

## Clinical Presentation and Management Outcome of Obstructive Uropathy

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Received: 16 February 2026

Accepted: 06 March 2026

Published: 16 March 2026

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### Abstract

**Background:** Obstructive uropathy is a significant cause of acute and chronic renal impairment resulting from blockage of urine flow at any level of the urinary tract. Early diagnosis and timely intervention are essential to prevent irreversible renal damage and associated complications.

**Objective:** To evaluate the clinical presentation and management outcomes of patients with obstructive uropathy in a tertiary care hospital.

**Methods:** This observational study was conducted in the Department of Urology of Satkhira Medical College Hospital, Bangladesh over a 24-month period. A total of 200 patients diagnosed with obstructive uropathy were included. Data were collected using a structured data sheet, including demographic characteristics, presenting symptoms, etiology, management modalities, and in-hospital outcomes. Statistical analysis was performed using SPSS version 22, and a  $p$ -value  $<0.05$  was considered statistically significant.

**Results:** The majority of patients were aged 41–60 years (35%), with a mean age of  $47.6 \pm 16.8$  years. Males constituted 66% of cases. Flank pain was the most common presenting symptom (74%). Urolithiasis was the leading cause (48%), followed by benign prostatic hyperplasia (19%) and malignancy (14%). Double J stenting was the most frequently performed procedure (26%). Complete clinical improvement was observed in 71% of patients, while complications occurred in 8%, and mortality was 2%.

**Conclusion:** Obstructive uropathy is commonly caused by urolithiasis and predominantly affects middle-aged males. Prompt diagnosis and appropriate intervention lead to favorable short-term outcomes.

**Keywords:** Obstructive uropathy; Urolithiasis; Hydronephrosis; Urinary tract obstruction; Double J stenting.

### 1. INTRODUCTION

Obstructive uropathy refers to functional or mechanical blockage of urine flow anywhere from the renal calyces to the urethral meatus, leading to urinary stasis, rising upstream pressure, hydronephrosis, and when prolonged progressive renal dysfunction.<sup>1</sup>

It is clinically important because it represents one of the more preventable and potentially reversible pathways to acute kidney injury (post-

renal AKI) and chronic kidney disease when recognized early and treated appropriately.<sup>2</sup> The spectrum ranges from painless, slowly progressive obstruction (e.g., benign prostatic hyperplasia, urethral stricture, pelvic malignancy) to abrupt obstruction with severe pain (e.g., ureteric calculus), and to life-threatening “infected obstruction” with sepsis and rapid deterioration.<sup>3</sup>

The underlying pathophysiology is driven by elevated intratubular pressure, reduced

glomerular filtration, renal vasoconstriction, inflammatory activation, and over time tubulointerstitial fibrosis. Clinical presentation depends on the level (upper vs lower tract), laterality (unilateral vs bilateral), acuity, and presence of infection. Upper-tract obstruction classically presents with flank pain/renal colic, nausea/vomiting, hematuria, and costovertebral angle tenderness; however, chronic or partial obstruction may be minimally symptomatic until renal impairment is detected. Lower-tract obstruction often produces lower urinary tract symptoms (hesitancy, weak stream, intermittency, straining, incomplete emptying), acute urinary retention with suprapubic pain/distension, or overflow incontinence. In complicated cases, fever, rigors, hypotension, altered sensorium, oliguria/anuria, and laboratory features of AKI or severe electrolyte/acid–base disturbance signal urgent need for decompression and resuscitation.<sup>4</sup>

Diagnosis is guided by history, examination, and targeted investigations. Serum creatinine/urea, electrolytes (notably potassium and bicarbonate), inflammatory markers, urinalysis, urine culture, and assessment of urine output help classify severity and identify infection. Imaging is central: ultrasound is widely recommended/used as a first-line test to detect hydronephrosis and assess kidney size and bladder volume, while CT (often non-contrast CT KUB for suspected stones) improves etiologic definition and procedural planning.<sup>5</sup> In AKI pathways, guidance emphasizes prompt specialist referral for upper-tract obstruction especially pyonephrosis, bilateral obstruction, solitary kidney obstruction, or AKI complications.<sup>6</sup>

