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Ureteroscopy *Versus* Double J Stenting in Emergency Treatment of Obstructive Lithiasis

P. GEAVLETE[a, b, c], A. PLESUVESCU[b], F. STANESCU[b], C. ENE[a, b], C. MARES[a, b], C. BULAI[a, b], R. MULTESCU[b], B. GEAVLETE[a, b, c]

[a]"Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

[b]"Saint John" Emergency Clinical Hospital, Department of Urology, Bucharest, Romania

[c]Sanador Hospital, Bucharest, Romania

ABSTRACT

Objective: *Ureteroscopy (URS) is a commonly used procedure for the management of ureteral stones. While elective URS has been extensively studied, the literature on emergency URS remains limited. The aim of the present study is to evaluate the efficacy and safeness of URS performed in emergency settings and to determine the ideal candidates for this type of intervention.*

Methods: *Patients who underwent URS for ureteral stones in a single healthcare unit, "Saint John" Emergency Clinical Hospital, Bucharest, Romania, were included in a retrospective investigation between April 2022 and March 2023. The study group was divided into two subgroups: group A (138 patients who underwent semirigid URS in an emergency setting) which was subdivided into group A1 (95 patients with stone on the distal ureter) and group A2 (43 patients with stone on the proximal ureter), and group B (151 patients who underwent a double J stent insertion). The success rate defined as stone fragmentation and resolution of renal obstruction, along with intraoperative and postoperative complications were assessed. A URS procedure was considered unsuccessful if either the instrument could not be passed to access the stone or it was deemed unsafe to perform the URS. In such cases, patients were managed by inserting a ureteric stent and scheduled for a subsequent procedure.*

Results: *It could be observed that most complications occurred in emergency ureteroscopy on distal ureter (95 cases) and the most severe ones on proximal ureter (two cases – Clavien 4). Double J stenting provided a reduced number of complications (51 cases). It should be mentioned that patients with emergency semirigid ureteroscopy had more complications than those with double J stent for every group of BMI, while most of the complications were observed in the groups with the highest BMI. The success of the URS procedure was determined based on complete stone fragmentation and extraction, and it was of 91.3% for cases with emergency ureteroscopy.*

Conclusion: *Patients who underwent URS for ureteral stones at a single facility, "Saint John" Emergency Clinical Hospital, Bucharest, Romania, were included in a retrospective investigation. The success rates and complication rates of emergency URS were comparable to those of elective URS, providing valuable insights for clinical decision-making.*

Keywords: efficacy, elective, emergency, safety, ureteral stones, ureteroscopy.

Address for correspondence:
Geavlete Petrisor, M.D.
Urology Department of Saint John Emergency Hospital, Bucharest, Romania
13 Vitan-Barzesti Bulevard, 042122, Bucharest, Romania
Email: geavlete@gmail.com; cosmin85_ene@yahoo.com

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INTRODUCTION

Ureteroscopy (URS) is a commonly used procedure for ureteral stones, . while While extensive research has been conducted on elective URS, there is only limited literature data on URS performed in emergency settings. Ureteral stones can cause significant discomfort and complications, leading patients to seek immediate medical attention (1). In an emergency setting, prompt intervention is crucial to relieve symptoms, mitigate complications and restore urinary flow. URS, a minimally invasive technique, allows direct visualization and removal of ureteral stones, making it an attractive option for emergency management Because URS is a minimally invasive procedure that enables direct viewing and ureteral stone removal, it is a desirable choice for emergency management (2).

The most frequent reason for hospitalization in urological practice is renal colic caused by a ureteral stone. In urological practice, renal colic brought on by a ureteral stone is the most common cause of hospitalization. Patients might need kidney decompression through the insertion of a ureteral stent or a nephrostomy tube. Renal decompression effectively relieves pain but necessitates subsequent treatment such as ureteroscopy (URS) or extracorporeal shock wave lithotripsy. Aside from possible problems like ureteral perforation and, in certain situations, stent passage failure, the implantation of a double J stent may increase the risk of urosepsis, constriction of the ureter and wall swelling, all of which may reduce the chance of successful fragmentation or the passage of stone fragments in the future.The insertion of a double J stent, aside from potential complications like urethral ureteral perforation and stent passage failure in some cases, could elevate the risk of urosepsis, urethral ureteral constriction, and wall swelling, both of which may diminish the likelihood of successful fragmentation or subsequent passage of stone fragments (3). Although elective URS is more invasive, it is quicker and has a higher success rate in completely removing the stones (stone-free rate or SFR). Emergency URS is a valid option to provide both kidney decompression and stone removal in urgent cases (4).

