TİKA

REPUBLIC OF TÜRKİYE MINISTRY OF CULTURE AND TOURISM
TURKISH COOPERATION AND COORDINATION AGENCY

UROLITHIASIS DAYS

MAY 08-09, 2026

Mersin City Education and Research Hospital

ABSTRACT BOOK

Mersin

www.urolithiasisdays2026.com

Dalya

INVITATION

Dear colleagues,

We are delighted and honored to invite you to our “UROLITHIASIS DAYS” meeting, which aims to discuss the topic of urinary tract stone disease as a whole.

The meeting will be held on May 8-9, 2026, at the Mersin City Hospital conference hall.

We believe that this meeting, where we wish to discuss the latest developments in the treatment of urinary stone disease from a broad perspective, will be a scientific feast for all participants, as the scientists from abroad and within the country who will attend will share their experiences.

The pathogenesis, epidemiology, diagnostic methods, and the latest applications in the surgical and medical treatment of stone disease The pathogenesis, epidemiology, diagnostic methods, and the latest applications in surgical and medical treatment of stone disease will be discussed in all their aspects.

We hope that not only urologists but also all nephrologists, pediatricians, and dietitians interested in stone disease will participate and share their current experiences at this meeting. Through the presentations of invited speakers and interactive educational video presentations, we aim to provide fundamental practical knowledge on the treatment and follow-up of urinary system stone disease.

We look forward to meeting you in the pearl city of the south, Mersin, for our meeting in May, which we believe will be very successful both socially and scientifically.

Best regards,

Prof. Dr. Kemal SARICA

Toplantı Başkanı

Doç. Dr. M. Can KIREMIT
Bilimsel Komite Başkanı

Prof Dr Ozan EFESOY
Lokal Organizasyon Komitesi Başkanı

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SCIENTIFIC PROGRAMME

	Urolithiasis Days *First Day of Meeting*
08:00 - 08:30	**Opening Remarks** **Kemal Sarıca (TR), Ozan Efesoy (TR)**
08:30 - 09:30	**Session - 1 Society Lectures** **Chairs: Kemal Sarıca (TR), Erdem Akbay(TR), Hammad Ather (PK)**
08:30 - 08:45	IAU Lecture - Intrarenal Pressure and Temperature: A Silent Drivers of Complications ***Alberto Budia Alba (ES)***
08.45 - 09:00	SIU Lecture - Robotics and Tissue Sensitivity - Game Changers in Endourology? ***Jean de la Rosette (TR)***
09:00 - 09:15	EAU / YAULecture - From Vision to Clearance: Suction Technologies in Modern Urolithiasis Management ***Victoria Jahrreiss (AT)***
09:15 - 09:30	SEGUR Lecture - PCNL for Anatomically Challenging Kidneys: Mastering Access and Techniques for Optimal Outcomes ***Iliya Saltirov (BG)***
09:30 - 10:30	**Semi-Live Surgery Video Session – 1** **Chairs: Sinan Zeren (TR), Ozan Efesoy (TR), Mehmet Özsoy (AT)** **Surgery & Surgeons:** **RIRS for Big Kidney Stone - Mesut Tek (TR)** **RIRS with Integrated IRP and IRT Measurement - M. Can Kiremit (T** **Mini-PNL in Pediatric Population - Numan Baydilli (TR)**
10:30 - 11:00	**Coffee Break**
11:00 - 12:00	**Case Discussion - 1** **Moderator: Tarık Esen (TR)** **Panel: Elisa De Lorenzis (IT), Maria Ramos-Cebrian (ES), Alberto Budia Alba (ES), İlker Seçkiner (TR), Tzevat Tefik (TR)**
12:00 - 12:30	**Satellite Symposium - Real-Time Monitoring and Management of Intrarenal Pressure** **Chair: Cenk M. Yazıcı (TR)** **Speaker: Kemal Sarıca (TR)**
12:30 - 13:30	**Lunch**
13:30 - 14:30	**Session 2 – Metabolic Evaluation and Medical Treatment** **Chairs: Sadık Görür (TR), Erhan Erdoğan (TR)**
13:30 - 14:00	**Metabolic Evaluation in High-Risk Patients**
	I Will Be Honest: I Do Not Perform It ***Burak Turna (TR)***
	I Perform It, and We Should ***Barış Saylam (TR)***
14:00 - 14:30	**Citrate in Calcium Oxalate Stones: Should We Prescribe It to Everyone?**