Management priorities are (1) stabilization, (2) urgent drainage when indicated, and (3) definitive treatment of the cause once the patient is medically optimized. Urological guidelines consistently describe an obstructed kidney with infection/sepsis and/or anuria as a urological emergency requiring urgent decompression, typically by ureteral stenting or percutaneous nephrostomy, alongside immediate antibiotics and supportive care; definitive stone/tumor/stricture management is usually delayed until sepsis resolves.<sup>7</sup> For obstructing stones with suspected infection, both EAU and AUA-aligned guidance support urgent drainage (stent or nephrostomy) without clear superiority of one approach in all patients, with choice tailored to anatomy, expertise, and clinical status.<sup>8</sup> Recent systematic reviews and meta-analyses comparing nephrostomy and ureteral

stents in obstructive urolithiasis/hydronephrosis suggest broadly comparable effectiveness, with differences often relating to technical success, patient comfort, and local feasibility rather than consistent survival benefit.<sup>9,10</sup>

Outcomes after relief of obstruction vary. Many patients recover renal function substantially if obstruction is relieved early, but delayed presentation, severe infection, malignancy-related obstruction, bilateral disease, and baseline CKD are associated with incomplete recovery and higher morbidity. Post-obstructive diuresis and electrolyte shifts can complicate recovery, requiring careful monitoring and fluid/electrolyte replacement. Because “clinical presentation” (pain vs retention vs sepsis) and “management pathway” (catheterization vs stent vs nephrostomy vs definitive surgery) strongly influence renal recovery, complications, length of stay, and mortality, studying real-world presentation patterns and management outcomes in a defined hospital setting is essential to identify delays, optimize triage, and improve patient-centered results.

## 2. OBJECTIVES

The main objective was to evaluate the clinical presentation and management outcomes of patients diagnosed with obstructive uropathy.

## 3. METHODOLOGY & MATERIALS

The observational study was conducted in the Department of Urology, Satkhira Medical College Hospital, Satkhira, Bangladesh. The study was conducted over a 2 years period from 1 January 2024 to 31 December 2025.

### 3.1. Inclusion Criteria

- Patients of any age and both sexes
- Patients clinically and radiologically diagnosed with obstructive uropathy
- Patients who gave informed written consent (or guardian consent for minors)

### 3.2. Exclusion Criteria

- Patients with pre-existing chronic kidney disease unrelated to obstruction
- Patients with incomplete clinical records
- Patients who refused consent

A total of 200 patients were included in the study. Patients of all age groups and both sexes who were admitted with a diagnosis of obstructive uropathy were enrolled consecutively. The diagnosis was established based on clinical features supported by radiological evidence of

urinary tract obstruction demonstrated by ultrasonography, computed tomography (CT) scan, or other appropriate imaging modalities. Patients with previously diagnosed chronic kidney disease not attributable to urinary tract obstruction and those with incomplete medical records were excluded from the study. Informed written consent was obtained from each participant or from legal guardians in the case of minors.

Data were collected using a structured data collection form. Detailed history was taken, and thorough clinical examination was performed in all patients. Information regarding demographic characteristics, presenting symptoms, duration of illness, and associated comorbidities was recorded. Presenting clinical features included flank pain, lower abdominal pain, hematuria, fever, oliguria or anuria, and lower urinary tract symptoms.

Laboratory investigations included complete blood count, serum creatinine, blood urea, serum electrolytes, urine routine and microscopic examination, and urine culture where indicated. Radiological investigations such as ultrasonography of the kidney, ureter, and bladder (KUB), CT scan of the urinary tract, and X-ray KUB were performed to determine the level and cause of obstruction.

4. RESULT

Table 1. Distribution of Patients by Demographic Characteristics (n=200)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	≤20	28	14
	21–40	62	31
	41–60	70	35
	>60	40	20
Mean ± SD	47.6 ± 16.8		
Sex	Male	132	66
	Female	68	34
Residence	Rural	118	59
	Urban	82	41

Table 1 shows the demographic characteristics of the study population. A total of 200 patients were included. The majority of patients (35%) were in the 41–60 years age group, with a mean age of

The underlying causes of obstructive uropathy were documented, including urolithiasis, benign prostatic hyperplasia, malignancy, urethral stricture, pelvi-ureteric junction obstruction, and other etiologies. The type of management provided was recorded, including conservative management, urethral catheterization, double-J stenting, percutaneous nephrostomy, ureteroscopy, and open or laparoscopic surgical procedures. Management outcomes were assessed during hospital stay based on clinical improvement, changes in renal function parameters (particularly serum creatinine), relief of obstruction on follow-up imaging where applicable, duration of hospital stay, postoperative complications, and in-hospital mortality.