The study aimed to evaluate the outcomes of emergency URS in comparison with the standard approach in patients who arrive at to the ER with renal colic non-responsive to the medical treatment.

The purpose of the study was to compare the effectiveness of emergency URS with the standard of care for patients who arrive at the emergency room (ER) with non-responsive renal colic. ❑

MATERIAL AND METHODS

A retrospective analysis was conducted to evaluate the safety and efficacy of ureteroscopy performed in emergency settings compared to elective surgical casesprocedures. The study was carried out in "Saint John" Emergency Clinical Hospital, Bucharest, Romania, between April 2022 and March 2023. The study cohort comprised 289 patients who arrived at the ER with symptoms of renal colic which were non-responsive or ineligible for conservative treatment. As a result of The patients were divided into two main groups based on treatment modalitytreatment modalities, patients were divided into two primary groups. Group A comprised 138 patients (47.7%) who underwent semirigid URS in emergency settings. Within group A, further subdivisions were made to analyze the outcomes based on stone location in the ureter. Subgroup A1 included 95 patients with Stones stones located in the distal ureter and subgroup A2 43 patients with stones in the proximal ureter. Group B comprised 151 patients (52.3%) who received the insertion of a double J stent (Table 1). The therapeutic decision was taken according to individual clinical and paraclinical criteria. The cases without fever and with good clinical and biological status underwent emergency ureteroscopy, while for those with fever and either active or past urinary tract infection as well as suspicion of infection, the double J stenting was the option for of choice. To assess stone clearance, imaging modalities such as KUB X-ray and ultrasound examination were utilized used. Any complications that arose during the

	Patients number
URS	138
Double J	151
Total	289

TABLE 1. Patient distribution regarding the final intervention

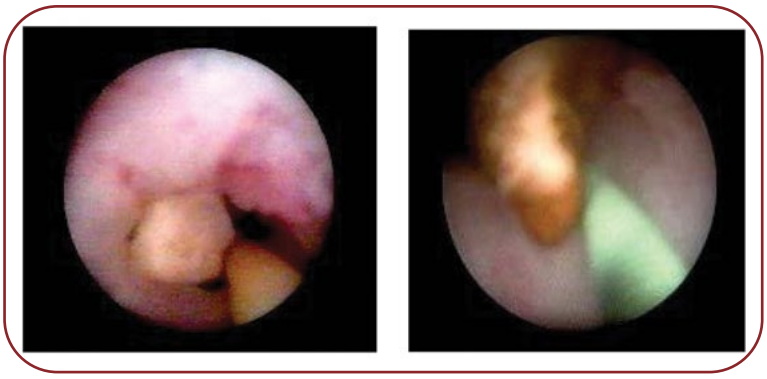

FIGURE 1. Ureteroscopy in an emergency setting with removal of the lithiasis

FIGURE 2. Placement of a double J stent

procedure were classified according to the Clavien-Dindo classification system.

Surgical technique

Ten skilled surgeons performed each procedure while under general or spinal anesthesia. For stone fragmentation, either a pneumatic lithotripter (EMS Swiss Lithoclast, Switzerland) or a holmium laser (Calculase, Karl Storz, Germany) employing a 365 µm laser fiber was utilized with a nine-French semi-rigid ureteroscope (Karl Storz, Germany). Endoscopic forceps were used to extricate the stones (Karl Storz, Germany). Fragments less than 2 mm in diameter were not removed from the ureter; instead, they were allowed to flow naturally. Patients had a postoperative stent implanted for up to two weeks following surgery, depending on the surgical technique and at the surgeon's discretion. An effective URS treatment resulted in the complete extraction and/or fragmentation of the stone (Figure 1). Failure to execute a safe URS or the inability to pass the instrument to reach the calculus were both recorded as failed URSs. In these cases, patients had ureteric stent insertion and were brought back for a second treatment (Figure 2). By using a KUB X-ray and an ultrasonic examination (USS), the stone-free status was determined. According to the Clavien-Dindo classification system, each complication has been graded. ❑

RESULTS

Patients' mean age was 48.2 years, with no differences between the study groups. The average stone dimension was of 9.4 mm, with no significant differences between groups. The average operative time was 42.3 min for the ureteroscopy group and 15.7 min for the double J stent group. The hospital stay was relatively similar between groups (2.4 days). Complications were evaluated assessed taking into consideration the Clavien-Dindo modified system. We encountered an overall complication of grade I in all groups. There was only 1 case of grade II Clavien-Dindo complication in URSPCNL group. There were no major complications in all the groups. There was a longer time in hospitalization in the URS PCNL group. The Clavien-Dindo modified system was considered when evaluating the complications. In every group, we found an overall grade I problem. In the URS group, there was just one instance of a grade II Clavien-Dindo complication. There were no major difficulties in any of the study groups. In the URS group, patients had longer hospital stays (Table 2).

