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CLINICAL OUTCOMES OF MALIGNANT URETERAL OBSTRUCTION: INSIGHTS FROM AHSANIA MISSION CANCER AND GENERAL HOSPITAL

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KEYWORDS

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ABSTRACT:

Background: Malignant ureteral obstruction (MUO) is a severe complication caused by primary or metastatic malignancies compressing or invading the ureters. Management options include percutaneous nephrostomy (PCN) and ureteral stenting. However, clinical outcomes depend on tumor burden, response to oncologic treatment, and patient performance status. Aim of the study: The aim of this study was to assess the clinical outcomes of malignant ureteral obstruction. Methods: This cross-sectional study was conducted in Department of General Surgery, Ahsania Mission Cancer and General Hospital, Dhaka, Bangladesh, during the period from January 2024 to December 2024 (1 Year). Total 36 patients diagnosed with malignant ureteric obstruction (MUO) were included in this study. Result: The study population (N=36) had a mean age of 60.5 ± 9.3 years, with a male predominance (61.11%). Bladder cancer (33.33%) was the most common malignancy. Advanced-stage disease (T4: 55.56%) and bilateral obstruction (41.67%) were prevalent, indicating severity. Baseline renal function showed moderate to severe impairment (creatinine: 2.5 ± 0.8 mg/dL, eGFR: 45.6 ± 12.3 mL/min/1.73m²). Intraoperatively, ureteric stenting (61.11%) was more common than PCN (38.89%), with a high success rate (91.70%). Blood loss was minimal, and complications were low. Postoperatively, mortality was 8.33%. Complications occurred in 27.78% of cases, with infection (11.11%) being the most frequent. At six months, renal function slightly declined, and intervention durability dropped to 80.20. Conclusion: This study highlights the clinical impact of malignant ureteric obstruction (MUO), demonstrating initial renal function improvement post-intervention, but progressive deterioration over time.

INTRODUCTION

Malignant ureteric obstruction (MUO) is a severe complication arising from advanced malignancies, leading to significant morbidity and mortality due to obstructive uropathy. This condition occurs when malignancies cause ureteric blockage through extrinsic compression, direct tumor invasion, or metastatic spread, ultimately resulting in hydronephrosis, renal dysfunction, and, if untreated, end-stage renal disease (ESRD).[1] MUO is frequently observed in patients with urothelial, gynecological, colorectal, and prostate cancers, with its prevalence rising in parallel with the increasing global cancer burden.[2] The condition significantly impacts patient survival, quality of life, and healthcare management, making its timely diagnosis and treatment crucial. The pathophysiology of MUO is multifaceted, with three primary mechanisms contributing to ureteric obstruction. The most common cause is extrinsic compression, which results from tumor mass effect or lymph node metastasis, often seen in advanced cervical, bladder, and prostate cancer.[3] Additionally, direct tumor invasion of the ureter is frequently reported in high-grade urothelial carcinoma and invasive colorectal cancer, further complicating treatment approaches.[4] Delayed diagnosis or inadequate intervention for MUO can lead to rapid deterioration of renal function, with a high risk of progression to chronic kidney disease (CKD) or uremia, significantly reducing patient survival.[5] In a study analyzing 188 cases of MUO, acute kidney injury (AKI) was found in 53.3% of patients, underscoring the renal complications associated with delayed intervention.[6] The clinical management of MUO remains challenging, with treatment strategies primarily aimed at relieving obstruction, preserving renal function, and improving quality of life. The two main approaches for urinary diversion include ureteric stenting (Double J stents) and percutaneous nephrostomy (PCN).[7] Ureteric stents are a minimally invasive option that provides temporary relief, but they are prone to occlusion due to tumor compression.[8] PCN, on the other hand, is used when stents fail, offering effective urinary drainage but often at the cost of reduced patient quality of life due to external drainage dependence.[9] Surgical interventions, including ureteric reimplantation and ileal conduit diversion, are rarely pursued due to poor overall prognosis in advanced malignancies.[10] Novel treatment strategies, including metallic and drug-eluting stents, have shown promising results in prolonging ureteric patency, but widespread adoption remains limited due to the need for further clinical validation.[11] Despite advancements in MUO management, patient survival remains dismal, especially in palliative settings. A systematic review found that the median survival after MUO diagnosis was only 6.4 months, with a 41% post-intervention complication rate.[12] Moreover, a comparative study of stents vs. PCN found that patients who underwent urinary diversion had a median survival of 8.67 months, while those who did not receive intervention had significantly worse outcomes.[6] The prognostic factors influencing survival include tumor type, degree of renal impairment, and the success of urinary diversion procedures.[2] However, due to limited data from developing countries, survival patterns may differ, necessitating further research in regions like Bangladesh. A major challenge in MUO management in Bangladesh is the disparity in healthcare access, with resource constraints, late-stage cancer presentations, and limited availability of advanced interventional techniques affecting treatment outcomes. Given these gaps in existing knowledge, the present study aims to analyze the clinical outcomes of different interventions (ureteric stenting vs. PCN) for MUO patients in Bangladesh.

