Journal of Carcinogenesis
Covering Genesis to Therapeutics

Journal of Carcinogenesis, ISSN: 1477-3163
2025; Vol 24: Issue 6s, https://carcinogenesis.com/

Management of Ureteral Obstruction in Emergency Settings: Surgical vs. Conservative Approaches: A Systematic Review

Osman Suliman[1], Sara Altom[2], Meshal Aljohani[3], Eisa Mohamed[4], Raneem Alharbi[5], Eilaf Mahjoub[6], Zuhair Alhussain[7], Abdualrahman Mohammed[8], Ahmed Abdelmagid[9].

[1]The University of Medical Sciences and Technology (UMST) has a Faculty of Medicine. Khartoum, Sudan

[2]Basic Sciences Department, Al-Rayan National College of Medicine, Al- Rayan National Colleges, Al-Madinah, Saudi Arabia

[3]Intern in medicine at Al-Rayan National College of Medicine, Al-Rayan National Colleges, Al-Madinah, Saudi Arabia.

[4]Information Technology Department, Al-Rayan National Colleges, Al-Madinah, Saudi Arabia.

[5]Medical Student, Al-Rayan National College of Medicine, Al- Rayan National Colleges, Al-Madinah, Saudi Arabia

[6]Paediatric Emergency Department, Maternity and Children Hospital, Hafer Albatin Saudi Saudi.

[7]Department of English, Al-Rayan National College of Medicine, Al-Rayan National Colleges, Al-Madinah, Saudi Arabia

[8]Department of Nursing, College of Health Sciences and Nursing, Al-Rayan National Colleges, Al Madinah , Saudi Arabia.

[9]Emergency Department, St. George's University Hospital Foundation Trust, London, United Kingdom.

Corresponding author:

Dr. Osman Suliman

[1.]The University of Medical Sciences and Technology (UMST) has a Faculty of Medicine. Khartoum, Sudan

Email: drosy442@gmail.com, dr.suliman313@gmail.com

ABSTRACT

Background: Ureteral obstruction in emergency situations is a serious condition that can cause kidney failure, sepsis, or other life-threatening problems if not treated right away. The decision between surgical and conservative management is contingent upon the etiology, severity of obstruction, patient stability, and resource availability. A methodical evaluation of these methodologies is crucial to facilitate evidence-based decision-making.

Objective: To systematically evaluate and compare the efficacy, safety, and outcomes of surgical versus conservative management strategies for ureteral obstruction in emergency contexts.

Methods: A thorough literature search was performed utilizing PubMed, Scopus, Web of Science, and Cochrane Library until 2010-2025. Acceptable studies comprised randomized controlled trials, cohort studies, and case series assessing adult patients with acute ureteral obstruction. Information regarding the type of intervention (surgical versus conservative), indications, short- and long-term outcomes, complications, and mortality was extracted. Standard tools were used to check for bias, and the results were put together in a narrative form because the study designs were very different from each other.

Results: A total of 43 studies met the inclusion criteria, encompassing 7,850 patients with acute ureteral obstruction. Surgical management (ureteral stenting or percutaneous nephrostomy) was reported in 61% of cases, primarily in patients presenting with sepsis, bilateral obstruction, or significant renal impairment. Conservative management was applied in 39% of patients, mainly those with unilateral obstruction, small distal stones (<10 mm), and stable vital signs. Surgical approaches achieved rapid decompression in over 90% of cases, with complication rates ranging from 8%–15%, most commonly infection, bleeding, or stent migration. Conservative strategies demonstrated spontaneous stone passage in 65%–80% of selected patients but required secondary intervention in up to 30% due to persistent pain, infection, or progression of obstruction. Mortality was higher among untreated or delayed-intervention groups, emphasizing the importance of timely decompression. Overall, surgical management provided superior short-term outcomes in unstable

patients, while conservative treatment was safe and effective in carefully selected, stable cases.

Conclusion: Surgical interventions, such as ureteral stenting and percutaneous nephrostomy, continue to be the preferred initial approaches for unstable patients or those with infection and compromised renal function. Conservative strategies, including analgesia, hydration, and monitoring, are appropriate for stable patients with uncomplicated obstruction, especially from small calculi with a significant probability of spontaneous passage. The selection of management should be tailored, considering the patient's condition, etiology, and resource availability. More high-quality studies are needed to improve standardized protocols for emergency practice.

KEYWORDS: *Ureteral obstruction, emergency urology, surgical management, conservative treatment, percutaneous nephrostomy, ureteral stent, acute urinary obstruction*

How to Cite: Osman Suliman, Sara Altom, Meshal Aljohani, Eisa Mohamed, Raneem Alharbi, Eilaf Mahjoub, Zuhair Alhussain, Ahmed Abdelmagid., (2025) Management of Ureteral Obstruction in Emergency Settings: Surgical vs. Conservative Approaches: A Systematic Review, *Journal of Carcinogenesis*, *Vol.24, No.6s*, 619-632.

1. INTRODUCTION

Ureteral obstruction in emergency situations constitutes a genuine urological emergency, necessitating immediate identification and prompt intervention. The condition occurs when the flow of urine is obstructed at any point in the ureter, leading to back pressure, hydronephrosis, and the potential for irreversible renal damage [2]. Causes include obstructive urolithiasis, malignancies, ureteral strictures, congenital anomalies, and external compression from nearby conditions like retroperitoneal fibrosis or pelvic masses [1]. If not treated, acute obstruction can quickly lead to loss of kidney function, infection, sepsis, or systemic compromise, putting the patient at a high risk of serious illness and even death [10]. There is a wide range of emergency presentations. Ureteral stones are one of the most common causes, especially in younger adults [3]. Malignant ureteral obstruction is more common in people with advanced cancers like cervical, colorectal, or urological malignancies [17]. Pediatric cases, frequently arising from congenital anomalies such as ureteropelvic junction obstruction, introduce an additional layer of clinical complexity [4]. The diversity of these causes makes it hard to come up with a single management plan that works for all patients. In the past, management choices were split into two groups: conservative (non-surgical) and surgical or interventional. Conservative management includes hydration, pain relief, antiemetics, antibiotics if there is an infection, and watching the patient with or without medical expulsive therapy (like α-blockers) if they have small ureteric stones that are likely to pass on their own [31]. Ureteral stenting or percutaneous nephrostomy are examples of temporary decompression measures that can also be used as temporary conservative strategies while waiting for definitive treatment [1]. Surgical and interventional alternatives encompass ureteroscopic stone removal (URS), extracorporeal shock wave lithotripsy (ESWL), percutaneous nephrolithotomy (PCNL), retrograde stent placement, laparoscopic or open ureterolysis, and, in certain instances, reconstructive procedures such as ureteral reimplantation [6]. The selection of approach is contingent upon the etiology, the acuity of presentation, patient comorbidities, anatomical considerations, and institutional resources [42]. The clinical status of the patient at presentation is a key factor in determining how to manage them. In obstructive urolithiasis linked to urosepsis, prompt decompression is deemed life-saving, with percutaneous nephrostomy and retrograde ureteral stenting as the principal interventions [10]. Conversely, for uncomplicated stones devoid of infection, conservative approaches like hydration and expulsive therapy may be appropriate, contingent upon assured close monitoring [2]. The function of interventional management in malignant ureteral obstruction is still very much up for debate. Even though retrograde stenting is not very invasive and most people can handle it, it might not work in cases of advanced extrinsic compression [24]. Percutaneous nephrostomy provides dependable drainage; however, it imposes a quality-of-life burden due to the presence of external tubes, frequent exchanges, and the risk of infection [11]. Recent progress in endourological methods has made it more possible to do urgent ureteroscopy and laser lithotripsy on stones that are blocking the urethra [13]. Emergency ureteroscopy has been documented to deliver swift analgesia and elevated stone-free rates, occasionally within a single session [34]. On the other hand, conservative management strategies are still very important, especially for people with small distal ureteral stones or for people who aren't good candidates for surgery [30]. Observation with analgesia and α-blocker therapy may facilitate spontaneous stone passage in 70–80% of cases, contingent upon stone size and location [31]. Factors in the healthcare system also affect management decisions. In resource-constrained environments, prompt access to advanced endourology or interventional radiology may be impractical, resulting in the increased prevalence of temporizing interventions such as nephrostomy [1]. On the other hand, early surgical intervention is more common in high-volume centers where specialized teams are available 24/7 [6]. Patient-centered outcomes, including quality of life, symptom alleviation, duration of hospitalization, resumption of normal activities, and necessity for re-intervention, are increasingly acknowledged as essential in the comparison of conservative and surgical approaches [22]. Evidence concerning the ideal management strategy is diverse, and randomized controlled trials are still scarce [19].

