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Original Article

Pattern of Lower Urinary Tract Injuries and Outcome of Their Management

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ABSTRACT

Background: *Lower urinary tract injuries, though relatively uncommon, are significant complications of blunt abdominal and pelvic trauma. This study aims to analyze the pattern, and outcomes of lower urinary tract injuries in trauma patients admitted to a tertiary care center.* ***Methods & Materials:*** *This descriptive type of observational study was conducted at the casualty block and urology department of Dhaka Medical College Hospital, from November 2015 to November 2016. Patients of all age groups with lower abdominal & perineal injuries presented to the casualty block of Dhaka Medical College Hospital were considered as the study population. All the cases of lower abdominal & perineal injury (240 cases) and lower urinary tract injury (98 cases) during the study period were recorded to estimate the incidence of lower urinary tract injury. Data analysis was done with the SPSS 23.0 version.* ***Result:*** *Out of 915 trauma patients, 98 (10.71%) had lower urinary tract injuries, mostly urethral (71.43%) and predominantly in males (86.73%) aged 21–30. Initial care involved catheterization or suprapubic cystostomy, with some delays in definitive treatment. At one month, 31.6% had no complications; by three months, 63% were symptom-free. Persistent issues included poor flow and dysuria. All three deaths occurred in polytrauma cases.* ***Conclusion:*** *Urethral injuries (71.43%) were more common than bladder injuries (28.57%). At one month post-treatment, 31.6% had no complications, improving to 63% by three months. Some patients continued to experience urinary issues. Mortality was limited to cases with polytrauma, highlighting the need for timely, specialized care.*

Keywords: *Lower Urinary Tract Injuries, Management Outcome, Suprapubic Cystostomy, Dysuria*

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INTRODUCTION

Trauma is the medical term used to denote injury and usually refers to life-threatening or serious injuries that require specialized surgical care if the patient is to survive without disability. It is the most common cause of death in people younger than 45 years of age and accounts for more years of life loss than cancer, heart disease, and stroke combined [1]. The WHO estimation shows that every day around the world almost 16000 people die from injury accounting for 9% of the world's death in 2000 and 12% of the diseases [2]. Blunt trauma (i.e. motor vehicle accidents and falls from heights) is still the most common mechanism of injury in the world although penetrating injuries are becoming more common due to increasing violence. According to the police report total number of road traffic accidents was 40,927 in Bangladesh from 2001 to 2010, and the number of killed persons was 32,261. In 2010; 3,300 people were killed in RTAs, which rose to 5928 in 2011, a rise of 80% [3]. Approximately 33% of the beds in primary and secondary-level hospitals in Bangladesh were occupied by injury-related patients [4]. Bangladesh is a poor and densely populated area. About 25% of the population lives in the urban areas. As injury often involves young patients in the first four decades of their lives, it causes significant economic loss to society and causes an enormous burden on health care [5]. About 10% of all traumas primarily involve the genitourinary (GU) system, while another 10% to 15% of patients with abdominal trauma have concurrent GU injuries. The majority of these injuries (80%) result from blunt trauma. Altogether, blunt trauma accounts for more than 90% of urethral injuries. Overall, the male posterior urethra is injured in 4-19% and female urethra in 0-6% of all pelvic fractures; risk varies with the extent of the fracture [6].

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Blunt injury accounts for the majority of bladder trauma and a pelvic fracture accompanies most cases of bladder rupture [7]. Timely identification and management of lower urinary tract injuries minimize associated morbidity, which may include impairment of urinary continence and sexual function. Prompt injury identification depends upon a systematic evaluation with consideration of the mechanism of injury, pertinent physical examination findings, analysis of the urine, and appropriate diagnostic imaging, performed in the correct sequence. Lower urinary tract injuries seldom pose a threat to life. Once life-threatening conditions are stabilized, investigation for urinary injury is conducted in a retrograde fashion beginning with an evaluation of the urethra before that of the bladder [7]. The ureters and kidneys are evaluated after lower urinary tract injury is excluded, or after initiation of appropriate emergency management for an identified lower urinary tract injury. This study aimed to assess the pattern of lower urinary tract injuries and outcome of their management.