	Yes – It Remains Our Most Trusted Ally ***Yusuf Kadir Topçu (TR)***
	No – Treatment Must Be Personalized ***Kemal Sarıca (TR)***
14:30 - 15:30	**Session - 3 Technical Details in Ureteroscopy** **Chairs Ahmet Öztürk (TR), Hakan Erçil (TR), Serdar Arısan (TR)**
14:30 - 15:00	**Should Pre-stenting Be Routine?**
	Yes ***Fatih Bıçaklıoğlu (TR)***
	No ***Hakan Çakır (TR)***
15:00 - 15:30	**Can Ureteroscopy Be Performed Fluoroless?**
	Yes – Why not? ***Altuğ Tuncel (TR)***
	No – Fluoroscopy is essential ***Nevzat Can Şener (TR)***
15:30 - 16:00	**Coffee Break**
16:00 - 18:00	**Session - 4 Pediatric Stone Disease** **Chairs: Tayfun Oktar (TR), Erim Erdem (TR)**
16:00 - 16:15	Metabolic Evaluation and Medical Management in Pediatric Stone Disease: Practical Tips and Pitfalls ***İsmail Selvi (TR)***
16:15 - 16:30	Shock Wave Lithotripsy in Children: Is It Still a Contemporary Treatment Option? ***Mesut Pişkin (TR)***
16:30 - 16:45	Retrograde Intrarenal Surgery in Pediatric Patients: Indications and Patient Selection ***H. Serkan Doğan (TR)***
16:45 - 17:00	Pediatric Percutaneous Nephrolithotomy: A Practical Decision-Making Algorithm Based on Current Evidence ***Ali Sezer (TR)***
17:00 - 17:45	**Case Discussion - 2** **Moderator: Gürkan Arıkan (TR)** **Panel: Serra Sürmeli Döven (TR), Nihat Satar (TR), Tarkan Soygür (TR), Bülent Önal (TR), M. Can Kiremit (TR)**

Urolithiasis Days *Second Day of Meeting*	
08:00 - 09:30	**Session - 5 RIRS: Innovations and Controversies**
	Chairs: Bülent Erkurt (TR), Selahattin Bedir (TR), Fatih Hızlı (TR)
08.00 - 08:30	**Robotic RIRS: The Next Step in Endourology?**
	Yes – Robotics Will Expand the Boundaries of RIRS ***Rıfat Ergül (TR)***
	No – Conventional RIRS Is Already Highly Effective ***Turgay Ebiloğlu (TR)***
08:30 - 09:00	**Is a Suction System Essential for RIRS?**
	Yes – Effective Stone Clearance Requires Suction ***T. Emre Şener (TR)***
	No – Surgical Technique Matters More Than Aspiration ***Mehmet Özsoy (AT)***
09:00 - 09:30	**Is Intrarenal Pressure Monitoring Necessary During RIRS?**
	Yes – What You Don't Measure, You Can't Control ***Victoria Jahrreiss (AT)***
	Routine Monitoring? No, Thank You! ***E. Denizhan Demirkıran (TR)***
09:30 - 10:30	**Session - 6 Decision Making and Responsibility in Endourology**
	Chairs: Zafer Gökhan Gürbüz (TR), Ahmet Sarıkaya (TR),
09:30 - 10:00	**Who Is Primarily Responsible for Prolonging the Lifespan of Endourological Instruments?**
	The Surgeon's Instrument Handling Practices ***H. Murat Akgül (TR)***
	The Sterilization Unit's Protocols ***Sevim Tekin (TR)***
10:00 - 10:30	**Ureteral Stricture in 2026: Is Endoscopic Management a Durable Solution?**
	Yes – Advances in Endoscopic Techniques Changed the Game ***Fatih Yanaral (TR)***
	No – Reconstruction Remains Superior in the Long Term ***Tayfun Oktar (TR)***
10:30 - 11:00	**Coffee Break**
11:00 - 12:00	**Semi-Live Surgery Video Session - 2**
	Chairs: Bilal Eryıldırım (TR), Cenk M. Yazıcı (TR), M. Akif Diri (TR)
	Surgery & Surgeons: **RIRS with IRP Monitoring and Managing - Selahattin Bedir (TR)** **RIRS with FANS - Tzevat Tefik (TR)** **Supine PNL with a Combined Lithotripter - T. Emre Şener (TR)**

