-mail yielded the majority of responses in both periods (Figure 4).

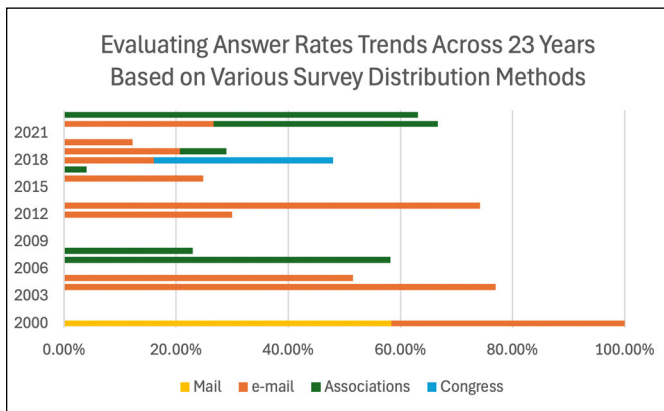


Figure 4. Trends of answers rate based on different survey distribution methods (mail, e-mail, associations, and congress).

DISCUSSION

Percutaneous nephrolithotomy

Numerous studies offer valuable insights into the preferences and practices of urologists regarding percutaneous nephrolithotomy (PCNL), a widely utilised technique in urological practice. To begin with, PCNL is performed by a substantial proportion of urologists globally, with approximately 70% employing this method [2], and mini-PCNL represents the primary treatment for renal stones larger than 3 cm among German urologists (70%) [3]. Notably, its prevalence is particularly prominent in non-European and Eastern European countries. A study by Sahin et al. [4] indicates a higher incidence of PCNL among Turkish urologists (39.7%) compared to their European counterparts (31%), where PCNL ranks as the second choice following retrograde intrarenal surgery (RIRS), favoured by 41%.

Before conducting a PCNL, most urologists rely on a non-contrast CT scan, with a consensus of 90.9% in Saudi Arabia and 92.6% in Latin America, as documented by Kamal et al. [5] and Batagello et al. [6], respectively. Particularly, 85.1% of urologists with endourology training consider preoperative CT scans essential for surgical planning, whereas only 58.5% of those without such training deem them useful [7]. In terms of patient positioning during PCNL, the prone position is preferred by more than 80% of Saudi urologists [5] and Latin American surgeons [6], especially those with over 20 years of experience. Conversely, 64% of urologists with less than 5 years of experience prefer the supine position, with only 14.7% opting for the lateral position [6]. Regarding technical aspects, fluoroscopy is predominantly used for puncture guidance, with 68.2% of Saudi urologists [5]

and 96.3% of Latin American urologists employing it [6]. Additionally, regarding dilation methods, metal bougies are favoured by urologists in Eastern Europe, while balloon dilatation is preferred by 69.7% of Saudi urologists, who dilate to ≥ 25 Fr. When it comes to the energy source for lithotripsy, pneumatic lithotripters are the most common globally, followed by electrohydraulic and laser lithotripters [2]. However, in Saudi Arabia, a combination of ultrasonic and pneumatic lithotripters is preferred by 63.6% of urologists [5]. In special cases like staghorn calculi, most Saudi urologists prefer a single-procedure, single-track approach (45.5%), while PCNL is the preferred initial treatment for staghorn calculi by 95% of urologists in Minnesota, as reported by Kamal et al. [5] and Skenazy et al. [8], respectively. Regarding complications, Batagello et al. [6] reported that 25.6% experienced urologists faced a colonic injury at least once in their lifetime, with 47.4% occurring in reports from urologists with over 20 years of experience. Moreover, regarding blood loss, standard PCNL exhibited the highest transfusion rate, compared to mini-PCNL (5.88%) and RIRS (5.88%), as observed by Zanetti et al. [9].

Training in endourology appears to significantly influence urologists' practice patterns, with trained Latin American endourologists more commonly utilising minimally invasive PCNL and endoscopic combined intrarenal surgery (ECIRS) [7]. Furthermore, a study by Lee et al. [10] highlights the correlation between percutaneous access training and increased proficiency in performing renal procedures, underscoring the importance of promoting endourology training worldwide. As demonstrated by Lim et al. [29], webinars can represent a valid educational method for practicing urologists encouraging them to implement changes in their clinical practice based on the lessons learned and expertise gained.

Shockwave lithotripsy

Surveys from the early 2000s indicated shockwave lithotripsy (SWL) as the primary treatment modality for renal calculi under 20 mm, and for both proximal and distal ureteric calculi of 10 mm [8, 11, 12]. As reported by the survey by Betschart et al. [13], interest in SWL is declining. This shift was linked to the absence of SWL devices in 40% of Swiss centres, leading to a higher preference for URS for ureteral stones (86% preference) compared to SWL (13% preference).