METHODS & MATERIALS

This descriptive type of observational study was conducted at the casualty block and urology department of Dhaka Medical College Hospital, from November 2015 to November 2016. Patients of all age groups with lower abdominal & perineal injuries presented to the casualty block of Dhaka Medical College Hospital were considered as the study population. All the cases of lower abdominal & perineal injury (240 cases) and lower urinary tract injury (98 cases) during the study period were recorded to estimate the incidence of lower urinary tract injury. Lower urinary tract injuries were taken as a sample (98) by non-randomized purposive sampling to study the presentation and management of lower urinary tract injuries. Patients were evaluated thoroughly by history, physical examination, and help of investigation. All patients were managed according to options and facilities available in the casualty block and later in the urology department of Dhaka Medical College Hospital. The outcome was denoted as death, morbidity, or total cure. On receiving the patient, rapid resuscitative steps were taken depending on the presenting condition of the patient. Patients were followed up at multiple intervals and with specific investigations to assess postoperative outcomes. The first follow-up was conducted one month after the procedure to evaluate initial recovery. Subsequent follow-up included urine routine microscopy examination (R/M/E) and culture and sensitivity (C/S) to detect any urinary tract infections or abnormalities. Additionally, ultrasonography (USG) was performed to assess post-void residual (PVR) urine volume. At the three-month follow-up, uroflowmetry was carried out to evaluate the urinary flow pattern and functional recovery of the lower urinary tract. Data analysis was done with the SPSS 23.0 version. Informed written consent was taken from the patient. Ethical clearance was taken from the review board of the hospital.

Inclusion Criteria:

- Patients with lower urinary tract injuries were admitted to the hospital during the study period.
- Patients of all age groups and both sex had been included in this study.

Exclusion Criteria:

- The patient has a head injury
- Patients or attendants unwilling to give informed consent to take part in the study

RESULTS

Table – I: Incidence of lower urinary tract injury

Number of totals admitted trauma patients	Number of patients with lower abdominal & perineal trauma	Number of patients with lower urinary tract injury
915	240	98

During the study period, 915 patients were admitted to the casualty block suffering from various types of trauma. Out of this, 240 cases were detected to have lower abdominal trauma and perineal trauma. Out of 240 cases of blunt abdominal trauma, 98 suffered from different types of lower urinary tract injuries, which is 40.83% of lower abdominal injuries and 10.71% of total trauma patients. [Table I]

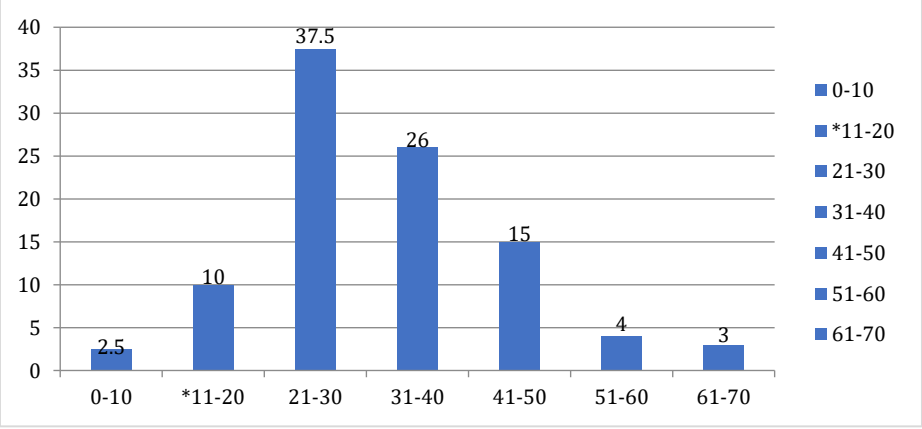

Figure – 1: Age distribution of patients suffering from lower urinary tract injury (*n*=98)

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The patients in the study ranged from age 7 years to 64 years. The majority of the patients belonged to the age group of 21 to 30 years being 38.78%, This group is followed by the age group ranging from 31 to 40 years (26.53%). The number of patients between ages 41 to 50 was 15.31%, immediately followed by those ranging between 11 & 20 years (10.20%). 4 were 51 & 60 years while 2 below 10 years of age, and 3 patients were found to be in the range of 61 to 70 years. [Figure 1]

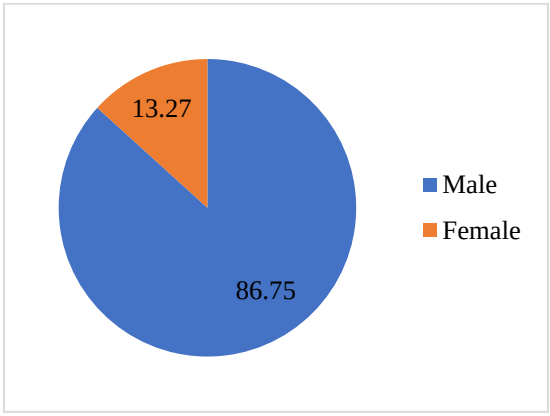

Figure – 2: Sex distribution of the patients suffering from lower urinary tract injury (*n*=98)