12:00 - 13:00	**Lunch**
13:00 - 14:00	**Session - 7 Clinical Decision-Making in Percutaneous Nephrolithotomy**
	Chairs: Nurettin Cem Sönmez (TR), Y. İlker Çömez (TR), Murat Dinçer (TR)
13:00 - 13:30	**Pus During Percutaneous Access: What Is Your Next Step?**
	Nephrostomy Tube Is a Wonderful Tool, Isn't It? ***Atilla Arıdoğan (TR)***
	Avoid a Hasty Decision ***Sinan Zeren (TR)***
13:30 - 14:00	**Is a Suction System Essential in PNL?**
	Yes - Lower Pressure, Better Clearence ***Alberto Budia Alba (ES)***
	No - Simplicity Works ***Arda Atar (TR)***
14:00 - 14:10	Supracostal Access in PNL: When and How? ***Mohamed El-Shazly***
14:10 - 15:40	**Session - 8 Treatment Strategies for Upper Urinary Tract Stones**
	Chairs: Bülent Soyupak (TR), Reşit Gören (TR), Fatin Cezayirli (TR)
14:10 - 14:40	**10–20 mm Renal Pelvic Stone**
	SWL ***Kubilay Sabuncu (TR)***
	RIRS ***Volkan Ülker (TR)***
	PNL ***Kadir Yıldırım (TR)***
14:40 - 15:10	**Are Treatment Standards Changing for 20–30 mm Renal Stones?**
	Yes - RIRS ***Mehmet Salih Boğa (TR)***
	No - PNL ***Tzevat Tefik (TR)***
15:10 - 15:40	**My Approach to Impacted Proximal Ureteral Stones**
	Retrograde Ureteroscopy ***Taylan Oksay (TR)***
	Antegrade Ureteroscopy ***Mesut Tek (TR)***
	Laparoscopic–Robotic Ureterolithotomy ***E. Sabri Pelit (TR)***
14:00 - 15:30	***HALL B*** **Abstract Session** **Moderators: Barış Saylam, Fatih Bıçaklıoğlu**
15:40 - 16.20	**Semi-Live Video Session - 3**
	Chairs: Haluk Akpınar (TR), Murat Binbay (TR), Rahim Horuz (TR)

	Surgery & Surgeons: **RIRS with TFL and Single-Use Scope -Bülent Erkurt (TR)** **Mini-ECIRS with Suction-Enabled Percutaneous Sheath - E. Denizhan Demirkıran (TR)**
16:20 - 16:50	**Coffee Break**
16:50 - 17:30	**Session - 9 Contemporary Approaches to Metabolic and Infection Stones**
	Chairs: Asıf Yıldırım (TR), Fatih Kurtuluş (TR), Serkan Altınova (TR)
16:50 - 17:00	The Acidic Face of Stones: Current Approaches to Uric Acid Stones ***Ümit Yıldırım (TR)***
17:00 - 17:10	Stubborn Stones, Challenging Patients: The Art of Managing Cystine Stones ***Kayhan Tarım (TR)***
17:10 - 17:20	Stone or Bacteria: The Vicious Cycle of Infection Stones ***Elisa De Lorenzis (IT)***
17:20 - 17:30	Stone Treatment in the Presence of Infection: A Road to Sepsis? ***Mutlu Ateş (TR)***
17:30 - 18:30	**Session - 10 Clinical, Economic, and Environmental Perspectives in the Management of Urinary Stone Disease**
	Chairs: M. Öner Şanlı (TR), Tuna Mut (DE), Özcan Özalpat (TR)
17:30 - 17:40	Management of Ureteral Stent–Related Symptoms and Complications ***Yasin Yitgin (TR)***
17:40 - 17:50	Impact of Stone Disease Treatment on Quality of Life ***Mehmet Eflatun Deniz (TR)***
17:50 - 18:00	Green Endourology: Can We Reduce the Carbon Footprint of Stone Surgery? ***Barış Aydın (TR)***
18:00 - 18:10	A 17 mm Renal Stone: Which Treatment Makes Economic Sense? ***Mehmet Uslu (TR)***
18:10 - 18:30	**Closing Remarks & Group Photo**