Among urologists, 52% favoured SWL for small lower calyceal stones in children, especially for asymptomatic cases [14]. Patient preferences, along with

factors like skin-to-stone distance and Hounsfield units, influenced decision-making for 63% and 92% of Swiss urologists, respectively. Additionally, 61% opted for antibiotic prophylaxis for patients undergoing SWL [13]. Regarding discontinuation of new oral anticoagulants (NOACs) in patients undergoing SWL, Alathel et al. [15] conducted a global survey and discovered that while 92.7% of participants considered SWL for symptomatic stones, this percentage decreased to 53.4% if patients were taking NOACs. There was a variation in the decision to discontinue NOACs before surgery, with preferences for holding them for 3 days (26.6%), 2 days (20.4%), 4 days (14.8%), and 7 days (13.6%). Interestingly, preferences varied regionally, with North American physicians preferring a 3-day cessation, Europeans opting for 2 days, and Asians and Latin Americans recommending 7 days. Some urologists preferred to restart NOACs after surgery once the haematuria resolved (35.8%). Stent placement before SWL was recommended by American urologists, and it strongly correlated with stone size, with the preference for stenting increasing accordingly: 25.3% for 10 mm, 57.1% for 15 mm, and 87.1% for 20 mm stones [12]. SWL was preferred for managing ureteral calculi, particularly for proximal ureteral calculi, with preferences ranging from 77% for 5 to 10 mm and 40% for 10 to 20 mm stones [11]. For distal ureteral stones >10 mm, SWL was preferred, while for stones <5 mm, ureteroscopy was favoured [12, 16]. SWL was chosen as a technique for treating lower pole calculi by 46% of urologists if stones were between 5 and 10 mm and by 24% if it was between 10 and 20 mm [11]. Overall, SWL was more common in community practice than in academic settings, often dictated by the availability of SWL devices in hospitals.

Ureteroscopy

Recent surveys focusing on ureteroscopy (URS) and RIRS have gained prominence due to notable advancements in endoscopic technology, including improvements in endoscope design, accessory tools, and laser technology. Notably, there has been a shift in the predominant type of ureteroscope utilised by the urologists. Historically, rigid or semi-rigid ureteroscopes accounted for the majority (79%) of usage, with flexible ureteroscopes representing a smaller proportion (21%) [2]. However, in recent years, there has been a significant change, with 90% of urologists acquiring a new endoscope within the past 5 years. This includes a diverse range of scopes, with 16% being single-use, 53% reusable, and 31% acquiring both types of scopes. Additionally, there is considerable

interest (53%) among urologists for a ureteroscope capable of measuring intrarenal pressure, with an additional 28% expressing interest depending on cost considerations [17]. In terms of treatment preferences, URS has emerged as the primary choice for ureteral stones measuring less than 10 mm, with 86% of physicians favouring this approach according to surveys conducted by Betschart et al. in 2019 [13]. Furthermore, a significant majority (69%) recommend URS for proximal ureteral stones exceeding 10 mm, and even more (94%) advocate for its use in distal ureteral stones larger than 10 mm.

When faced with an equivalent choice for SWL and URS, patient preferences (77%) were the primary determinant, followed by considerations such as skin-to-stone distance (54%), body mass index (BMI) (38%), and stone composition (38%). In the realm of renal stone management, RIRS has emerged as the preferred initial treatment modality (41%), followed by PCNL (31%) and SWL (28%). Notably, adherence to treatment guidelines is nearly universal for lower pole stones measuring less than 10 mm, whereas compliance rates are lower for middle/upper pole stones exceeding 20 mm. Patient preferences (36%) and stone composition (27%) are key decision-making criteria when PCNL and RIRS are rated equally. Before surgery, approximately 39.1% of Norwegian urologists routinely administer antibiotic prophylaxis. [18] Primary URS is performed in 70% of cases for obstructing stones, with 30% of patients undergoing emergency stent insertion followed by subsequent elective URS, typically after an average interval of 21 days [17]. Over the years, there has been a notable increase in the utilisation of guidewires during URS, with a preference for hydrophilic types [2, 18, 19]. The utilisation of ureteral access sheaths (UAS) in URS procedures was nearly universal among physicians, with 46% of respondents employing them for treating ureteral stones, increasing to 75.7% for kidney stones [20]. Among the favoured UAS, the 10/12 F was preferred by 37.6%, closely followed by the 12/14 F, favoured by 30% [19]. The majority of urologists (over 90%) were of the opinion that a double-J stent was unnecessary before UAS insertion, and 79% believed that UAS did not increase postoperative complication rates [20]. Notably, there has been a gradual shift in lithotripsy techniques over time. In 2005, pneumatic lithotripsy held the dominant position, accounting for 69.8% of usage, followed by laser (24%) and electrohydraulic instruments (6%). However, contemporary practice leans heavily towards laser lithotripsy, particularly the Holmium laser [18]. In terms of URS approach, 47% of respondents routinely performed a semi-rigid

URS approach with a combination of dusting and fragmentation for intrarenal lithotripsy. Additionally, 43% prefer dusting alone, while 10% opt for fragmentation with basketing. The preferred laser fibre was reusable, with a preferred size ranging between 200 and 272 μm [19].