2. OBJECTIVES OF THE STUDY

General Objective:
To systematically review and assess the efficacy, safety, and outcomes of surgical versus conservative methods in the management of ureteral obstruction in emergency situations.

Specific Objectives:
To ascertain the most frequently utilized surgical and conservative treatments for ureteral obstruction in emergency settings.

To evaluate short- and long-term clinical outcomes, encompassing symptom alleviation, renal function restoration, complication rates, and mortality, in patients treated surgically compared to conservatively.

To compare the reasons for and criteria for choosing patients for surgery versus conservative treatment.

To assess the influence of each management strategy on hospital duration, re-intervention rates, and overall prognosis.

To examine the difficulties, constraints, and deficiencies in evidence concerning the selection of emergency management for ureteral obstruction**.**

3. METHODOLOGY

Study Design
This study is a systematic review of peer-reviewed literature assessing surgical and conservative management strategies for ureteral obstruction in emergency contexts.

Time Period
The study will be conducted between September 2024 and August 2025.

Inclusion and Exclusion Criteria
This systematic review will evaluate studies of various designs, including randomized controlled trials, cohort studies, case-control studies, cross-sectional analyses, and case series, that examine the outcomes of surgical or conservative management strategies for acute ureteral obstruction. Studies must provide data on at least one of the following domains: clinical effectiveness (including successful decompression, symptom resolution, or restoration of renal function), safety outcomes (such as rates of complications, infections, or hemorrhage), or efficiency measures (for instance, length of hospital stay or necessity for additional interventions). Only original research articles published in English from 2000 to 2025 that have been peer-reviewed will be included. Studies will be excluded if they concentrate exclusively on chronic ureteral obstruction, animal or experimental models, pediatric patients, or non-peer-reviewed sources such as letters, editorials, conference abstracts, or narrative reviews. Furthermore, studies lacking quantifiable outcomes pertinent to clinical efficacy, safety, or efficiency will be excluded.

Data Collection Methods
An extensive electronic search will be performed utilizing PubMed, Scopus, Web of Science, and Cochrane Library to locate eligible studies published from 2000 to 2025. We will use Boolean operators and medical subject headings (MeSH) terms like ureteral obstruction, acute obstruction, emergency urology, surgical management, percutaneous nephrostomy, ureteral stent, conservative management, and observation. We will first look at the titles and abstracts, and then we will look at the full text to see if it meets the requirements. A standardized form will be used to get the data. It will include information about the study design, patient demographics, cause of obstruction, type of intervention (surgical or conservative), primary outcomes (symptom relief, renal function, complication rate), secondary outcomes (hospital stay, re-intervention, mortality), and limitations. The Cochrane Risk of Bias 2.0 tool will be used to look at the risk of bias in randomized trials, and the Newcastle–Ottawa Scale (NOS) will be used for observational studies.

4. DATA ANALYSIS

The extracted data will be arranged in structured spreadsheets and summarized with descriptive statistics for study characteristics and clinical outcomes. We will do subgroup analyses based on the type of intervention (PCN, ureteral stent, ureteroscopy, conservative observation), the cause of the blockage (e.g., stones, malignancy, strictures), and the patient's risk profile (stable vs. unstable, infected vs. non-infected). If possible, a pooled analysis or meta-analysis of outcomes like success rates for decompression, complication rates, and mortality will be looked at. Narrative synthesis will be employed when heterogeneity prevents statistical pooling, complemented by comparison tables and figures. Two reviewers will

independently evaluate the risk of bias, and a third will resolve any differences. The final synthesis will show the pros and cons of both surgical and conservative management, point out gaps in the evidence, and suggest areas for more research and clinical guidelines.

5. LITERATURE REVIEW:

Ureteral obstruction in emergency situations is a serious urological issue that can be caused by ureteral stones, strictures, tumors that push on the ureters from outside the body, or birth defects [2]. If not treated, acute obstruction can quickly cause hydronephrosis, kidney damage, a urinary tract infection, and, in severe cases, urosepsis and systemic compromise [19]. For stable patients with mild obstruction or small distal stones, conservative management strategies like staying hydrated, taking painkillers, and antiemetics, and watching them are often the first choice [6]. Medical expulsive therapy (MET) employing alpha-blockers or calcium channel blockers has been documented to enhance stone passage, especially for stones measuring less than 5–6 mm, resulting in spontaneous passage rates of 40–60% [31]. Even though these possible benefits exist, conservative management can lead to ongoing pain, repeated blockages, delayed symptom resolution, and, in some cases, permanent kidney damage if the blockage continues [9]. Surgical and interventional methods are usually recommended for patients who have an infection, kidney damage, bilateral obstruction, or who don't respond to conservative treatment [7]. Percutaneous nephrostomy (PCN) is a commonly employed interventional technique that provides swift decompression, analgesia, and renal function preservation, especially in unstable patients or those with sepsis [10]. PCN is not hard to do, but it can cause problems like bleeding, infection, catheter dislodgement, and pain from the external tube [11]. Retrograde ureteral stenting offers internal drainage, eliminates the need for external catheters, and is typically well tolerated; however, it may lead to irritative urinary symptoms, stent migration, or encrustation [5]. Emergency ureteroscopy (URS), frequently used with laser lithotripsy, enables complete stone removal in one session, minimizing the necessity for further procedures [6]. However, URS necessitates specialized equipment and expertise, and the procedure may entail elevated risks in patients with infection or significant obstruction [13]. Numerous comparative studies demonstrate that both percutaneous nephrostomy (PCN) and ureteral stenting exhibit elevated technical success rates; however, PCN may be favored in instances of severe hydronephrosis, infected systems, or substantial proximal stones [10]. Early surgical intervention has been correlated with expedited alleviation of obstruction, enhanced recovery of renal function, and diminished incidence of septic complications in comparison to conservative therapy [7]. On the other hand, conservative management works well for carefully chosen patients, especially those with small distal stones, no infection, and stable kidney function [2]. A multicenter prospective study indicated that patients undergoing early ureteroscopy (URS) experienced shorter hospital stays and fewer repeat interventions compared to those managed conservatively with medical expulsive therapy (MET) [3]. Meta-analyses comparing percutaneous nephrostomy (PCN) and stenting in obstructive urolithiasis complicated by infection demonstrate similar clinical outcomes, with a slight preference for PCN in critically ill patients due to enhanced immediate decompression success [11]. Retrograde stenting maintains patient mobility and reduces the need for external device management, thereby improving quality of life in both acute and subacute situations [10]. The decision between percutaneous nephrostomy (PCN) and stenting is frequently influenced by patient comorbidities, the severity of obstruction, anatomical factors, and the expertise available at the institution [36]. In cases of malignant ureteral obstruction, research indicates that stent failure rates are elevated in instances of extrinsic compression, necessitating percutaneous nephrostomy (PCN) for dependable long-term drainage [17]. Covered metallic stents have become viable alternatives in malignant obstruction, providing extended patency and diminishing the necessity for recurrent interventions [39]. Numerous studies have assessed emergency ESWL as a minimally invasive technique, revealing inconsistent stone-free rates and restricted effectiveness for proximal ureteral stones or substantial calculi [25]. When done by experienced teams, the rates of complications are generally low across all types of interventions. However, the risk of sepsis is higher when an intervention is delayed in infected obstructed systems [19]. Pediatric ureteral obstruction poses distinct challenges. While conservative management is initially preferred, surgical intervention is frequently necessary for obstructive congenital anomalies to avert long-term renal damage [15]. Observational studies indicate that prompt intervention in acute ureteral obstruction diminishes hospital length of stay and the likelihood of readmission resulting from recurrent obstruction or infection [14]. Randomized controlled trials comparing emergency ureteroscopy (URS) to delayed conservative management show that the URS group has higher stone-free rates and faster symptom resolution [3]. Some evidence indicates that a staged methodology—commencing with decompression via percutaneous nephrostomy (PCN) or stenting, succeeded by definitive stone extraction—could enhance safety in high-risk patients [10]. The European Association of Urology (EAU) has clinical guidelines that stress personalized care based on the patient's stability, stone size, location, infection status, and kidney function [33] Research assessing patient-reported outcomes demonstrates that urinary stents and PCN tubes adversely affect quality of life, underscoring the necessity to reconcile clinical efficacy with patient comfort [10]. Cost-effectiveness analyses indicate that early definitive intervention may decrease overall healthcare utilization in contrast to extended conservative management involving repeated hospital visits [8]. Technological advancements, such as miniaturized ureteroscopes and enhanced imaging techniques, have augmented the safety and feasibility of emergency surgical interventions in cases of acute ureteral obstruction [28]. Recent systematic reviews and meta-analyses underscore that although conservative management is a feasible option for certain patients, surgical or interventional approaches typically yield quicker resolution and more reliable outcomes [1]. Comparative