ORAL PRESENTATIONS

Management Of A Severely Encrusted And Fragmented Forgotten Double-J Stent After 9 Years: A Multimodal Endourological Approach

Mehmet Selçuk Buyantemur[1], Burak Ünal[1], Hüseyin Yıldız[1], Melih Yeşil[1], Özgür Çınar[1], Selahattin Bedir[1]

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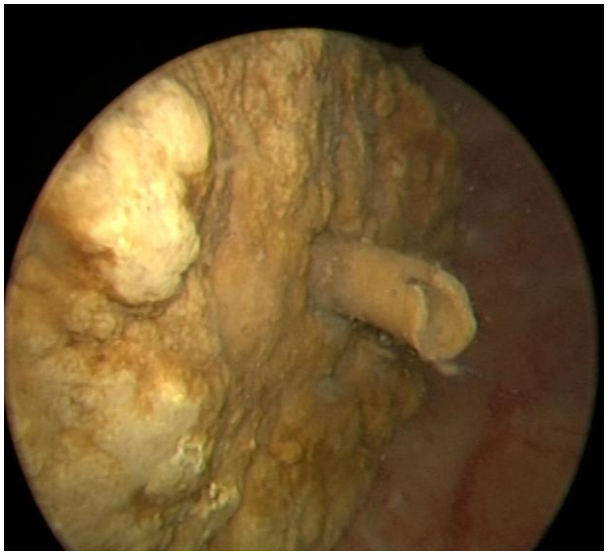
Introduction and Aim: Long-term indwelling double-J (DJ) stents may lead to severe complications such as encrustation, fragmentation, and large stone formation. We aimed to present a rare and challenging case of a long-standing, fragmented, and encrusted DJ stent associated with a giant bladder stone, and to demonstrate its endourological management.

Material and Method: A patient with a history of multiple prior endourological interventions presented with a retained DJ stent. Imaging revealed a fragmented and heavily encrusted stent along with a large bladder stone measuring approximately 5 cm. Endoscopic management included pneumatic cystolithotripsy for bladder stone fragmentation and ureterorenoscopy (URS) for the treatment of encrusted stent components.

Findings: The DJ stent was found to be fragmented and extensively encrusted. A giant bladder stone encasing distal stent fragments was successfully fragmented using pneumatic lithotripsy. Proximal and ureteral segments of the stent were treated endoscopically with URS. Complete clearance was achieved without major complications.

Encrusted DJ Stent (Removed)

encrusted DJ stent (petrified)



Conclusion: Forgotten or long-term DJ stents can result in severe encrustation, fragmentation, and large stone burden requiring complex endourological management. Combined endoscopic approaches can provide effective and minimally invasive treatment. Timely stent follow-up is essential to prevent such challenging scenarios.

Keywords: Bladder stone, Double-J stent, Encrustation, Forgotten stent, Ureterorenoscopy

Role of Inflammatory Markers in Infection-Related Urinary Stone Formation

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Introduction and Aim: Urinary stones are classified according to their composition, with infection-related stones representing a distinct subtype. Patients with infection stones are at high risk of recurrence. Despite their clear association with urinary tract infections and inflammation, the role of systemic inflammatory and infectious markers in their development remains unclear. This study aimed to evaluate the association between routinely available inflammatory and infectious markers and infection-related urinary stones using clinical and laboratory data.