The success rate of URS was determined by assessing stone fragmentation and the resolution of renal obstruction. Intraoperative and postoperative complications were also evaluated. The

Stone location	Patients number	Clavien-Dindo grade I	Clavien-Dindo grade II	Clavien-Dindo grade III	Clavien-Dindo grade IV	Clavien-Dindo grade V
Distal ureter	95	8	86	1	0	0
Proximal ureter	43	3	39	1	2	0
Double J stent	51	30	21	0	0	0
Total	191	41	146	2	2	0

TABLE 2. Distribution of Clavien-Dindo complications

TABLE 3. Patients' distribution and their BMI

BMI	<18	18-25	26-30	>30
Number of patients	15	80	110	84
URS semirigid	10	44	59	59
Double J	5	36	51	25

decision to perform double J stent insertion was based on individual patient factors, including their condition, severity of obstruction, and the presence of complications such as stone larger than 10 mm or ureteral stenosis. It could be observed that most complications appeared in emergency ureteroscopy on distal ureter (95 cases) and the most severe ones on proximal ureter (two cases – Clavien 4). Double J stenting provided a reduced number of complications (51 cases).

Data were collected from medical records and further analyzed retrospectively. We took into consideration the Clavien-Dindo classification system of postoperative complications. Statistical analysis was performed to compare the outcomes between the emergency URS group and the elective URS from the literature and the double J stent insertion. The results were interpreted to evaluate the safety and efficacy of URS in emergency cases and its potential as a viable option for managing the renal colic.

The complication and the necessity of inserting a double J stent were compared with patients' BMI (Table 3). It could be observed that patients with emergency semirigid ureteroscopy had more complications than those with double J stent for every group of BMI, while most complications were observed in the groups with the highest BMI.

The success of the URS procedure was determined based on complete stone fragmentation and extraction, and it was of 91.3% for the cases with emergency ureteroscopy. ❑

DISCUSSION

The present research offers proof regarding the possibility, safety, and effectiveness of URS in emergencies in addressing ureteric calculi within a publicly funded healthcare environment. The outcomes are comparable to those observed in patients who undergo a preoperative stent placement followed by a delayed procedure. As a result, when considered as a whole, URS in an emergency has the potential to result in reduced hospitalization, shorter stays, lower stent-related complications, and ultimately prove to be a more economically efficient approach (5). Also, the findings demonstrated that emergency URS is a safe and effective option for patients presenting with renal colic. The success rate and complication rates observed in emergency URS were those of elective URS, indicating that prompt intervention in emergency settings can benefit certain patients (6, 7). Based on our observations, urgent ureteroscopy demonstrated comparable effectiveness and safety in comparison to the planned procedure. Its primary benefit lies in offering instant pain relief and facilitating stone fragmentation simultaneously (8).This study provides evidence for the feasibility, safety and efficacy of URS in treating ureteric calculi in emergency situations in a publicly funded healthcare setting. The results are similar to those seen in individuals who have a preoperative stent implantation and a subsequent postponed surgery. Because of this, when taken into account holistically, emergency URS may lead to fewer hospital admissions, shorter stays, less problems due to stents, and ultimately show to be a more cost-effective strategy (5). Furthermore, the results show that emergency URS is a secure and useful treatment for individuals who arrive at the emergency department with renal colic. Emergency URS success and complication rates were comparable to those of elective URS, suggesting that timely intervention in emergency situations can be beneficial for some patients. If successful, most ureteral stones can be monitored with a fair prospect of a smooth passage; also, this approach is usually less expensive and intrusive than other alternatives. The majority of urethral ureteral stones can be monitored with a reasonable expectation of a smooth passage, and this approach is typically less costly and invasive compared to other options, if successful (9).