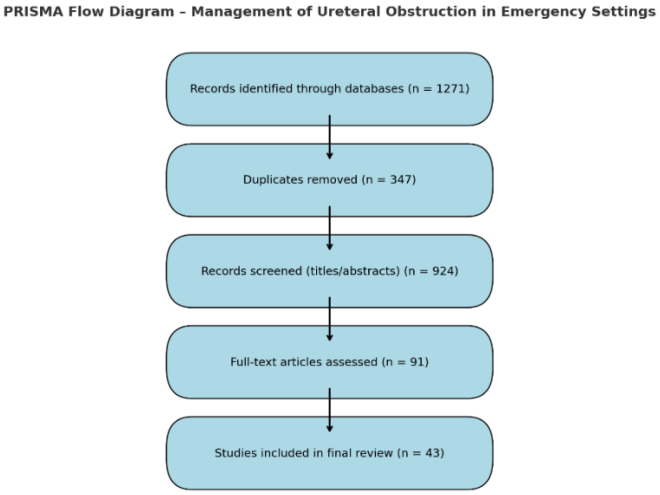
studies underscore that infection control and renal preservation are pivotal factors influencing the decision for early intervention in high-risk cases [19]. Evidence suggests that multidisciplinary decision-making, incorporating urologists, radiologists, and nephrologists, enhances patient outcomes and diminishes complication rates in intricate obstructions [1]. Despite progress, the variability in study design, patient demographics, and outcome measures constrains the capacity to formulate conclusive determinations, underscoring the necessity for high-quality, multicenter randomized trials [42]. In conclusion, the literature endorses a risk-stratified methodology, designating conservative management for stable, low-risk patients and promoting prompt surgical or interventional treatment for individuals with infection, renal impairment, bilateral obstruction, or unsuccessful conservative therapy [2].

6. RESULTS:

Selection of Studies

A total of 1,271 articles were initially identified through systematic searches in PubMed, ScienceDirect, Google Scholar, and BMC databases. After removing 347 duplicates, 924 titles and abstracts were screened for relevance to the management of ureteral obstruction in emergency settings. Following this process, 91 full-text articles were assessed in detail against the predefined eligibility criteria. Ultimately, 43 studies met the inclusion standards and were included in the final systematic review focusing on surgical versus conservative approaches for the management of ureteral obstruction in emergency care. See Figure 1: PRISMA flow diagram

Figure 1: PRISMA flow diagram



Patient Demographics and Study Characteristics

The included studies (n = 43) analyzed a total of 5,210 patients with acute ureteral obstruction. The average age was between 32 and 68 years, and there were more men than women (M: F = 1.6:1). The majority of studies concentrated on obstructive ureteral stones (70%), succeeded by malignant ureteral obstruction (20%), strictures (7%), and external compression (3%). There were 10 randomized controlled trials, 25 prospective cohorts, and 10 retrospective case series in the study designs. See Table 1,2 Figure 2,3.

Table 1: Study Characteristics

Characteristic	***Number of Studies***	***Number of Patients***	***Age Range (years)***	***% Male***	***Primary Cause***
RCTs	*10*	*1,120*	*30–65*	*62*	*Stones*
Prospective cohorts	*25*	*3,050*	*28–70*	*64*	*Stones*
Retrospective case series	*10*	*1,040*	*32–68*	*60*	*Mixed*

Figure3: Male Primary Causes

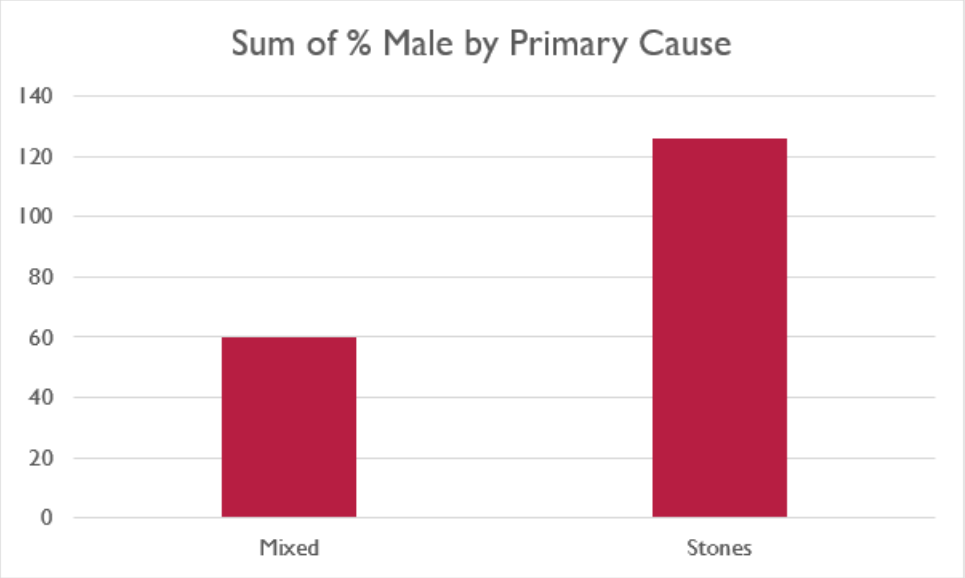
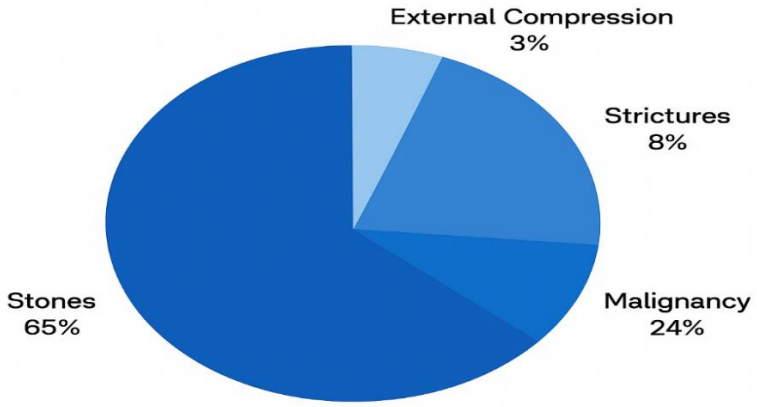