Material and Method: In this retrospective study, clinical and laboratory data of patients with kidney stones were analyzed. Blood sample analyses, inflammation-derived ratios calculated from these parameters, CRP and albumin levels, as well as urinalysis findings and urine culture results were evaluated. Data preprocessing and analyses were performed using Python. Patients were classified into two groups: infection-related and non-infection stones. Group comparisons were conducted using the Mann–Whitney U test, and univariate logistic regression analysis was performed to identify potential predictors.

Findings: In a total of 182 patients, 53 were classified as having infection-type stones. (%28,6) The presence of bacterial growth in urine culture was significantly associated with infection-type stones (OR≈2.54, $p < 0.05$). In addition, the platelet-to-lymphocyte ratio (PLR) was found to be statistically significant (OR≈1.005, $p < 0.05$). Although Mann–Whitney U analysis showed differences in median values of some inflammatory parameters between groups, most of these variables did not remain significant as independent predictors in logistic regression analysis. Other inflammatory indices such as NLR and MLR demonstrated limited discriminative performance.

Results for Urine Parameters

Variable	**OR (Odds Radio)**	**p-value**
Leukocyte positivity (urine strip)	2,445	0,0005
Bacterial growth (urine culture)	4,0991	0,0162
Urine leukocyte count (microscopy)	1,0006	0,3975
Bacteria count (urine microscopy)	0,9895	0,6992

Results for Blood Parameters

Variable	OR (Odds Ratio)	p-value
MLR (Monocyte-to-Lymphocyte Ratio)	0.0075	0.1231
Monocyte count	0.1292	0.1433
Lymphocyte count	1.3357	0.1568
dNLR (Derived Neutrophil-to-Lymphocyte Ratio)	1.2436	0.164
SIRI (Systemic Inflammatory Response Index)	0.7007	0.3286
Platelet count (PLT)	0.9966	0.4051
PLR (Platelet-to-Lymphocyte Ratio)	0.9959	0.4663
CRP (C-Reactive Protein)	1.0058	0.5007
RDW (Red Cell Distribution Width)	1.1017	0.5047
CRP/Albumin ratio	1.0147	0.5858
Neutrophil count	1.0695	0.5903
Platelet/Albumin ratio	0.9957	0.8027
NLR (Neutrophil-to-Lymphocyte Ratio)	1.0182	0.847
MPV (Mean Platelet Volume)	1.0273	0.902
SII (Systemic Immune-Inflammation Index)	1.0000	0.9266
MPR (MPV/Platelet Ratio)	0.5626	0.941
RPR (RDW/Platelet Ratio)	0.7762	0.960
WBC (White Blood Cell count)	0.9945	0.963
CRP/Lymphocyte ratio	0.9997	0.9711

Conclusion: The presence of infection in urine and PLR may serve as important markers in the formation of infection-type urinary stones. Further large-scale and multicenter studies are needed to integrate these findings into clinical decision-making processes.

Keywords: Urinary stone disease, infection, inflammation

ESWL Management of Ureteral Stones in Cases under Antiplatelet Management: Balancing Increasing Utilization Rates and Bleeding Risk

Alper Asık[1], Hikmet Taha Temizkan[1], Salih Yıldırım[1], Gamze Simsek[1], Sameer PARMAR[2], Erhan Erdoğan[1], Kemal Sarıca[1]

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Introduction and Aim: This study aimed to evaluate the efficacy and safety of Extracorporeal Shock Wave Lithotripsy (ESWL) for the management of mid and distal ureteral stones in patients maintaining continuous antiplatelet therapy, addressing the critical balance between hemorrhagic and thromboembolic risks.

Material and Method: A retrospective analysis was conducted on 97 adult patients who underwent ESWL for 5–10 mm mid or lower ureteral stones between February 2024 and December 2025. Patients were divided into two cohorts: Group 1 (n=47), who continued active antiplatelet therapy (acetylsalicylic acid or clopidogrel), and Group 2 (n=50), who discontinued the medication prior to the procedure following standard guidelines. Treatment success, defined as absolute stone-free status, was assessed using non-contrast computed tomography at four weeks post-procedure. Safety was evaluated based on the incidence of hemorrhagic complications and the requirement for secondary interventions, such as Double-J (DJ) stenting.