Among the 98 patients in the study 85(86.73%) were male ranging from age 7 to 64 years. The total number of female patients admitted was only 13.27%. They were between the ages of 20 & 55 years. 4 of them sustained blows to the abdomen by physical assault. One fell from the height while the rest sustained road traffic accidents. The male-female ratio was 6.54:1. [Figure 2]

Table – II: Organ involvement in lower urinary tract injury (*n*=98)

Organ Involved	Number	Percentage
Bladder	28	28.57%
Urethra	70	71.43%

In this series cases of urinary bladder injury were 28 (28.57%). Urethral injury counted the highest number of cases (71.43%) in this series. [Table II]

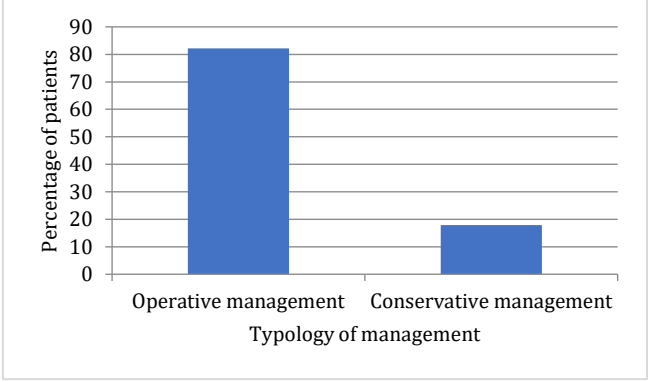

Figure – 3: Management of bladder injury (*n*=28)

5 cases of bladder injury were managed conservatively by catheterization. In 23 cases suprapubic cystostomy was done where blind catheterization was not possible. 10 cases of intraperitoneal rupture were managed surgically and repair was done. [Figure 3]

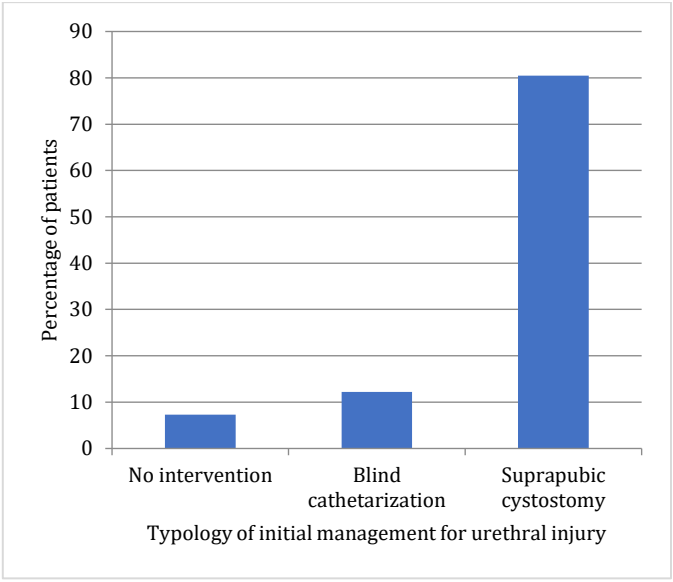

Figure – 4: Initial Management of urethral injury (*n*=70)

No specialized treatment of complicated urethral injury was done in the casualty block. Only initial management was done and later on, referred to the urology unit for definitive management. 5 (7.14%) cases of anterior urethral injury were treated without any intervention. 9 (12.86%) cases of urethral injuries were successfully catheterized blindly. 56 (80%) required suprapubic cystostomy. [Figure 4]

Table – III: Management outcome after the first month (*n*=98)

Outcome	Number of Patients (n)	Percentage (%)
No complications (Routine follow-up)	31	31.6
Poor flow during micturition	13	13.3
Interrupted flow	12	12.2
Urinary retention	11	11.2
Narrow/Double/Spraying stream	10	10.2
Incomplete evacuation + Dysuria	21	21.4

After the first month of definitive treatment (operation), 31.6 % of patients came to the outpatient department for follow-up without any complications. The rest of the patients came with complaints of poor flow during micturition (13.3%), interrupted flow (12.2%), Retention (11.2%), and Narrow/ Double/Spraying stream (10.2%) during micturition. Some

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patients had a sense of incomplete evacuation of the bladder and dysuria (21.4%). [Table III]