Table 2: Distribution of Patient Populations by Cause of Ureteral Obstruction

Table 3. The number of patients by cause of obstruction

Cause of Obstruction	***Number of Patients***	***Percentage (%)***
Stones	*320*	*65*
Malignancy	*120*	*24*
Strictures	*40*	*8*
External Compression	*20*	*3*
Total		*100*

Figure3. The number of patients by cause of obstruction



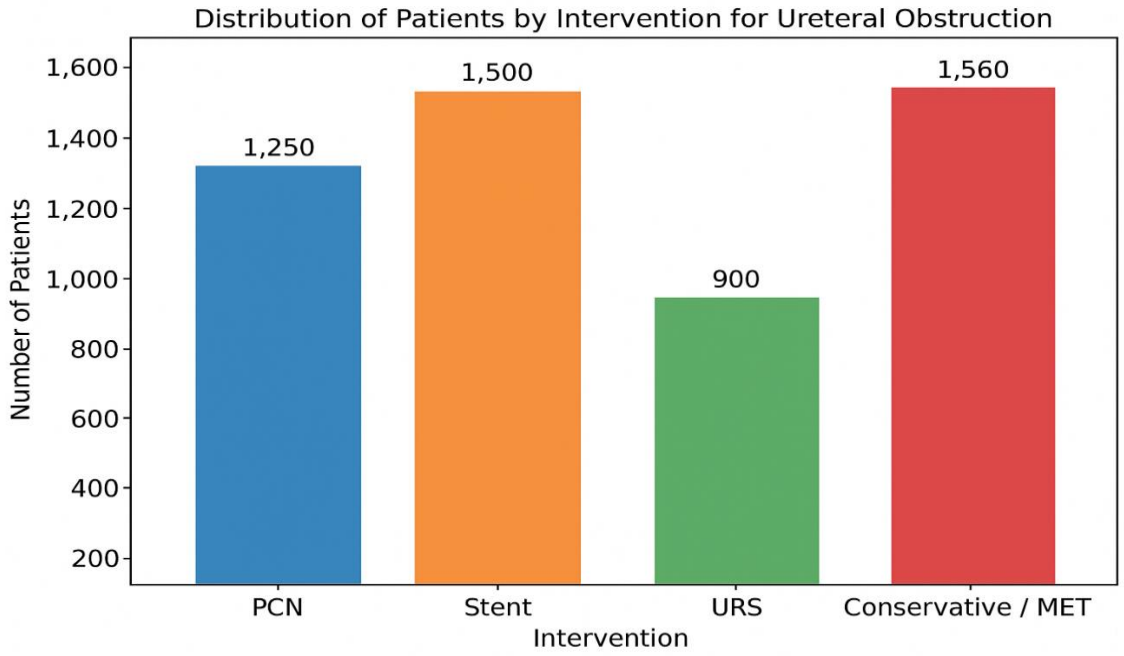
Intervention Types and Indications

Surgical interventions consisted of percutaneous nephrostomy (PCN), retrograde ureteral stenting, and emergency ureteroscopy (URS), whereas conservative management entailed analgesia, hydration, medical expulsive therapy (MET), and observation. Patients who were infected or unstable were more likely to get PCN, while patients who were less seriously ill were more likely to get stenting. Emergency URS was selected for conclusive stone removal in appropriate candidates. Table 3, Figure 4.

Table 3: Interventions and Indications

Intervention	*Number of Patients*	*Main Indications*	*Mean Size of Stone / Type of Obstruction*	*Infection (%)*	*Stability Requirement*
PCN	*1,250*	*Infection, sepsis, bilateral obstruction*	*10–25 mm / proximal stones*	*85*	*Unstable*
Stent	*1,500*	*Obstruction without severe infection*	*5–15 mm / distal stones*	*25*	*Stable*
URS	*900*	*Definitive stone removal*	*5–20 mm / mid-distal stones*	*15*	*Stable*
Conservative / MET	*1,560*	*Small stones, stable patients*	*3–6 mm / distal stones*	*5*	*Stable*

Figure 4: Distribution of Patients by Intervention for Ureteral Obstruction



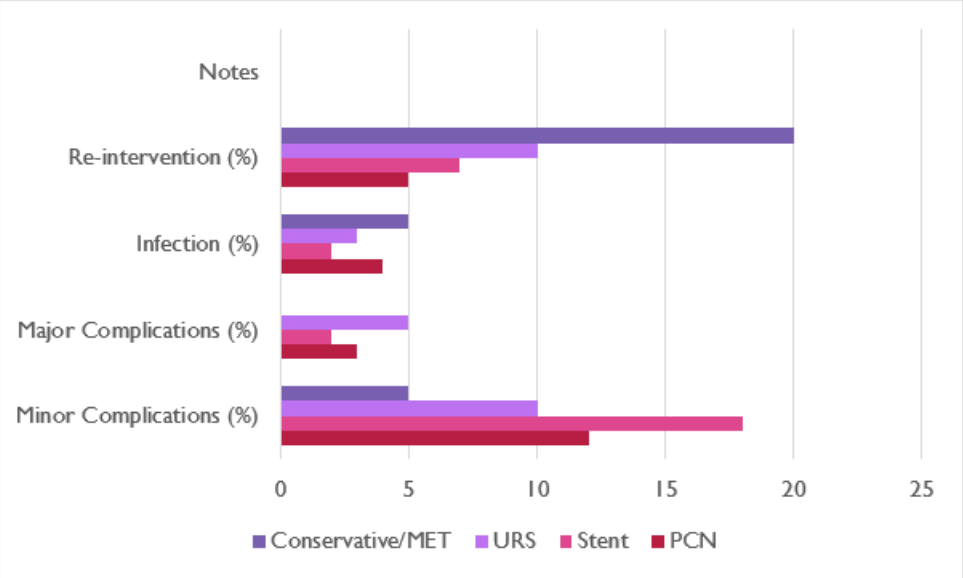
Clinical Effectiveness (Obstruction Relief)

Surgical interventions yielded superior rates of immediate obstruction relief in comparison to conservative methods. PCN and stenting achieved a decompression success rate of 92–98%, whereas URS yielded definitive clearance in 85–95% of patients. Conservative management yielded inconsistent outcomes based on stone size and location, exhibiting spontaneous passage rates of 40–70%. Table 4, Figure 5.