AIM

To assess the clinical outcomes of malignant ureteral obstruction.

METHODOLOGY & MATERIALS

This cross-sectional study was conducted in Department of General Surgery, Ahsania Mission Cancer and General Hospital, Dhaka, Bangladesh, during the period from January 2024 to December 2024 (1 Year). Total 36 patients diagnosed with malignant ureteric obstruction (MUO) were included in this study.

Inclusion criteria

Patients aged 18 years or older with a confirmed diagnosis of malignant ureteric obstruction (MUO) secondary to bladder, prostate, colorectal, cervical, or other advanced cancers were included in the study.

Exclusion criteria

Patients were excluded if they had benign ureteric obstruction, were critically ill with a life expectancy under one month, had severe coagulopathy or contraindications to urinary diversion, or declined participation in the study.

Diagnosis of the disease

The diagnosis of malignant ureteric obstruction (MUO) was established based on clinical symptoms, laboratory findings, and radiological imaging. Patients presenting with hydronephrosis, flank pain, renal dysfunction, or urinary retention underwent further evaluation using ultrasound, CT urography, or MRI to confirm ureteric obstruction. Serum creatinine levels, estimated glomerular filtration rate (eGFR), and electrolyte panels were assessed to evaluate renal function before intervention. Tumor staging was performed based on the TNM classification, and oncological history was reviewed to determine the underlying malignancy.

Surgical management

The surgical intervention involved either ureteric stenting (Double J stents) or percutaneous nephrostomy (PCN) to relieve obstruction and preserve renal function. Ureteric stenting, a minimally invasive endoscopic procedure, was performed under cystoscopic or fluoroscopic guidance, wherein a self-retaining Double J stent was placed to facilitate urine flow past the obstruction. PCN, indicated for cases where stenting was not feasible, involved ultrasound or fluoroscopic-guided insertion of a nephrostomy tube directly into the renal pelvis for external drainage. The choice of procedure was based on tumor location, degree of obstruction, renal function, and patient condition.

Follow-up

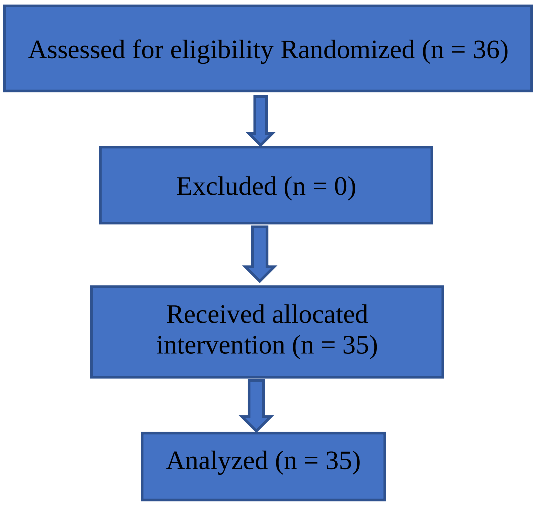
Patients were followed up at 1 month, 3 months, and 6 months post-procedure to assess renal function, intervention durability, and clinical outcomes. Serial monitoring included serum creatinine, eGFR, stent or nephrostomy patency, and quality of life assessments using the EQ-5D questionnaire. Any complications such as infections, stent migration, nephrostomy blockage, or sepsis were recorded. Disease progression, need for repeat interventions or dialysis, and overall survival outcomes were evaluated throughout the follow-up period to determine the long-term efficacy of each intervention.