Regarding stone extraction, the utilisation of Dormia baskets was significantly more prevalent outside Europe, as noted by Kauer et al. [2]. This observation is supported by Pereira et al. [21], who found that US physicians were more inclined towards frequent stone basketing (57.5%). In terms of post-procedural management, there has been a notable evolution in the routine placement of double-J stents. In 2005, 61% of urologists routinely placed a double-J stent for one month, while only 14% opted for nephrostomy placement [2]. However, by 2013, double-J stent placement had become less routine, with only 47.3% of Norwegian urologists adopting this practice [18]. In 2022, 43.86% of urologists left the stent in place for 1–2 weeks, while 38% opted for 2–4 weeks, 13.45% for less than 1 week, and 9.36% for more than 4 weeks [22]. Leong et al. [26] highlighted that the most commonly used stent diameter was 6 Fr (83.7%), with a length of 24 cm (50%). Approximately 36.5% of urologists left a retrieval string on the stent for later removal, and most were comfortable leaving stents in place for up to 3 months.

The stone-free rate (SFR) one month after RIRS was reported as 80.6%, with only 10.8% of cases requiring a second procedure [9]. Interestingly, residents demonstrated a higher SFR compared to attending physicians (34.8% vs 13.2%) [18]. When detailed, common high-grade complications following URS/RIRS include urosepsis (61.72%), acute kidney injury (28.23%), ureteral injury with consecutive stenosis (8.13%), and urinoma (1.9%). Despite these risks, more than 85% of physicians opt for primary URS [22]. Nevertheless, almost half of respondents believe that performing a primary URS necessitates surgical experience. Only 33% would opt for primary URS in cases of renal colic due to ureteral stones <4 mm, with the majority preferring double-J stent placement and planning for secondary treatment with semi-rigid ureteroscopy [22]. However, as demonstrated by Pietropaolo et al. in their 2021 survey, [23] the decision regarding the type of drainage of a stone-obstructing hydronephrosis should be individualised.

Mixed outcomes

Recently, 2 worldwide surveys by Randall [27] and Rodriguez Alvarez et al. [28], encompassing the endourological society, investigated the capacity

of urologists to recognise stone compositions based on endoscopic images and videos, respectively. In both surveys, none of the respondents successfully identified all the images, and only 1.06% of participants accurately identified all videos, with slightly enhanced accuracy observed in identifying stones through video footage of stone dusting compared to static images alone. The overall accuracy for stone identification was around 44% in both surveys, with calcium oxalate stones being the most identifiable (73.6%), while calcium phosphate and cystine stones were often misidentified. Consequently, caution is warranted in utilising endoscopic stone appearance as a sole determinant for guiding metabolic management strategies. In the management of acute renal colic in the UK and Ireland in 2005, Otite et al. [24] found that intravenous urography was the preferred imaging modality (85.4%), with limited utilisation of non-contrast-enhanced spiral CT (10.5%) and ultrasonography (4.1%). This preference was influenced by factors such as the restricted availability of CT, the expediency of the procedure, lower costs, and the familiarity of clinicians with interpreting intravenous urography images. To address colic-associated pain, Engeler et al. [25] reported that in Switzerland, non-opioid analgesics were the preferred first-line therapy for colic pain (81%), with opioids being used as first-line treatment by only 9% of respondents. Kidney stone disease (KSD) is linked to lifestyle factors including smoking, alcohol, and exercise, and while the prevalence is rising, the gender gap in stone disease is becoming narrower [30, 31]. There seems to be a growing role of artificial intelligence (AI) in the management of KSD [32]. While our review of surveys looked mainly at procedures on KSD, we did not look at other aspects of stone disease.

CONCLUSIONS

Surveys on urolithiasis management have experienced steady growth in publications over the past decade, particularly focusing on URS and PCNL procedures. Preferences in the practice of these procedures have evolved over the years and vary among different countries. Particularly, survey trends reflect that SWL has lost traction, with flexible URS gaining the maximum momentum in recent times. PCNL surveys mainly focus on training attitudes and resource allocation. Instrumentation trends show surveys focusing on miniaturisation, stent indications, types of lasers, and the emerging role of disposable ureteroscopes. In the last decade the focus has also been on endourological training,

imaging, ergonomics, and the utility of guidelines to improve patient and surgical experiences.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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ETHICS APPROVAL STATEMENT

The ethical approval was not required.

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