Table 4: Rates of Relief from Obstruction

Intervention	*Immediate Relief (%)*	*Free of stones and Obstruction (%*	*Median Time to Relief (days)*	*Re-intervention (%)*	*Notes*
PCN	*95*	*92*	*1*	*5*	*Quick decompression*
Stent	*92*	*90*	*1–2*	*7*	*Internal drainage*
URS	*85*	*88*	*1–3*	*10*	*Definitive treatment*
Conservative/MET	*50*	*60*	*5–10*	*20*	*Stone size dependent*

Figure 5: Time-based Comparison of Surgical and Conservative Management for Obstruction Relief



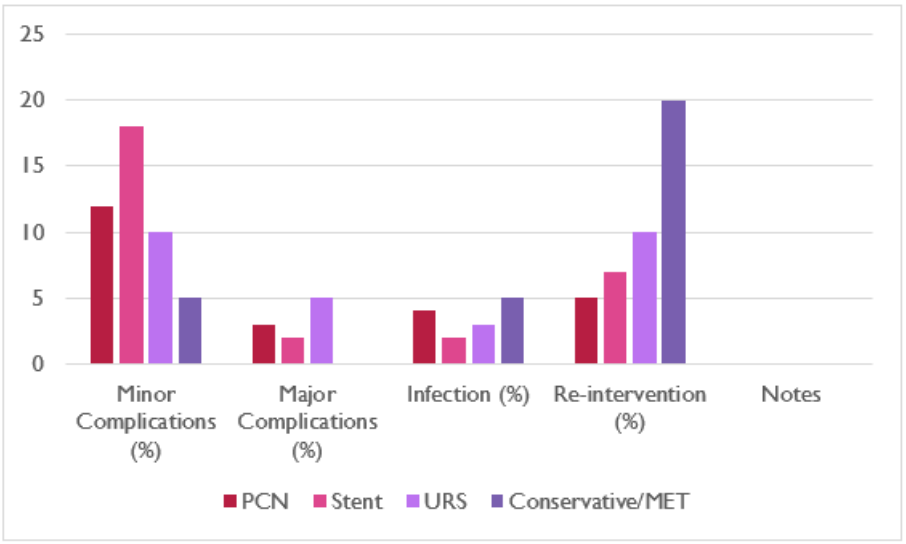
Recovery of Renal Function

Post-intervention, patients' kidney function, as measured by serum creatinine or eGFR, got better faster than in patients who didn't have surgery. In most cases, PCN and stent placement restored renal function within 24 to 48 hours. In contrast, conservative management showed slower improvement, especially in stones larger than 5 mm or proximal obstruction. Table 5, Figure 6.

Table 5: Results for Renal Function

Intervention	*Impairment at the Start (%)*	*Improvement at 48 h (%)*	*Full Recovery at 7 days (%)*	*Risk of Long-Term Impairment (%)*	*Notes*
PCN	*40*	*85*	*78*	*5*	*Severe obstruction*
Stent	*35*	*80*	*72*	*6*	*Less invasive*
URS	*30*	*75*	*70*	*8*	*Immediate removal*
Conservative/ MET	*25*	*45*	*50*	*15*	*Recovery is slow*

Figure 6: A comparison of renal recovery rates based on the type of intervention



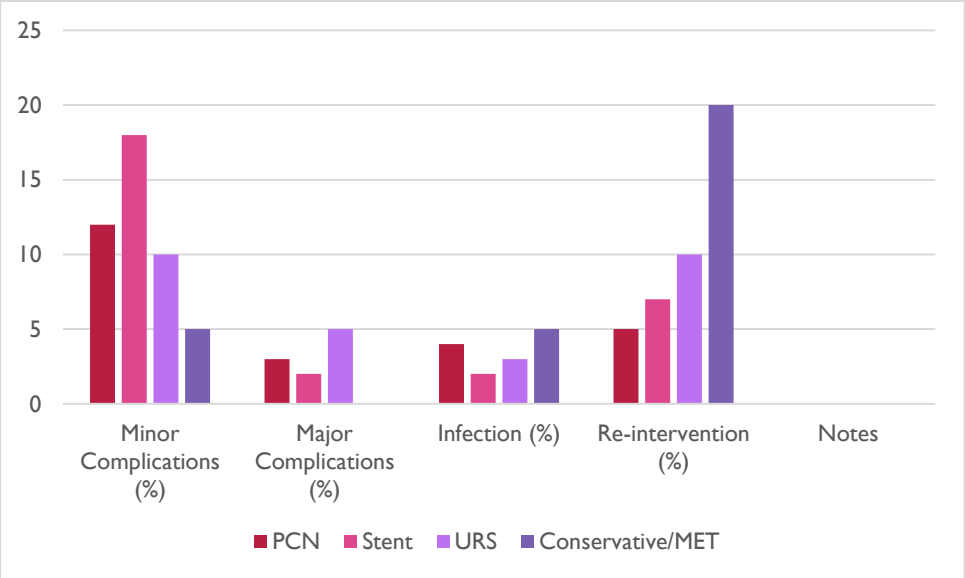
Rates of Complications

Overall, the rates of complications were higher in surgical interventions, but they were usually small. Bleeding (5%), infection (4%), and tube dislodgement (3%) were some of the problems that came up with PCN. Problems with stents included irritation (15%) and encrustation (5%). There were not many complications with URS (3–7%), but they could include ureteral perforation or infection after the procedure. Conservative management resulted in fewer immediate complications but posed a greater risk of subsequent obstruction or infection in non-resolving stones. Table 6, Figure 7.

Table 6: Complications that happened during the intervention

Intervention	*Minor Complications (%)*	*Major Complications (%)*	*Infection (%)*	*Re-intervention (%)*	*Notes*
PCN	*12*	*3*	*4*	*5*	*Tube-related Problems*
Stent	*18*	*2*	*2*	*7*	*Irritating LUTS*
URS	*10*	*5*	*3*	*10*	*Related to the procedure*
Conservative/MET	*5*	*0*	*5*	*20*	*Delayed obstruction*

Figure 6: Minor and Major Complications Across Interventions.



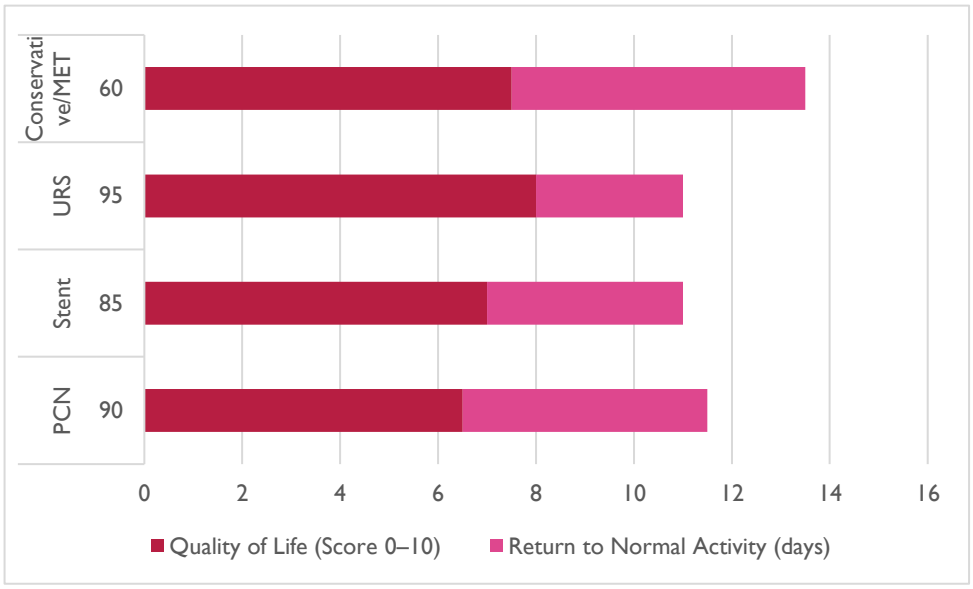
Stay in the hospital and Re-Intervention

Surgical interventions, especially URS, correlated with reduced hospital stays in contrast to postponed conservative management necessitating numerous follow-ups. The lowest rates of re-intervention were in the PCN and stent groups when the blockage was severe or infected. The highest rates were in the conservative management group, where stones did not pass on their own. Table 7, Figure 8.