Ethical approval

Consent of the patients and guardians were taken before collecting data.

Statistical analysis

Data analysis was performed using MS Excel, continuous variables were evaluated using an independent t-test, and categorical data were analyzed using the chi-square test. Statistical significance was set at a p-value < 0.05.



CONSORT flow diagram

RESULT

Table-I: Baseline characteristics of the study people (N=36)

Variable	Number of patients	Percentage (%)
Age (years)		
Mean ± SD	60.5 ± 9.3	
Gender		
Male	22	61.11
Female	14	38.89
Primary Malignancy location		
Bladder	12	33.33
Prostate	8	22.22
Colorectal	6	16.67
Cervical	6	16.67
Other	4	11.11
Tumor Stage (TNM Classification)		
T3	10	27.78
T4	20	55.56
N1	6	16.67
Extent of Obstruction		
Unilateral	21	58.33
Bilateral	15	41.67
Baseline Serum Creatinine (mg/dL)		
Mean ± SD	2.5 ± 0.8	

Baseline eGFR (mL/min/1.73m²)	
Mean ± SD	45.6 ± 12.3

The baseline characteristics of the study population (N=36) reveal a mean age of 60.5 ± 9.3 years, indicating that the participants were primarily older adults. The gender distribution showed a male predominance, with 22 males (61.11%) and 14 females (38.89%). Regarding the primary malignancy location, bladder cancer was the most common, affecting 12 patients (33.33%), followed by prostate cancer (22.22%), colorectal cancer (16.67%), and cervical cancer (16.67%). A smaller proportion of cases (11.11%) had malignancies of other origins. The tumor stage classification (TNM system) demonstrated that most patients had advanced-stage disease, with 20 patients (55.56%) at T4 stage, 10 patients (27.78%) at T3 stage, and 6 patients (16.67%) with lymph node metastasis (N1). The extent of obstruction was unilateral in 21 patients (58.33%) and bilateral in 15 patients (41.67%), indicating a considerable proportion of severe cases requiring urgent intervention. Renal function parameters at baseline showed a mean serum creatinine of 2.5 ± 0.8 mg/dL, and a mean estimated glomerular filtration rate (eGFR) of 45.6 ± 12.3 mL/min/1.73m², suggesting moderate to severe renal impairment.

Table-II: Intra-operative characteristics of the study people (N=36)

Characteristics	Number of patients	Percentage (%)
Mean Operative Time (minutes)		
Mean ± SD	42.5 ± 10.8	
Type of Procedure Performed		
Ureteric Stenting	22	61.11
Percutaneous Nephrostomy (PCN)	14	38.89
Technical Success Rate (%)	91.70%	
Anesthesia Type		
Local Anesthesia	19	52.78
General Anesthesia	17	47.22
Intraoperative Blood Loss (mL)		
Mean ± SD	35.2 ± 12.6	
Requirement for Blood Transfusion (%)	3	8.33
Intra-operative complications		
Ureteric Perforation	2	5.56
Stent Malposition	1	2.78
Nephrostomy Tube Misplacement	2	5.56

The intraoperative characteristics of the study population provided insights into the surgical and procedural aspects. The mean operative time was 42.5 ± 10.8 minutes, indicating relatively short procedures in line with standard urinary diversion techniques. The type of procedure performed varied, with ureteric stenting being the most common intervention (61.11%), while percutaneous nephrostomy (PCN) was required in 38.89% of cases. The technical success rate was high at 91.70%, demonstrating procedural feasibility. Anesthesia administration was nearly evenly distributed, with local anesthesia used in 52.78% and general anesthesia in 47.22% of cases. Intraoperative blood loss was minimal, with a mean of 35.2 ± 12.6 mL, and only 8.33% of patients required a blood transfusion. Procedure-related complications were relatively low, with ureteric perforation occurring in 5.56%, stent malposition in 2.78%, and nephrostomy tube misplacement in 5.56% of cases.