3.3. Statistical Analysis

All data were recorded systematically in preformed data collection form and quantitative data was expressed as mean and standard deviation and qualitative data was expressed as frequency distribution and percentage. Statistical analysis was carried out by using Statistical analysis was done by using SPSS (Statistical Package for Social Science) Version 22. A p-value of less than 0.05 was considered statistically significant. Confidentiality was strictly maintained.

47.6 ± 16.8 years. Most patients were male (66%), and more than half (59%) were from rural areas.

Table 2. Clinical Presentation of the Patients (n=200)

Clinical Feature	Frequency (n)	Percentage (%)
Flank pain	148	74
Lower abdominal pain	92	46
Hematuria	64	32
Fever	58	29
Oliguria/Anuria	44	22
Lower urinary tract symptoms	86	43
Nausea/Vomiting	52	26

Table 2 illustrates the clinical presentation of the patients. Flank pain was the most common presenting complaint (74%), followed by lower abdominal pain (46%) and lower urinary tract

symptoms (43%). Hematuria was observed in 32% of patients, while 22% presented with oliguria or anuria.

**Table 3.** Etiology of Obstructive Uropathy (n=200)

Cause	Frequency (n)	Percentage (%)
Urolithiasis	96	48
Benign Prostatic Hyperplasia (BPH)	38	19
Malignancy	28	14
Urethral stricture	20	10
Pelvi-ureteric junction obstruction	12	6
Others	6	3

Table 3 presents the etiology of obstructive uropathy. Urolithiasis was the leading cause (48%), followed by benign prostatic hyperplasia

(19%) and malignancy (14%). Urethral stricture and pelvi-ureteric junction obstruction accounted for 10% and 6% of cases, respectively.

**Table 4.** Type of Management Provided (n=200)

Management Modality	Frequency (n)	Percentage (%)
Conservative treatment	30	15
Urethral catheterization	36	18
Double J (DJ) stenting	52	26
Percutaneous nephrostomy	28	14
Ureteroscopy	34	17
Open/Laparoscopic surgery	20	10

Table 4 shows the management modalities used. Double J stenting was the most frequently performed intervention (26%), followed by

urethral catheterization (18%) and ureteroscopy (17%). Conservative treatment was provided in 15% of patients.

**Table 5.** Management Outcome during Hospital Stay (n=200)

Outcome	Frequency (n)	Percentage (%)
Complete clinical improvement	142	71
Partial improvement	38	19
Developed complications	16	8
Mortality	4	2
Mean hospital stay (days)	7.8 ± 3.2	

Table 5 shows management outcome of the patients. Most patients (71%) showed complete clinical improvement during hospital stay.

Complications occurred in 8% of cases, and mortality was 2%.

**Table 6.** Association between Etiology and Complications (Optional Strong Table)

Etiology	Complication Present (n)	Complication Absent (n)	p-value
Urolithiasis	6	90	0.032*
BPH	2	36	
Malignancy	6	22	
Others	2	36	
Total	16	184	

**4.1. Chi-Square Test Applied**

Table 6 show Etiology and Complications of the patients. A significant association was found between etiology and development of

complications (p = 0.032), indicating that the underlying cause of obstruction influences clinical outcome.

## 5. DISCUSSION

This study describes the clinical presentation and in-hospital management outcomes among 200 patients with obstructive uropathy. Overall, our findings reflect the typical tertiary-care pattern where stone disease and bladder outlet obstruction dominate, but malignancy-related obstruction contributes disproportionately to complications and poorer outcomes. In our series, obstructive uropathy occurred most frequently in middle-to-older age (peak 41–60 years; mean  $47.6 \pm 16.8$  years) with male predominance (66%). Similar age/sex clustering is widely reported because urolithiasis and BPH/bladder outlet obstruction increase with age and are more common in men.<sup>2</sup> The higher proportion of rural patients (59%) may indicate delayed presentation and barriers to early diagnosis and definitive stone/BPH care—an issue also emphasized in recent regional stone-burden and access discussions.<sup>11</sup> Flank pain (74%) was the most common symptom, followed by lower abdominal pain (46%) and LUTS (43%), which is consistent with obstruction from stones (pain) and bladder outlet causes (LUTS). Reviews and clinical references note that presentation varies by level and acuity of obstruction, with flank pain/colic typical for upper tract obstruction and voiding symptoms/retention typical for lower tract obstruction.<sup>1</sup> Hematuria (32%) in our cohort fits with stone disease, infection, and malignancy pathways.<sup>3</sup> The presence of oliguria/anuria (22%) suggests a clinically important subgroup with severe or bilateral obstruction/solitary kidney involvement, where urgent decompression is recommended to prevent irreversible renal injury and sepsis-related deterioration.<sup>2</sup> Urolithiasis was the leading cause (48%), followed by BPH (19%) and malignancy (14%). This etiology distribution mirrors many tertiary-care cohorts in stone-prevalent regions and aligns with evidence that stones and bladder outlet obstruction are major drivers of hydronephrosis/obstructive uropathy, while malignant obstruction is less frequent but clinically high-risk.<sup>12</sup> Large multicenter data focused on patients requiring decompression (e.g., percutaneous nephrostomy cohorts) often show higher malignant obstruction representation, because advanced cancer is more likely to require urgent diversion—highlighting how case mix and hospital pathway influence apparent “most common cause.”<sup>13</sup> In our study, DJ stenting (26%) was the most frequent intervention, with additional use of urethral