Findings: Baseline demographics and stone parameters were comparable between the groups. The stone-free rate was statistically similar, reaching 76.6% in Group 1 and 80.0% in Group 2 ($p = 0.686$). Crucially, no severe hemorrhagic complications, perirenal hematomas, or instances requiring blood transfusion occurred in either group. Both groups experienced only transient, self-limiting macroscopic hematuria (Clavien-Dindo Grade 1). Furthermore, the requirement for post-procedural DJ stents due to steinstrasse or resistant colic pain did not differ significantly between the cohorts (10.6% vs. 8.0%, $p = 0.733$).

	Continue antiplatelet therapy (n:47)	Discontinued antiplatelet therapy (n:50)	p value
Age	58,23±8,74	55,10±7,54	0,063
Male	37 (%78,7)	34(68%)	0,231
Female	10(%21,3)	16(32%)	0,231

BMI	30,53±4,60	29,4±4,07	0,203
Success Rate	36(76,6%)	40(80%)	0,686
DJ stent	5(10,6%)	4(8%)	0,733
Stone size	8,04±2,24	7,40±1,37	0,092
HUN Grade	1,73±0,78	1,557±0,63	0,486
Session number	1,96±0,81	1,70±0,92	0,186
Density (HU)	776,60±333,91	777,17±272,12	0,774

Conclusion: Performing ESWL for mid and distal ureteral stones without the cessation of antiplatelet therapy demonstrates high efficacy and an excellent safety profile. Given the non-parenchymatous nature of the ureter, continuing antiplatelet medications does not increase the risk of significant bleeding, thereby safely protecting high-risk cardiovascular patients from potentially fatal thromboembolic events.

Keywords: Ureteral stone, ESWL, Antiplatelet management, Stone-free rate

Robotic Flexible Ureterorenoscopy with AI-Based Real-Time Stone Segmentation

Rifat Burak Ergül[1], Arda Tunç Aydınoğlu[2], Mert Emre Erden[2], Poyraz Doğan[3], Ahmad Gharemohammadlou[2], Tzevat Tefik[2]

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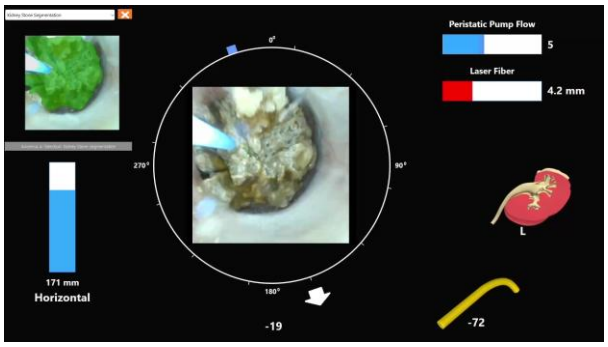
Introduction and Aim: Robotic flexible uretroscopy (robo-URS) is increasingly adopted in the management of renal stones; however, it involves a learning curve, particularly for less experienced surgeons. Real-time stone segmentation integrated into robotic systems may enhance intraoperative guidance. This study aimed to evaluate the feasibility, safety, and clinical performance of robot-integrated real-time stone segmentation during robo-URS.

Material and Method: This retrospective, single-center pilot study included 15 patients who underwent robo-URS. Procedures were performed under general anesthesia by a first-year resident under supervision using the Roboflex Avicenna platform with FANS and a robot-integrated real-time segmentation module (Figure 1); thulium fiber laser lithotripsy was used. Demographic, clinical, perioperative, and ergonomic variables were recorded, including age, sex, BMI, stone characteristics, operative parameters, complications, stone-free status, and surgeon-reported ergonomic outcomes.

Figure 1. Robot integrated segmentation module



In the upper left, a segmentation image integrated into the robotic console is shown, with the stone boundaries outlined in green.