Table-III: Post-operative characteristics of the study people (N=36)

Characteristics	Number of patients	Percentage (%)
Mortality	3	8.33
Improvement in Renal Function (Δ Creatinine, mg/dL)	-0.9 ± 0.3	
Improvement in eGFR (Δ mL/min/1.73m²)	+3.1 ± 1.4	
Post-operative complications		
Infection	4	11.11
Stent Migration	2	5.56
Nephrostomy Blockage	1	2.78
Sepsis	1	2.78
Rehospitalization	5	13.89
Dialysis Requirement	4	11.11

Quality of Life Score (EQ-5D, Mean ± SD)	0.71 ± 0.12
Hospital Stay (Days)	7.4 ± 3.2

The post-operative characteristics further evaluated patient recovery and complications. The overall mortality rate was 8.33%, reflecting the poor prognosis associated with malignant ureteric obstruction (MUO). Renal function improvements were evident, with a mean reduction in serum creatinine by -0.9 ± 0.3 mg/dL, and a mean increase in eGFR by +3.1 ± 1.4 mL/min/1.73m², indicating a degree of functional recovery post-intervention. Post-operative complications occurred in 27.78% of cases, with infection being the most common (11.11%), followed by stent migration (5.56%), nephrostomy blockage (2.78%), and sepsis (2.78%). Rehospitalization was required in 13.89% of patients, primarily due to complications or disease progression. Notably, 11.11% of patients eventually required dialysis, reinforcing the severity of renal dysfunction in these cases. Quality of life was assessed using the EQ-5D questionnaire, with a mean score of 0.71 ± 0.12, suggesting a moderate impairment in overall well-being. The average hospital stay was 7.4 ± 3.2 days, consistent with post-procedure monitoring requirements.

Table-IV: Follow-up results of the study people (N=36)

Follow-up Period	Mean Serum Creatinine (mg/dL)	Mean eGFR (mL/min/1.73m²)	Intervention Durability (%)	Survival Rate (%)
1 Month	2.0 ± 0.6	50.2 ± 10.8	90.30%	91.70%
3 Months	1.9 ± 0.5	52.3 ± 9.5	85.60%	88.89%
6 Months	2.1 ± 0.7	48.9 ± 11.1	80.20%	88.89%

The follow-up outcomes provided an overview of renal function trends, intervention durability, and survival rates over time. At 1st month post-procedure, the mean serum creatinine was 2.0 ± 0.6 mg/dL, with an eGFR of 50.2 ± 10.8 mL/min/1.73m², reflecting initial renal function improvement. Intervention durability remained high at 90.30%, and the survival rate was 91.70%. By three months, the serum creatinine had further decreased to 1.9 ± 0.5 mg/dL, while the eGFR improved to 52.3 ± 9.5 mL/min/1.73m². However, intervention durability declined to 85.60%, and the survival rate decreased to 88.89%, indicating disease progression in some cases. At six months, a slight deterioration in renal function was observed, with the mean serum creatinine rising to 2.1 ± 0.7 mg/dL, and eGFR declining to 48.9 ± 11.1 mL/min/1.73m². Intervention durability further reduced to 80.20%, and the survival rate remained at 88.89%, suggesting that although most patients were alive, their disease burden and renal function deterioration persisted.