catheterization (18%), ureteroscopy (17%), and PCN (14%). This pattern is consistent with modern practice: immediate goals are rapid decompression (stent/PCN/catheter) and stabilization, followed by definitive management once infection/renal dysfunction is controlled.<sup>4</sup>

For obstructing stones with infection or sepsis risk, guideline-based care emphasizes urgent decompression (ureteral stent or nephrostomy) rather than definitive stone removal during the acute septic phase.<sup>2</sup> Comparative studies and reviews generally show both PCN and DJ stent are effective, with differences depending on anatomy, severity, technical feasibility, and local expertise; some series report higher initial success with PCN in complex/fever/high obstruction settings.<sup>14</sup> We observed complete improvement in 71%, complications in 8%, and in-hospital mortality 2% with mean stay  $7.8 \pm 3.2$  days. Short-term improvement after decompression is expected when obstruction is relieved promptly, but outcomes are strongly modified by infection, baseline renal function, duration of obstruction, and malignant obstruction.<sup>4</sup> A key clinical concern after relief is post-obstructive diuresis and electrolyte shifts, which can prolong admission and contribute to complications if not monitored—highlighting the importance of post-decompression observation protocols in high-risk patients.<sup>15</sup> Our Table 6 shows a significant association between etiology and complications ( $p = 0.032$ ), with a higher complication burden in malignant obstruction (and some severe stone cases). This is consistent with broader evidence that malignant upper tract obstruction is linked with worse prognosis and more complex decision-making regarding diversion and overall survival, compared with benign causes.<sup>16</sup> Studies of malignant obstruction frequently report higher use of PCN and variable success with stents depending on pelvic tumor burden and ureteral compression, supporting the clinical interpretation that malignant cases in our cohort contributed disproportionately to adverse outcomes.<sup>17</sup> Taken together, our findings support that obstructive uropathy in a tertiary hospital is most often a stone- and BPH-driven condition presenting with flank pain and/or LUTS, and that outcomes are generally favorable when decompression is timely. However, malignancy-related obstruction and severe presentations (oliguria/anuria, systemic infection) remain key determinants of complications and mortality, reinforcing the need for rapid triage, urgent drainage pathways, and careful post-

decompression monitoring to improve management outcomes.

### 6. LIMITATIONS OF THE STUDY

This study was conducted in a single tertiary care hospital, which may limit the generalizability of the findings to the broader population. Only short-term in-hospital outcomes were assessed, so long-term renal function recovery and recurrence could not be evaluated. The use of purposive sampling may have introduced selection bias. Additionally, variations in management were based on clinical judgment and institutional practice rather than standardized protocols.

### 7. CONCLUSION

Obstructive uropathy in this study was most commonly observed in middle-aged and elderly patients, with a male predominance. Urolithiasis was identified as the leading cause, followed by benign prostatic hyperplasia and malignancy. Flank pain was the most frequent presenting symptom, reflecting the high prevalence of upper urinary tract obstruction.

Timely intervention, particularly urinary diversion procedures such as double J stenting and catheterization, resulted in favorable short-term outcomes in the majority of patients. However, complications and mortality were more commonly associated with malignant obstruction and severe presentations.

Early diagnosis and prompt relief of obstruction are essential to improve clinical outcomes and prevent irreversible renal damage.

### 8. FUNDING

No funding sources

### 9. CONFLICTS OF INTEREST

There are no conflicts of interest.

### 10. ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

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**Citations:** Dr. Md. Mozzammel Haque et al. "Clinical Presentation and Management Outcome of Obstructive Uropathy". *ARC Journal of Urology.* 2026; 10(1):1-7. DOI: <https://doi.org/10.20431/2456-060X.1001001>.

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