Findings: Fifteen patients (mean age 48.9 ± 11.3 years; mean stone size 11.4 ± 4.2 mm) were included. Proximal ureter was the most common stone location (33.3%). Mean operative time was 88.3 ± 25.5 minutes, with docking and console times of 11.3 ± 3.8 and 45.8 ± 24.3 minutes, respectively. Laser fragmentation time was 27.0 ± 15.4 minutes. Stone-free rate was 86.7% based on postoperative day 1 CT. Biochemical parameters remained stable, and mean hospital stay was 1.3 ± 1.6 days. Minor intraoperative complications occurred in two patients (13.3%) as mucosal bleeding. Two patients (13.3%) developed Clavien–Dindo grade II complications due to UTI

requiring antibiotic therapy. (Table 1) Robo-URS demonstrated favorable ergonomic outcomes, with minimal musculoskeletal strain, suggesting a potential role in reducing surgeon fatigue and improving long-term operator sustainability. (Table 2)

Table 1. Patient Demographics, Clinical, and Perioperative Characteristics

Variable	**Value**
Number of patients	15
Age (years)	48.9 ± 11.3 (34–72)
BMI (kg/m²)	26.4 ± 3.4 (21.3–34.2)
Sex (Male/Female)	7 (46.7%) / 8 (53.3%)
Stone laterality (Right/Left/Bilateral)	8 (53.3%) / 6 (40.0%) / 1 (6.7%)
Previous stone surgery	6 (40.0%)
Preoperative JJ stent (Yes/No)	3 (20.0%) / 12 (80.0%)
ASA score	1.5 ± 0.8 (1–3)
ASA I	10 (66.7%)
ASA II	4 (26.7%)
ASA III	1 (6.7%)
Stone size – maximum diameter (mm)	11.4 ± 4.2 (6.0–22.5)
Stone location	
Proximal ureter	5 (33.3%)
Renal pelvis	4 (26.7%)
Upper pole	1 (6.7%)
Middle pole	2 (13.3%)
Lower pole	2 (13.3%)
Multiple	1 (6.7%)
Total operative time (min)	88.3 ± 25.5 (40–120)

Robotic docking time (min)	11.3 ± 3.8 (3–16)
Robotic console time (min)	45.8 ± 24.3 (25–97)
Laser fragmentation time (min)	27.0 ± 15.4 (12–68)
Preoperative creatinine (mg/dL)	0.91 ± 0.19 (0.72–1.43)
Postoperative creatinine (mg/dL)	0.87 ± 0.20 (0.60–1.22)
Preoperative hemoglobin (g/dL)	13.2 ± 1.5 (9.6–15.2)
Postoperative hemoglobin (g/dL)	12.3 ± 1.3 (9.5–13.9)
Hospital stay (days)	1.3 ± 1.6 (0–5)
Stone-free rate – postoperative imaging	
Grade A (complete stone-free)	13 (86.7%)
Grade B (≤4 mm residual fragments)	0 (0%)
Not stone-free	2 (13.3%)
Intraoperative complications	2 (13.3%) – mucosal bleeding
Postoperative complications	2 (13.3%)

Table 2. Surgeon Ergonomic and Procedural Quality Assessment Scores

Ergonomic Domain	Mean ± SD	Range
Visual quality scale (0–10)	6.7 ± 1.5	3–9
Robotic control (0–10)	7.7 ± 1.3	5–10
Instrument stability (0–10)	7.3 ± 1.3	5–9
Stone fragmentation quality (0–10)	7.1 ± 0.8	6–8
Overall surgeon satisfaction (0–5)	3.9 ± 0.8	2–5
Musculoskeletal pain score (0–5)	0.3 ± 0.5	0–1

SD: standard deviation. All scores collected via postoperative self-administered questionnaires. Visual quality, robotic control, instrument stability, and fragmentation quality scored 0–10 (higher = better). Satisfaction scored 0–5 (5 = most satisfied). Musculoskeletal pain scored 0–5 (0 = no pain).

Conclusion: Robo-URS combined with real-time stone segmentation and FANS is feasible and demonstrates a favorable safety profile with acceptable stone-free rates. This integrated approach may improve intraoperative visualization, targeting precision, and procedural control, particularly during early learning curve, and can be considered as a supportive adjunct in robotic stone surgery.