DISCUSSION

The current study provides a comprehensive evaluation of the clinical outcomes of malignant ureteric obstruction (MUO) in among 36 patients. The mean age of patients in this study was 60.5 ± 9.3 years, consistent with prior research indicating that MUO predominantly affects older adults with advanced malignancies.[13] Bladder cancer (33.33%) was the most common primary malignancy, followed by prostate (22.22%), colorectal (16.67%), and cervical cancers (16.67%), which aligns with previous studies that identified urothelial and gynecological malignancies as leading contributors to MUO.[14] Additionally, 55.56% of patients had T4-stage tumors, reflecting the aggressive nature of the disease. The proportion of patients with bilateral ureteric obstruction (41.67%) was comparable to previous reports emphasizing that bilateral obstruction is a significant predictor of renal deterioration and poor prognosis.[15] The current study reported a mean operative time of 42.5 ± 10.8 minutes, which falls within the range observed in other studies evaluating ureteric stenting and percutaneous nephrostomy (PCN).[16] The technical success rate was 91.7%, similar to findings by Rahman and Abdulmajed[17], who reported a success rate of 92.5% for urinary diversion procedures. Notably, PCN was performed in 38.89% of cases, while 61.11% underwent ureteric stenting, a distribution that aligns with global trends favoring stents as the initial intervention due to their minimally invasive nature and immediate symptomatic relief.[7] Intraoperative complications, though infrequent, were reported in 27.78% of patients, with ureteric perforation (5.56%) and nephrostomy misplacement (5.56%) being the most notable. These rates are slightly lower than the 14–28% complication rates reported in systematic reviews of urinary diversion techniques.[16] The mean blood loss of 35.2 ± 12.6 mL was within expected levels, with only 8.33% of patients requiring transfusion, corroborating the low hemorrhagic risk of these procedures.[18] A key finding of this study was the significant improvement in renal function post-intervention, evidenced by a mean reduction in serum creatinine of -0.9 ± 0.3 mg/dL and an increase in eGFR by +3.1 ± 1.4 mL/min/1.73m². These results are comparable to those from Shuaibu et al.[19], who also noted renal function recovery in patients undergoing urinary decompression. However, long-term trends indicated marginal renal deterioration by the 6-month follow-up, with eGFR decreasing to 48.9 ± 11.1 mL/min/1.73m². This pattern aligns with Jin et al.[15], who demonstrated that urinary diversion primarily offers short-term renal function stabilization, with gradual decline due to disease progression or recurrent obstruction. Intervention durability was initially high at 90.3% at 1 month, but declined to 80.2% by 6 months, suggesting that stent occlusion, infection, or disease progression necessitated repeat interventions. This trend is comparable to findings by Coelho et al.[20], who observed that intervention failure increased over time due to progressive malignancy-related ureteral obstruction. The survival rates in this study were 91.7% at 1 month, 88.89% at 3 months, and 88.89% at 6 months, which are significantly higher than the median survival of 5 months reported in Heo et al.[13] and the 6-month survival rate of 48% in Dhani et al.[14]. The discrepancy may be attributed to differences in patient demographics, earlier intervention, or superior supportive care in the current study population. However, previous studies indicate that long-term survival remains limited, with mortality exceeding 80% within 12 months, suggesting that MUO is ultimately a terminal condition despite early functional recovery.[17] Postoperative complications occurred in 27.78% of cases, with infection (11.11%) being the most frequent, followed by stent migration (5.56%) and nephrostomy blockage (2.78%). These rates are lower than the 69.3% infection/sepsis rates reported by Rahman & Abdulmajed[17] but consistent with the infection rates observed in palliative MUO patients by New et al.[16]. Additionally, rehospitalization was required in 13.89% of patients, similar to trends observed in Shuaibu et al.[19], emphasizing that recurrent complications necessitate ongoing clinical management. Dialysis was eventually required in 11.11% of cases, further confirming that urinary diversion does not halt renal deterioration in advanced cancer cases.[21] Quality of life, assessed via EQ-5D scores (0.71 ± 0.12), indicated moderate impairment, which aligns with Monsky et al.[22], who found no significant QoL advantage between PCN and stenting, both causing physical and psychosocial burdens. The findings highlight the importance of timely intervention in MUO to preserve renal function, improve quality of life, and enable subsequent cancer treatments.

CONCLUSION

This study highlights the clinical impact of malignant ureteric obstruction (MUO), demonstrating initial renal function improvement post-intervention, but progressive deterioration over time. Despite high intervention success rates, long-term survival remains poor, emphasizing the need for optimized treatment strategies, improved intervention durability, and enhanced patient management to improve outcomes in MUO cases.

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