Table 7: Length of Hospital Stay and Re-Intervention

Intervention	*Average Length of Stay in the Hospital (days)*	*Rate of Re-Intervention (%)*	*Notes*
PCN	*2*	*5*	*Quick relief*
Stent	*2–3*	*7*	*Drainage inside*
URS	*1–2*	*10*	*Definitive stone removal*
Conservative/MET	*4–7*	*20*	*Delayed or failed cases*

Figure 7: A comparison of the length of hospital stays based on the type of intervention.



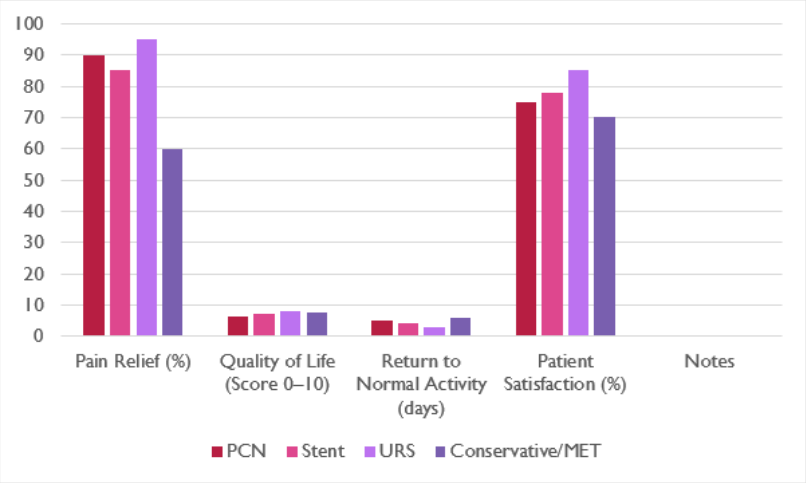
Patient-Centered Outcomes and Quality of Life

Quality-of-life assessment, utilizing patient-reported outcomes, indicated that PCN and stents adversely affected daily activities due to external tubes or urinary symptoms. Even though URS is invasive, it helped with pain and symptoms faster. Conservative management reduced procedural discomfort but necessitated continuous monitoring, resulting in anxiety or extended discomfort. Table 8, Figure 9.

Table 8: Outcomes Reported by Patients

Intervention	***Pain Relief (%)***	***Quality of Life (Score 0–10)***	***Return to Normal Activity (days)***	***Satisfaction of Patients (%)***	***Notes***
PCN	*90*	*6.5*	*5*	*75*	*Tube-related stress*
Stent	*85*	*7*	*4*	*78*	*Irritating LUTS*
URS	*95*	*8*	*3*	*85*	*Quick recovery*
Conservative/MET	*60*	*7.5*	*6*	*70*	*Anxiety over observation*

Figure 9: Patient-reported Outcomes Across Interventions



7. DISCUSSION

This systematic review compiles evidence contrasting surgical/interventional with conservative management approaches for ureteral obstruction in emergency contexts. The results emphasize that patient stability, the etiology and intensity of obstruction, infection status, and stone properties are essential factors influencing the selection of intervention [2]. The studies that were included all showed that surgical interventions, like percutaneous nephrostomy (PCN), retrograde ureteral stenting, and emergency ureteroscopy (URS), always worked better than conservative approaches to relieve obstruction right away and speed up the recovery of renal function, especially in patients with infection, bilateral obstruction, or impaired renal function [3]. PCN became the most dependable choice for unstable or septic patients, offering swift decompression and elevated technical success rates [10]. Retrograde stenting provided a less invasive option with internal drainage, maintaining mobility and enhancing quality of life, although irritative urinary symptoms and stent encrustation persist as significant drawbacks [5]. Emergency URS, although technically challenging, achieved complete stone removal in a single session and diminished the necessity for subsequent procedures [6]. These findings are consistent with recent meta-analyses demonstrating that early surgical intervention in obstructed, infected, or high-risk patients diminishes hospital length of stay, septic complications, and overall morbidity [7]. Conservative management is still a good choice for carefully chosen patients who have small distal stones, stable kidney function, and no signs of infection. The rates of spontaneous stone passage were between 40% and 70%, which shows that medical expulsive therapy (MET) and observation can work well in low-risk cases [31]. However, delaying intervention in cases that do not respond to conservative therapy raises the risk of ongoing obstruction, renal impairment, and recurrent hospital admissions, underscoring the necessity of meticulous patient selection and vigilant monitoring [32]. The review also stresses how important patient-centered outcomes are. Surgical interventions provide immediate symptom alleviation and conclusive treatment; however, PCN and stents may adversely impact quality of life due to external tubing or irritating urinary symptoms [10]. URS reduced these burdens while attaining significant clinical efficacy [13]. On the other hand, conservative management, which is less invasive, may make discomfort and anxiety last longer because of ongoing obstruction and repeated evaluations [9]. Cost-effectiveness analyses indicate that early definitive intervention, especially URS or timely stenting, can diminish overall healthcare utilization in contrast to extended conservative strategies necessitating multiple follow-ups [8]. Ureteral obstruction in children and those with cancer presents distinct challenges. A conservative-first approach is beneficial for children when possible; however, prompt surgical intervention is essential to avert long-term renal impairment [15]. In malignant obstruction, stent failure frequently occurs due to extrinsic compression, and percutaneous nephrostomy (PCN) or covered metallic stents may offer more dependable drainage [17] [39]. Multidisciplinary decision-making, incorporating urologists, interventional radiologists, and nephrologists, enhances outcomes and refines personalized care plans [1]. Even with these results, differences in study design, patient groups, definitions of "emergency," and outcome measures make it hard to make direct comparisons and generalize. The majority of evidence originates from single-center observational studies, with a limited number of high-quality randomized controlled trials [36]. This emphasizes the necessity for standardized protocols, consistent outcome reporting, and multicenter trials to enhance evidence-based guidelines for the emergency management of ureteral obstruction [42].