But the standard approach to treating symptomatic ureteral stones is to first remove blockage with a double J stent or nephrostomy tube, and then fragment the stone using ESWL later on (10). When sepsis symptoms are evident upon presentation, nephrostomy tube insertion – which is done under local anesthesia – is the preferable procedure since it is comparatively less intrusive. However, the generally accepted strategy for managing symptomatic ureteral

stones involves relieving obstruction by inserting a nephrostomy tube or a double J stent, followed by later stone fragmentation using ESWL (10). Nephrostomy tube insertion, performed under local anesthesia, is relatively less invasive and is preferred if signs of sepsis are present upon presentation. However, potential drawbacks include tube leakage, displacement and the need for stoma management (11). Technological advancements have elevated the safety and efficacy of ureteroscopy, leading to reduced complication rates (12) standing as a secure and minimally invasive procedure for addressing ureteral stones (13).

The success rate for natural passage of stones smaller than 5 mm is up to 98%, although the chance of spontaneous passage is often minimal for stones larger than 7 mm in diameter (14).

The best course of action for ureteral stones that require active treatment depends on a number of variables, such as the position and size of the stone, the operator's experience, patient's preferences, availability of medical equipment, and related expenses (15). Stones with a diameter of less than 5 mm have a success rate of up to 98% for natural passage, but for stones exceeding 7 mm in diameter, the likelihood of spontaneous passage is generally low (14).

When an active treatment approach is deemed necessary for urethral ureteral stones, the optimal procedure choice depends on multiple factors, including stone size and location, the experience of the operator, patient preferences, available medical equipment, and associated costs (15).

The study identified certain characteristics that could help in selecting ideal candidates for emergency URS. Younger patients with ureteral stones sized. between 5-8.5 mm located in the distal ureter, having a BMI Lower than 27, and showing no clinical or biochemical signs of UTI were found suitable candidates for this procedure (4).

The results of this study align with previous research on elective URS, emphasizing the comparable safety and efficacy of the procedure in both settings. URS offers the advantage of direct visualization and removal of ureteral stones, making it a minimally invasive and attractive option for emergency management. The findings of this study provide valuable insights for clinical decision-making, enabling healthcare professionals to optimize patient care and alleviate symptoms promptly. It is important to acknowledge the limitations of this study, primarily its retrospective design and potential selection bias. Retrospective analyses are subject to inherent limitations, such as incomplete data collection and the inability to control confounding factors. To overcome these limitations and strengthen the evidence, further prospective studies are necessary. Prospective studies would allow for standardized data collection, control of variables, and the inclusion of a larger and more diverse patient population. The study found a few traits that might be useful in choosing the best candidates for emergency URS. Younger patients who had distal ureteral stones that measured between 5 and 8.5 mm, a BMI under 27 and no clinical or biochemical indications of a urinary tract infection were determined to be good candidates for this surgery (4).

The findings of the present study support those of earlier studies on elective URS, highlighting a similar safety and effectiveness of the procedure in both contexts. The direct sight and removal of ureteral stones is one of the URS benefits, which makes it a minimally invasive and appealing choice for emergency care. The results of our study offer insightful information for clinical decision-making, empowering medical practitioners to maximize patient treatment and quickly relieve symptoms. Future research should focus on validating the outcomes of emergency URS through well-designed prospective studies. These studies can further explore selection criteria for ideal candidates and assess long-term outcomes, including stone recurrence rate and patient satisfaction. Comparative studies directly comparing emergency URS with alternative interventions, such as conservative management of other minimally invasive procedures, would also provide valuable insights into the best approach for managing renal colic in emergency settings.

This study contributes to the existing literature on emergency URS by demonstrating its safety and efficacy compared to elective cases for managing ureteral stones. The findings support the use of emergency URS as a viable option for promptly relieving symptoms, mitigating complications and restoring urinary flow in patients presenting with renal colic. (9).

It is imperative that subsequent investigations ought to focus on verifying the results of urgent

URS by means of well-planned prospective studies. These investigations can evaluate long-term results, such as the rate of stone recurrence and patient satisfaction, and delve deeper into the selection criteria for the best candidates. Research that explicitly compares emergency URS to other interventions – like cautious management of other minimally invasive procedures – would also be beneficial in shedding light on the most effective way to treat renal colic in emergency situations.

By proving the safety and effectiveness of emergency URS in handling ureteral stones in comparison to elective instances, the present study adds to the body of the available relevant literature. According to the results, emergency URS is a good option for patients who arrive with renal colic in order to quickly relieve symptoms, reduce complications and restore urine flow (9).

Like other studies that, for example, showcased that promptly administered ESWL represents a valuable treatment choice for enhancing the expulsion of ureteral stones and reducing the length of hospitalization, especially when the stone is positioned proximally to the iliac vessels (6), we can conclude that URS an emergency is a valuable option that can reduce costs and time in treating the patient (3).