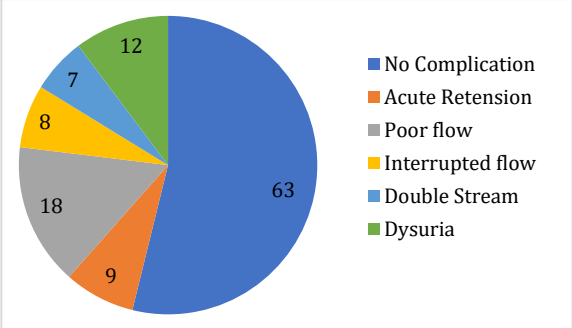

Figure – 5: Management outcome after three months

After three months 63% of patients had no complaints. Some patients came with poor flow, interrupted flow, and retention. Other complaints include low-grade fever, lower abdominal pain, and dysuria. [Figure 5]

Table – IV: Mortality in lower urinary tract injury

Injury	Number	Percentage
Isolated lower urinary tract injury	0	0
Lower urinary tract injury associated with polytrauma	3	3

In the present study, no cases of isolated lower urinary tract injury expired. 3 patients with associated polytrauma expired. [Table IV]

DISCUSSION

In the present study, 10.71% of total trauma patients presented with lower urinary tract injuries in the casualty block of Dhaka Medical College Hospital during the study period. This incidence is almost the same as the statement of Daller M. et al who stated 10% of lower urinary tract injuries in total trauma patients [8]. The ages of the patients in this study ranged from 7 years to 64 years. Death and disability in the early years of life are the most tragic of all. But the majority (38.78%) belonged to the age group of 21 to 30 years. This is the most active period of life. The second & third age groups were ages between 31 & 40 years (26.53%) and between 41 & 50 years (15.31%) respectively. That is these patients are also in active periods of life. With increasing age, the incidence also subsided at 51 - 60 years 4.08% and 61 - 70 years 3.06%. The sex predilection is towards males. The male patients in the study were 85% i.e. the male-female ratio is 6.54: 1. This is because males are more involved in outdoor activities than the female. Early management of genitourinary trauma prioritizes prompt resuscitation, control of hemorrhage, and identification of associated injuries. Minor bladder injuries may resolve conservatively, sometimes even without catheterization. Surgical repair is typically performed through a cystotomy at the dome using absorbable sutures in two to three layers. Suprapubic catheters may be placed via a separate incision. For IP ruptures—often large and dome-located—prompt surgical exploration is essential due to their association with sepsis and higher mortality. Follow-up cystograms are usually done after 2 weeks; however, simple dome lacerations may not require imaging follow-up, as suggested by Inaba et al. [9]. In our study, 28 bladder injuries were identified—23 were managed surgically and 5 conservatively. Urethral injuries are more common in males, typically resulting from pelvic fractures or straddle trauma, with the membranous urethra being the most vulnerable. Injury may involve laceration, transection, or contusion. Blood at the urethral meatus is the most important sign, necessitating a retrograde urethrogram (RGU) before any catheterization attempt. Blind catheter insertion can worsen the injury or cause infection. Hsieh CH et al. demonstrated 95.9% accuracy with retrograde cystography [10]. In our series, 87.80% had blood at the meatus, compared to 100% in Monstrey SJM et al. [11]. Kong JPL et al. found meatal bleeding in 37–93% of posterior and 75% of anterior urethral injuries [12]. Pelvic fractures were associated with 60.97% of urethral injuries in our study, while Monstrey SJM et al. reported 100% in posterior urethral cases [11]. Other signs included urinary retention (85.36%), perineal hematoma (48.78%), hematuria (21.95%), and high-riding prostate in 34.14% (vs. 50% in Monstrey SJM et al. [11]. Treatment goals are to preserve continence and potency while minimizing stricture formation. Life-threatening injuries are managed per ATLS protocols, with urinary diversion as the initial step. Partial urethral injuries may be managed with a urethral or suprapubic catheter, with the latter preferred to avoid manipulating the urethra. A micturating cystourethrogram is typically done after 2–4 weeks. About 50% of partial tears treated with catheterization eventually require surgery. In anterior blunt trauma, early repair is avoided due to spongiosum contusion. Penile fractures with partial anterior urethral tears can be repaired during cavernosal repair. Female urethral injuries are usually partial and associated with bladder or vaginal injuries. Complete posterior urethral injuries pose greater management challenges. Treatment options include primary realignment, immediate or delayed repair, and urethroplasty. Suprapubic catheterization followed by delayed urethroplasty is standard for complete anterior tears. There is an ongoing debate about initial management. McAninch JW44 strongly opposes catheterization in urethral injury. Conversely, Lynch TH et al. and Kong JPL et al. support catheter or suprapubic cystostomy for partial injuries, with a preference for the latter [12,13]. Djakovic N et al. and Kong JPL et al. found that careful catheterization may be successful in up to 50% of cases [12,14]. At one month post-surgery, 31.6% of patients were symptom-free. Others reported poor flow (13.3%), interrupted flow (12.2%), retention (11.2%), spraying/narrow stream (10.2%), and dysuria with incomplete evacuation (22.2%). By three months, 63% had no complaints. The remaining patients experienced poor or interrupted flow, retention, low-grade fever, abdominal pain, and dysuria. Three patients died: one postoperatively from intra-abdominal injury with pelvic fracture and hematoma, another during surgery due to hemodynamic instability with flank mass and hematuria, and one additional unspecified death. A study by Navai et al.

