Event: ICE25 International Conference on Endourology (ICE25)
Submission: ICE25 Abstract Submission
Abstract ID: ICE25-0267
Submitter: Mr. M.F. (Muhammet Firat) Özervarli

Robot-Assisted Retrograde Intrarenal Surgery with Flexible and Navigable Suction Ureteral Access Sheath

Topic Urolithiasis
Clinical step Treatment
Management tool Surgical Robotic

Presentation mode
Video

Author list
Tefik T.[1], Ergül R.B.[1], Özervarli M.F.[1], Saeb-Parsy K.[2], Dragos L.[2], Gauhar V.[3], Traxer O.[4]

[1]Istanbul University Istanbul Faculty of Medicine, Department of Urology, Istanbul, Türkiye, [2]Cambridge University Hospitals NHS Foundation Trust, Department of Urology, Cambridge, United Kingdom, [3]Ng Teng Fong General Hospital, Department of Urology, Singapore, Singapore, [4]Sorbonne Université, GRC n°20, Groupe de Recherche Clinique sur la Lithiase Urinaire, Hôpital Tenon, Department of Urology, Paris, France

Introduction & Objectives

Flexible and navigable suction ureteral access sheaths (FANS-UAS) and robotic-assisted retrograde intrarenal surgery (robo-RIRS) have each demonstrated potential to enhance surgical outcomes in renal stone management. This study aimed to evaluate the feasibility, safety, and clinical efficacy of combining FANS-UAS with robo-RIRS for the treatment of renal stones <2 cm.

Materials & Methods

A retrospective, single-center pilot study was conducted on 13 patients who underwent robo-RIRS with FANS-UAS between 2024 and 2025 for single renal stones smaller than 2 cm. Robo-RIRS was performed using the Avicenna robotic platform in combination with FANS-UAS, which provides continuous active suction and improved endoscopic stability. Data collected included patient demographics, stone characteristics, operative and console time, suction duration, PULS grade (Post-Ureteroscopic Lesion Scale), stone-free rates (SFR), and complications. Stone-free status was assessed by non-contrast CT within 24 hours postoperatively.

Results

The mean patient age was 51 ± 11.7 years, and the mean stone size was 11 ± 4.3 mm. Most stones (46.2%) were located in the lower pole. Mean operative time was 100 ± 32.6 minutes. PULS grades were 0 in 61.5%, 1 in 30.8%, and 2 in 7.7% of patients. The overall SFR was 92.3%. One patient developed a urinary tract infection (UTI) postoperatively, which was successfully treated with oral antibiotics. No major complications or reinterventions were reported. At the 6-month follow-up, one patient had a stable residual 6 mm stone without requiring further treatment.

Table 1. Baseline Demographic, Clinical, and Intraoperative Characteristics of the Study Population

Number of patients	13
Age (year)	51 ± 11.7 (24 – 67)
BMI	25.5 ± 5.6 (18.7 – 42)
Sex (Female/Male)	7 (53.8) /6 (46.2)
Stone laterality (Left/Right)	8 (61.5%)/ 5 (38.5%)
Preoperative JJ stent	8 (61.5%)
ASA score	1 ± 0.7(1-3)
Anesthesia (General/Spinal)	8(61.5)/5(38.5)
Stone size (mm)	11 ± 4.3 (6-20)
Stone location	Upper pole: 1 (7.7%) Middle calyx: 4 (30.8%) Lower pole: 6 (46.2%) Renal pelvis: 2 (15.4%)
Total operative time (min)	100 ± 32.6 (60 – 180)
Robotic console time (min)	91 ± 27 (55 – 150)
Suction time (min)	10 ± 6.8 (5 – 30)
PULS Grades	Grade 0: 8 (61.5%) Grade 1: 4 (30.8%) Grade 2: 1 (7.7%)
Stone-Free Rate Grade A Garde B Grade C Grade D	 11 (84,6%) 1 (7,7%) 0 (0%) 1 (7,7%)
Complications	1 (7,7%) patient with postoperative fever, treated with 3 days IV antibiotics.

Conclusions

This pilot study demonstrates that the combination of robo-RIRS with FANS-UAS is a feasible, safe, and effective approach for the management of renal stones <2 cm, offering high stone-free rates and minimal complications. The robotic platform, paired with active suction technology, may enhance ergonomic comfort and procedural efficiency. Larger prospective studies are warranted to confirm these preliminary findings.