By considering the identified selection criteria, healthcare professionals can make informed decisions and optimize patient care in emergency settings. Also taking into consideration that in the overall approach of the treatment, kidney stone disease is a costly disease comparable with to the cost of bladder cancer and prostate cancer, we can estimate that having just one procedure, URS in an emergency setting would reduce the overall costs of the treatment (3). Last but not least, it is important to note that this study has inherent limitations, including its retrospective nature and the potential for selection bias. Further prospective studies are needed to validate these findings and provide more robust evidence for clinical decision-making.

We can conclude that emergency URS is a valuable option that can save money and time in treating the patient, similarly to other studies which, for instance, demonstrated that promptly administered ESWL was representing a valuable treatment choice for improving the expulsion of ureteral stones and reducing the length of hospitalization, especially when the stone is positioned proximally to the iliac vessels (6).

Healthcare providers can make well-informed decisions and provide the best possible care for patients in emergency situations by taking into account the established selection criteria. Additionally, since kidney stone disease is a costly condition overall which requires medical care similar to that of bladder and prostate cancer, we can calculate that URS in an emergency situation would be the only procedure needed. ❑

CONCLUSION

In order to manage ureteral stones, this study compared the safety and effectiveness of emergency URS to elective instances. The results of our study show that emergency URS is a secure and useful treatment for patients who have renal colic. Younger patients with ureteral stones, size 5-8.5 mm, positioned in the distal ureter, BMI less than 27, and no clinical or biochemical indications of UTI were the best candidates for emergency URS. ❑

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References

1. **Wani M, Burki J, Melhem M, et al.** Is primary ureteroscopy an alternative to emergency stenting in terms of quality and cost?
Cent European J Urol 2021;74:446-450.
2. **Somani BK, Bres-Niewada E.** Primary ureteroscopy versus emergency stenting and delayed ureteroscopy: Is there a winner?
Cent European J Urol 2021;74:451-452.
3. **Geratghty R, Cook P, Walker V, Somani BK.** Evaluation of economic burden of Kidney stone disease in the UK: A retrospective cohort Study.
BJUI 2020; 125:586 -194.
4. **Gadzhiev NK, Akopyan GN, Tursunova FI, et al.** Emergency versus elective ureteroscopy for the management of ureteral stones.
Urologia 2022;89:79-84.
5. **McKay A, Somani BK, Pietropaolo A, et al.** Comparison of primary and delayed ureteroscopy for ureteric stones:

A prospective non-randomized comparative Study.
Urol Int 2021;105:90-94.

6. **Tombal B, Mawlawi H, Feyaerts A, et al.** Prospective randomized evaluation of emergency Extracorporeal Shock Wave Lithotripsy (ESWL) on the short-time outcome of symptomatic ureteral stones.
Eur Urol 2005;47:855-859.
7. **Guercio S, Ambu A, Mangione F, et al.** Randomized prospective trial comparing immediate versus delayed ureteroscopy for patients with ureteral calculi and normal renal function who present to the emergency department.
J Endourol 2011;25:1137-1141.
8. **Osorio L, Lima E, Soares J, et al.** Emergency ureteroscopic management of ureteral stones: why not?
Urology 2007;69:27-31; discussion 31-33.
9. **Lotan Y, Gettman MT, Roehrborn CG, et al.** Management of ureteral calculi: a cost comparison and decision making analysis.
J Urol 2002;167:1621-1629.
10. **Joshi HB, Obadeyi OO, Rao PN.** A comparative analysis of nephrostomy, JJ stent, and urgent in situ extracorporeal shock wave lithotripsy for obstructing ureteric stones.
BJU Int 1999;84:264-269.
11. **Preminger GM, Kettelhut MC, Elkins SL, et al.** Ureteral stenting during extracorporeal shockwave lithotripsy: help or hindrance.
J Urol 1989;142:32-36.
12. **New F, Somani BK.** A complete world literature review of the quality of life (QOL) in patients with kidney stone disease (KSD).
Curr Urol Rep 2016;17:88.
13. **Anagnostou T, Tolley D.** Management of ureteric stones.
Eur Urol 2004;45:714-721.
14. **Tiselius HG, Ackermann D, Alken P, et al.** Guidelines on urolithiasis.
Eur Urol 2001;40:362-371.
15. **Teichman JM.** Clinical practice. Acute renal colic from ureteral calculus.
N Engl J Med 2004;350:684-693.