reported that 15% of patients experienced postoperative complications following urethral reconstructive surgery, with infections being the most common. Additionally, 20% of those with complications had stricture recurrence within a year, compared to 7.4% without complications [15].

Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

CONCLUSION

Urethral injuries were more common (71.43%) than bladder injuries (28.57%). Initial management primarily involved suprapubic cystostomy, particularly for urethral injuries. After one month of definitive treatment, 31.6% of patients reported no complications, improving to 63% by three months. However, issues like poor urinary flow, retention, and dysuria persisted in a subset of patients. Mortality occurred only in cases with associated polytrauma, underscoring the severity of combined injuries and the importance of prompt and specialized management.

RECOMMENDATION

Early identification and prompt management of lower urinary tract injuries, especially in cases of polytrauma, are crucial to reduce morbidity and mortality. Routine follow-up is essential to monitor and manage postoperative complications such as poor urinary flow, retention, and dysuria. Strengthening emergency protocols, ensuring timely referral to urology units, and improving surgical intervention facilities can significantly enhance patient outcomes in trauma settings.

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REFERENCES

1. *Krug EG, Sharma GK, Lozano R. The global burden of injuries. American journal of public health. 2000;90(4):523.*
2. *McCoy A, Melendez-Torres GJ, Gardner F. Parenting interventions to prevent violence against children in low-and middle-income countries in East and Southeast Asia: A systematic review and multi-level meta-analysis. Child abuse & neglect. 2020;103:104444.*
3. *Biswas SK. Road traffic injuries: an emerging problem in Bangladesh. Faridpur Medical College Journal. 2012;7(1):5–5.*
4. *Mashreky SR, Rahman A, Khan TF, Faruque M, Svanström L, Rahman F. Hospital burden of road traffic injury: a major concern in primary and secondary level hospitals in Bangladesh. Public health. 2010;124(4):185–9.*
5. *Bailey H, Bulstrode CJ, Love RJM, O'Connell PR. Bailey & Love's short practice of surgery [Internet]. CRC Press; 2008*
6. *Lynch TH, Martínez-Piñeiro L, Plas E, Serafetinides E, Türkeri L, Santucci RA, et al. EAU guidelines on urological trauma. European urology. 2005;47(1):1–15.*
7. *Morris PJ, Wood WC. Oxford textbook of surgery. (No Title) [Internet]. 2000*
8. *Daller M, Carpinito G. Genitourinary Trauma and. Handbook of Urology: Diagnosis and Therapy. 2004;164.*
9. *Inaba K, McKenney M, Munera F, De Moya M, Lopez PP, Schulman CI, et al. Cystogram follow-up in the management of traumatic bladder disruption. Journal of Trauma and Acute Care Surgery. 2006;60(1):23–8.*
10. *Hsieh CH, Chen RJ, Fang JF, Lin BC, Hsu YP, Kao JL, et al. Diagnosis and management of bladder injury by trauma surgeons. The American journal of surgery. 2002;184(2):143–7.*
11. *Monstrey SJM, Vander Werken C, Debruyne FMJ, Goris RJA. Urological Trauma and Severe Associated Injuries. British Journal of Urology. 1987 Nov;60(5):393–8.*
12. *Kong JP, Bultitude MF, Royce P, Gruen RL, Cato A, Corcoran NM. Lower urinary tract injuries following blunt trauma: a review of contemporary management. Reviews in Urology. 2011;13(3):119.*
13. *Lynch TH, Martínez-Piñeiro L, Plas E, Serafetinides E, Türkeri L, Santucci RA, et al. EAU guidelines on urological trauma. European urology. 2005;47(1):1–15.*
14. *Martínez-Piñeiro L, Djakovic N, Plas E, Mor Y, Santucci RA, Serafetinidis E, et al. EAU guidelines on urethral trauma. European urology. 2010;57(5):791–803.*
15. *Navai N, Erickson BA, Zhao LC, Okotie OT, Gonzalez CM. Complications following urethral reconstructive surgery: a six year experience. International braz j urol. 2008;34:594–601.*