Keywords: Robotic flexible uretroscopy, Stone segmentation, FANS

Differentiation of Uric Acid Stones Using Machine Learning

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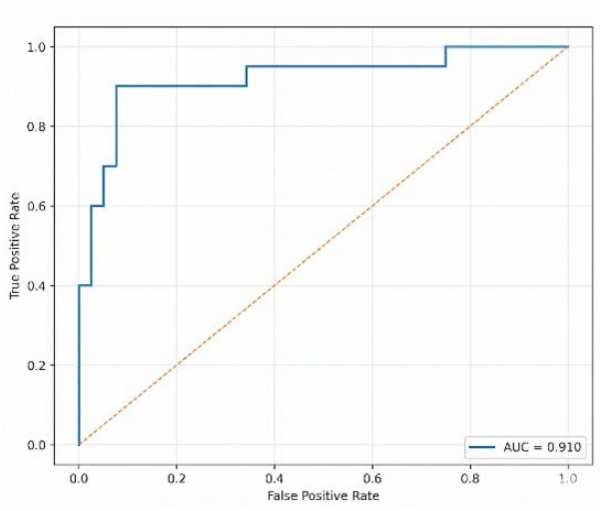
Introduction and Aim: Differentiating uric acid stones from other urinary stone types is crucial for clinical management without surgery; this study aimed to enable accurate and early identification using machine learning based on clinical, laboratory, and imaging data.

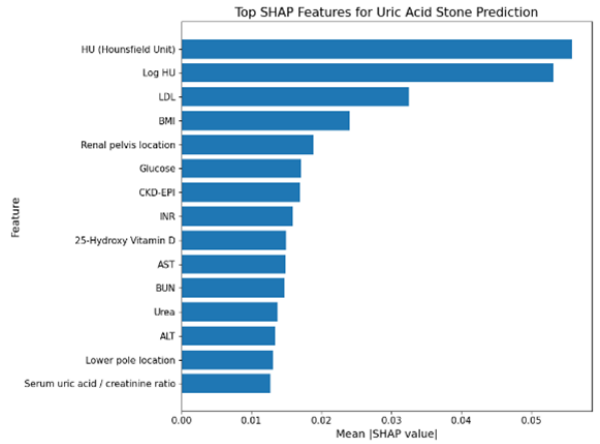
Material and Method: In this retrospective study, a multidimensional dataset of patients with kidney stones was analyzed, including demographic, laboratory, urinalysis, 24-hour urine, and imaging data (HU, stone size, and localization). Ethics committee approval was obtained prior to data collection and analysis . During preprocessing, missing values were imputed, categorical variables encoded, and only clinically relevant features retained to prevent data leakage. Feature engineering included logarithmic transformations and clinically meaningful derived variables to improve model performance. Machine learning models (XGBoost, Random Forest, and Extra Trees) were applied, with class imbalance addressed using SMOTE. Model performance was evaluated using 5-fold stratified cross-validation and repeated holdout validation, and the optimal model and decision threshold were selected. Model interpretability was assessed using SHAP analysis.

Findings: The model demonstrated high performance in distinguishing uric acid stones (ROC-AUC: 0.91 [Fig.1], PR-AUC: 0.88). Among 182 patients (uric acid: n = 23; non–uric acid: n = 159), accuracy was 84%, recall 87%, specificity 81%, precision 79%, and F1-score 0.83. Correlation analysis showed no problematic multicollinearity among the model variables, supporting the independent contribution of the included features. SHAP analysis revealed that HU values, stone localization, and some metabolic parameters such as LDL, HbA1c, and sodium were the most influential predictors. (Fig.2) Notably, lower HU values were strongly associated with uric acid stones.

ROC-AUC Curve



SHAP Analysis



Conclusion: Machine learning models can accurately differentiate uric acid stones using non-invasive data. This approach may support clinical decision-making, accelerate diagnosis, and optimize treatment strategies.

Keywords: Urinary stone disease, uric acid stone, machine learning

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