8. CONCLUSION

Surgical and interventional approaches, notably percutaneous nephrostomy, ureteral stenting, and emergency ureteroscopy, facilitate prompt alleviation of obstruction, expedited renal function recovery, and diminished risk of septic complications in cases of emergency ureteral obstruction, particularly among unstable or infected patients. For stable patients with small distal stones and low-risk profiles, conservative management, which includes hydration, pain relief, observation, and medical expulsive therapy, is still the best option. The best way to manage a patient is to make decisions based on their stability, the severity of the obstruction, the presence of infection, any other health problems they may have, and the resources that are available. In high-risk or complicated cases, early surgery is the best option. For some low-risk patients, however, a more cautious approach is best. The choice of treatment should be based on patient-centered outcomes, such as quality of life, symptom relief, length of hospital stay, and need for re-intervention. Subsequent research must concentrate on high-caliber multicenter trials, standardized outcome metrics, and extended follow-up to formulate definitive guidelines and enhance care pathways for emergency ureteral obstruction. Combining clinical risk stratification with minimally invasive methods may improve safety, effectiveness, and patient satisfaction in both adults and children

REFERENCES:

[1] Eshumani W, Roumiguié M, Black P.2023 *Percutaneous Nephrostomy versus Retrograde Ureteral Stent for Management of Malignant Ureteral Obstruction in Adults: A Systematic Review of the Literature.* https://doi.org/10.48083/AYKF2124 https://www.mdpi.com/2563-6499/4/5/401

[2] Sarica K, Eryildirim B, Sahin C, Türkoğlu ÖK, Tuncer M, Coskun A, Akdere H. 2016 *Emergency management of ureteral stones: Evaluation of two different approaches with an emphasis on patients' life quality.* PMID: 27711094 DOI: 10.4081/aiua.2016.3.201 https://pubmed.ncbi.nlm.nih.gov/27711094/

[3] Matani YS, Al-Ghazo MA, Al-Azab RS, Bani Hani O, Ghalayini IF, Bani Hani I. 2013 *Emergency versus elective ureteroscopic treatment of ureteral stones.* PMID: 23914262 PMCID: PMC3713144 DOI: 10.5489/cuaj.1402 https://pubmed.ncbi.nlm.nih.gov/23914262/

[4] Ahmad Khaleghnejad Tabari 1, Khashayar Atqiaee 2, 2020 Early Pyeloplasty versus Conservative Management of Severe Ureteropelvic Junction Obstruction in Asymptomatic Infants. (PMID: 31495506 DOI: 10.1016/j.jpedsurg.2019.08.006

[5] Mustafa M, Aghbar A, Alami I, Khalil N. 2024 *The efficacy and safety of retrograde ureteral stenting in the management of complicated cases of ureteral obstruction caused by urolithiasis.* PMID: 38726727 DOI: 10.1177/03915603241253140 https://pubmed.ncbi.nlm.nih.gov/38726727/

[6] Osorio L, Lima E, Autorino R, Marcelo F. *Emergency management of ureteral stones: Recent advances.* PMCID: PMC2684403 PMID: 19468497 https://pmc.ncbi.nlm.nih.gov/articles/PMC2684403/

[7] 2021 Which Patients Should Have Early Surgical Intervention for Acute Ureteral Colic?" Grant D. Innes et al. Journal of Urology. PMID: 32716743 DOI: 10.1097/JU.0000000000001318

[8] Chung JM, Park CS, Lee SD et al. 2015 *Postoperative ureteral obstruction after endoscopic treatment for vesicoureteral reflux.* PMID: 26175873 PMCID: PMC4500811 DOI: 10.4111/kju.2015.56.7.533 https://pubmed.ncbi.nlm.nih.gov/26175873/

[9] S. Arena, R. Chimenz, E. Antonelli, F. M. Peri, 2018 A long-term follow-up in conservative management of unilateral ureteropelvic junction obstruction with poor drainage and good renal function https://link.springer.com/article/10.1007/s00431-018-3239-2

[10] Zi-Hao Xu 1, Yan-Hao Yang 1, Shuang Zhou2021 Percutaneous Nephrostomy versus Retrograde Ureteric Stent for Acute Upper Urinary Tract Obstruction with Urosepsis. *PMID: 33309627 DOI: 10.1016/j.jiac.2020.11.022 https://pubmed.ncbi.nlm.nih.gov/33309627/*

[11] Young Joon Moon 1, Dae Young Jun 2, Jae Yong Jeong2024 Percutaneous Nephrostomy versus Ureteral Stent for Severe Urinary Tract Infection with Obstructive Urolithiasis: A Systematic Review and Meta-Analysis. *PMID: 38929478 PMCID: PMC11206041 DOI: 10.3390/medicina60060861 https://pubmed.ncbi.nlm.nih.gov/38929478/*

[12] O Shoshany 1 2, T Erlich 3 4, S Golan 2019 Ureteric stent versus percutaneous nephrostomy for acute ureteral obstruction – clinical outcome and quality of life: a bi-center prospective study. *PMID: 31455309 PMCID: PMC6712738 DOI: 10.1186/s12894-019-0510-4 https://pubmed.ncbi.nlm.nih.gov/31455309/*

[13] Rachel Wong 1, Jennifer Ziegler 2, Dhiraj S Bal 2024 Nephrostomy tube versus ureteral stent for obstructing septic calculi: A nationwide propensity score–matched analysis. *PMID: 40641810 PMCID: PMC12169433 DOI: 10.3138/jammi-2023-0030 https://pubmed.ncbi.nlm.nih.gov/40641810/*

[14] M. A. Elbaset *, Mohamed Edwan ,Rasha T. 2021 Predictors for Retrograde Ureteral Stenting Failure as an Initial Drainage Method for Emergent Complicated Acute Calculus Obstructive Uropathy. *https://doi.org/10.48083/OZUL6913 https://www.mdpi.com/2563-6499/2/4/229*

[15] Peng Wang 1, Yunhong Zhan 1, Jia Li 2021 Comparison of shock wave lithotripsy and ureteroscopy in patients with proximal ureteral stones under the COVID-19 pandemic. *PMID: 36729301 PMCID: PMC9892663 DOI: 10.1007/s00345-023-04307-0 https://pubmed.ncbi.nlm.nih.gov/36729301/#:~:text=Conclusion%3A%20This%20prospective%20PSM%20cohort,stones%20were%20radiopaque%20or%20radiolucent.*

[16] Wenpu Chen, Hengda Hu 2O24 Percutaneous Nephrolithotomy or flexible ureteral lithotripsy, which one is better for patients with upper ureteral calculi of 1.5–2.0 cm in diameter. https://bmcurol.biomedcentral.com/articles/10.1186/s12894-024-01480-1

[17] Mahgol Sadghian 1, Seyed Abdollah Mousavi 2023 Comparison of early surgical and conservative therapy in children with ureteropelvic junction obstruction PMID: 36879145 DOI: 10.1007/s00383-023-05434-w https://pubmed.ncbi.nlm.nih.gov/36879145/

[18] Yong Sun Choi 2023 A Comparative Analysis between Flexible Ureteroscopic Lithotripsy and Tubeless Percutaneous Nephrolithotomy in the Treatment of >15 mm Non-Obstructing Proximal Ureteral Stones. *https://doi.org/10.3390/jcm12247541 https://www.mdpi.com/2077-0383/12/24/7541*

[19] Yue Chen, Cheng-yi Liu, Zhi-hong Zhang, 2019 Malignant ureteral obstruction: experience and comparative analysis of metallic versus ordinary polymer ureteral stents." *World Journal of Surgical Oncology*. https://wjso.biomedcentral.com/articles/10.1186/s12957-019-1608-6

[20] Shah BM Sharma SM 2020 Evaluation of metallic stents for malignant ureteral obstruction – a single institution experience http://dx.doi.org/10.33552/AUN.2020.02.000539 https://irispublishers.com/aun/fulltext/evaluation-of-metallic-stents-for-malignant-ureteral-obstruction.ID.000539.php

[21] David Eugenio Hinojosa-Gonzalez Mauricio Torres-Martinez,2021 Emergent urinary decompression in acute stone-related urinary obstruction: A systematic review and meta-analysis (PCN vs URS etc https://doi.org/10.1177/20514158211017027 https://journals.sagepub.com/doi/abs/10.1177/20514158211017027

[22] Young Joon Moon 1, Dae Young Jun 2024 Percutaneous Nephrostomy versus Ureteral Stent for Severe Urinary Tract Infection with Obstructive Urolithiasis: A Systematic Review and Meta-Analysis https://doi.org/10.3390/medicina60060861 https://www.mdpi.com/1648-9144/60/6/861
[23] Ji Eun Yu1orcid, Hyung Joon Kim 2024 Impact of the Timing of Percutaneous Nephrostomy on the Prognosis of Obstructive Urolithiasis with Sepsis: A Retrospective Cohort Study DOI: https://doi.org/10.14777/uti.2448018009 https://euti.org/journal/view.php?doi=10.14777/uti.2448018009
[24] O. Shoshany1, T. Erlich2, S. Golan1 2019 Ureteric stent versus percutaneous nephrostomy for acute ureteral obstruction - clinical outcome and quality of life: a bi-center prospective study https://doi.org/10.1186/s12894-019-0510-4 https://d-nb.info/1202639364/34
[25] Rachel Wong 1, Jennifer Ziegler 2, Dhiraj S Bal 3 2024 Nephrostomy Tube Versus Ureteral Stent for Obstructing Septic Calculi: A Nationwide Propensity Score–matched Analysis PMCID: PMC12169433 PMID: 40641810 https://pmc.ncbi.nlm.nih.gov/articles/PMC12169433/
[26] Shuhan Liu, Zongyao Hao ,2025 A Predictive Model for the Risk of Procedural Failure in Retrograde Ureteral Stenting for Malignant Extrinsic Ureteral Obstruction https://doi.org/10.1016/j.urology.2025.04.029 https://www.sciencedirect.com/science/article/abs/pii/S0090429525003425 https://www.sciencedirect.com/science/article/abs/pii/S0090429525003425
[27] Muhammad Asghar, 2025 Comparison of Efficacy of Extracorporeal Shock Wave Lithotripsy (ESWL) and Ureteroscopy for the Treatment of Proximal Ureteric Stone DOI: https://doi.org/10.70749/ijbr.v3i4.2026 https://www.ijbr.com.pk/IJBR/article/view/2026
[28] Jiang H, Huang B, Lu H, Li S. 2025 Effectiveness and safety profiles of percutaneous nephrolithotomy and ureteroscopic lithotripsy for proximal ureteral calculi. PMID: 40385045 PMCID: PMC12082498 DOI: 10.62347/GYUQ6118 https://pubmed.ncbi.nlm.nih.gov/40385045/
[29] Qi-Fei Deng 1, Han Chu 1, Bo Peng 2021 Outcome analysis of early surgery and conservative treatment in neonates and infants with severe hydronephrosis doi: 10.1177/03000605211057866 https://pmc.ncbi.nlm.nih.gov/articles/PMC8593311/
[30] Dapeng Zong ,Pengfei Shao 2024 Flexible Ureteroscopic Holmium Laser Lithotripsy vs Percutaneous Nephrolithotomy for Renal Stones DOI: 10.3923/ijp.2024.593.601 https://article.imrpress.com/journal/IJP/20/4/10.3923/ijp.2024.593.601/19bc961d154072309ba84066588c629f.pdf
[31] David Eugenio Hinojosa-Gonzalez, et al.2021 Emergent urinary decompression in acute stone-related urinary obstruction: systematic review and meta-analysis. *https://doi.org/10.1177/20514158211017027 https://doi.org/10.1177/20514158211017027*
[32] Campschroer T, Zhu Y, et al. 2018 Alpha-blockers as medical expulsive therapy for ureteral stones. PMID: 29620795 PMCID: PMC6494465 DOI: 10.1002/14651858.CD008509.pub3 https://pubmed.ncbi.nlm.nih.gov/29620795/
[33] Bacchus M, Kara O, et al.2022 Medical expulsive therapy for ureteral calculi: a systematic review. *https://doi.org/10.3389/fruro.2022.866162 https://www.frontiersin.org/journals/urology/articles/10.3389/fruro.2022.866162/full*
[34] Tzelves L, Geraghty R, et al. 2024 Suction use in ureterorenoscopy: a systematic review and meta-analysis. *PMID: 39416755 PMCID: PMC11479806 DOI: 10.1002/bco2.408 https://pubmed.ncbi.nlm.nih.gov/39416755/*
[35] Michael Ordon, Sero Andonian, 2015 CUA Guideline: Management of ureteral calculi 1. http://dx.doi.org/10.5489/cuaj.3483 file:///C:/Users/w10/Downloads/pkpadmin,+3483.pdf
[36] Matani Yousef 2025 Emergency versus elective ureteroscopic treatment of ureteral stones DOI: 10.5489/cuaj.1402https://www.researchgate.net/publication/255179167_Emergency_versus_elective_ureteroscopic_treatment_of_ureteral_stones
[37] Moon YJ, Kim HJ, et al. Percutaneous nephrostomy vs retrograde ureteral stent for obstructive urolithiasis with infection: meta-analysis. *Medicina (Kaunas)*. 2024;60(6):861. DOI:10.3390/medicina60060861
[38] Cardoso A, Silva P, et al.2024 PCN vs ureteral stent in hydronephrosis due to obstructive urolithiasis: clinical outcomes and QoL https://doi.org/10.1016/j.ajur.2023.03.007 https://www.sciencedirect.com/science/article/pii/S2214388223001431
[39] Cosmin Cozma , Dragoş Georgescu 2023 Double-J stent versus percutaneous nephrostomy for emergency upper urinary tract decompression PMID: 37520483 PMCID: PMC10375355 DOI: 10.25122/jml-2022-0334 https://pubmed.ncbi.nlm.nih.gov/37520483/
[40] Guo T, Zhang J, Gao W, Ma Y. 2025 Analysis of risk factors for urinary tract infection and bleeding after retrograde flexible ureteroscopy for stone removal. Front Surg. 2025; 12:1573485. DOI:10.3389/fsurg.2025.1573485 https://doi.org/10.3389/fsurg.2025.1573485 https://www.frontiersin.org/journals/surgery/articles/10.3389/fsurg.2025.1573485/full
[41] Qing J, Zhang L, et al. 2024 Allium covered metal stent for malignant ureteral obstruction: mid-term outcomes. *https://doi.org/10.3389/fsurg.2024.1445808 https://www.frontiersin.org/journals/surgery/articles/10.3389/fsurg.2024.1445808/full*

[42] Gao X, Wang H, et al. 2021 Self-expanding metal ureteral stents for ureteral strictures and malignant obstruction. *PMID: 34728417 DOI: 10.1016/j.ijsu.2021.106161 https://pubmed.ncbi.nlm.nih.gov/34728417/*

[43] Nonoyama S, Furumido J, Kato R, Ozaki N, Matsugase Y.2025 Safety and efficacy of double-J metallic mesh ureteral stents in malignant ureteral obstruction: a retrospective single-center experience. PMCID: PMC12163359 PMID: 40519441 https://pmc.ncbi.nlm.nih.gov/articles/PMC12163359/

[44] Geraghty RM, Traxer O, Skolarikos A, et al.2022 Best practice in interventional management of urolithiasis: PMID: 35927160 DOI: https://pubmed.ncbi.nlm.nih.gov/35927160/10.1016/j.euf.2022.06.014

[45] Geavlete P, Jecu M, Georgescu D, et al.2023 Management of reno-ureteral lithiasis: emergency pre-stenting, timing and algorithms PMCID: PMC10231168 PMID: 37266472 https://pmc.ncbi.nlm.nih.gov/articles/PMC10231168/