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*Original Article*

# Clinical Utility of Pediatric Cystoscopy in Lower Urinary Tract Symptoms Evaluation in a Tertiary Medical College Hospital: An Observational Study (2022–2025)

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## Abstract

**Background:** Lower urinary tract symptoms (LUTS) in children are common and often require detailed evaluation to identify underlying anatomical or functional abnormalities. Pediatric cystoscopy remains an important diagnostic and therapeutic tool in pediatric urology.

**Objective:** To evaluate the clinical utility, indications, cystoscopic findings, and outcome of pediatric cystoscopy in male children presenting with lower urinary tract symptoms in a tertiary medical college hospital.

**Methods:** This observational study was conducted in the Department of Pediatric Surgery and Pediatric Urology of Dhaka Medical College and Hospital from January 2022 to January 2025. A total of 312 male children aged 1 month to 7 years undergoing diagnostic or therapeutic cystoscopy for LUTS were included. Demographic profile, presenting symptoms, imaging findings, cystoscopic findings, intervention performed, and postoperative outcomes were analyzed.

**Results:** The mean age was 3.2 ± 1.8 years. Most patients belonged to the 1–5 years age group (61.9%). Common presenting symptoms were poor urinary stream 131 (42.0%), recurrent urinary tract infection 119 (38.1%), straining during micturition 97 (31.1%), urinary retention 56 (17.9%), hematuria 34 (10.9%), and dribbling of urine 28 (9.0%). Posterior urethral valve was the most common cystoscopic finding 112 (35.9%), followed by cystitis 56 (17.9%), urethral stricture 37 (11.9%), bladder trabeculation 31 (9.9%), ureterocele 19 (6.1%), and normal findings 44 (14.1%). Therapeutic intervention was performed in 128 patients (41.0%). Minor postoperative complications occurred in 25 patients (8.0%) and were managed conservatively.

**Conclusion:** Pediatric cystoscopy is a safe and effective modality for evaluation and management of lower urinary tract symptoms in children. It provides significant diagnostic accuracy and allows simultaneous therapeutic intervention in selected patients.

**Keywords:** Pediatric cystoscopy, lower urinary tract symptoms, posterior urethral valve, pediatric urology, DMCH.

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## Introduction

Lower urinary tract symptoms (LUTS) in children represent a broad spectrum of storage and voiding abnormalities affecting quality of life and renal function if left untreated. Common symptoms include poor urinary stream, frequency, urgency, urinary retention, recurrent urinary tract infection, and hematuria.[1,2]

Pediatric cystoscopy has become an essential diagnostic and therapeutic procedure in modern pediatric urology. It enables direct visualization of the urethra, bladder neck, ureteric orifices, and bladder mucosa, facilitating accurate diagnosis of congenital and acquired lower urinary tract pathologies.[3,4]

The procedure is particularly useful in children with suspected posterior urethral valve, urethral stricture, ureterocele, recurrent urinary tract infection, hematuria, and unexplained voiding dysfunction. Several studies have demonstrated the utility of cystoscopy in identifying clinically significant abnormalities that are occasionally

missed by ultrasonography and voiding cystourethrogram alone.[5,6]

Despite advancements in imaging modalities, cystoscopy remains the gold standard for direct lower urinary tract evaluation. It additionally permits simultaneous therapeutic intervention such as valve fulguration, urethral dilatation, stent removal, and foreign body extraction.[7,8]

Posterior urethral valve is one of the most common causes of infravesical obstruction in male children and may lead to progressive renal impairment if not diagnosed early.[9,10] Early endoscopic evaluation can improve outcome by allowing timely diagnosis and intervention.[11]

Flexible and rigid pediatric cystoscopy techniques have significantly improved visualization and reduced procedural morbidity in pediatric patients.[12,13] The procedure is considered safe with minimal complications when performed under proper aseptic precautions and anesthesia support.[14]

Limited data are available from developing countries regarding the role of pediatric cystoscopy in lower urinary tract symptom evaluation. Therefore, this study aimed to assess the clinical utility, findings, and outcome of pediatric cystoscopy in male children presenting with LUTS in a tertiary medical college hospital.

## Materials and Methods

### Study Design

This was a hospital-based observational study.

### Study Place

The study was conducted in the Department of Pediatric Surgery and Pediatric Urology, Dhaka Medical College and Hospital, Dhaka, Bangladesh.

### Study Period

The study was conducted from January 2022 to January 2025.

### Study Population

Male children aged 1 month to 7 years presenting with lower urinary tract symptoms requiring cystoscopic evaluation were included.

### Sample Size

A total of 312 cases were included in the study.

### Inclusion Criteria

- Male children aged 1 month to 7 years
- Children presenting with lower urinary tract symptoms
- Patients who underwent cystoscopy

### Exclusion Criteria

- Female children
- Patients with incomplete records
- Patients with severe coagulopathy or unfit for anesthesia

### Data Collection

Data collected included age, presenting symptoms, imaging findings, indication for cystoscopy, cystoscopic findings, procedure performed, postoperative complications, and outcome.

### Statistical Analysis

Data were analyzed using SPSS version 26. Results were expressed as frequency, percentage, mean, and standard deviation.

### Ethical Approval

Ethical approval was obtained from the Institutional Review Board (IRB) of Dhaka Medical College and Hospital. Written informed consent was obtained from parents or guardians. Confidentiality was strictly maintained.

## Results

A total of 312 male children aged 1 month to 7 years underwent cystoscopy evaluation for lower urinary tract symptoms. The mean age of the patients was 3.2 ± 1.8 years. Most patients were in the 1–5 years age group.

**Table 1: Age Distribution of Patients (n = 312)**

| Age Group | Number | Percentage |
|---|---|---|
| 1 month–1 year | 56 | 17.9% |
| 1–3 years | 106 | 34.0% |
| 3–5 years | 87 | 27.9% |
| 5–7 years | 63 | 20.2% |
| Total | 312 | 100% |

**Table 2: Presenting Symptoms**

| Symptoms | Number | Percentage |
|---|---|---|
| Poor urinary stream | 131 | 42.0% |
| Recurrent UTI | 119 | 38.1% |
| Straining during micturition | 97 | 31.1% |
| Urinary retention | 56 | 17.9% |
| Hematuria | 34 | 10.9% |
| Dribbling of urine | 28 | 9.0% |
| Frequency/urgency | 50 | 16.0% |

**Table 3: Indications for Cystoscopy**

| Indication | Number | Percentage |
|---|---|---|
| Suspected PUV | 125 | 40.1% |
| Recurrent UTI | 81 | 26.0% |
| Voiding dysfunction | 44 | 14.1% |
| Hematuria | 25 | 8.0% |
| Suspected urethral stricture | 22 | 7.1% |
| Ureterocele evaluation | 15 | 4.8% |
| Total | 312 | 100% |

**Table 4: Cystoscopic Findings**

| Findings | Number | Percentage |
|---|---|---|
| Posterior urethral valve | 112 | 35.9% |
| Cystitis | 56 | 17.9% |
| Urethral stricture | 37 | 11.9% |
| Bladder trabeculation | 31 | 9.9% |
| Ureterocele | 19 | 6.1% |
| Normal findings | 44 | 14.1% |
| Foreign body | 6 | 1.9% |
| Diverticulum | 7 | 2.2% |
| Total | 312 | 100% |

**Table 5: Procedures Performed**

| Procedure | Number |
|---|---|
| Diagnostic cystoscopy only | 184 |
| Valve fulguration | 97 |
| Urethral dilatation | 19 |
| DJ stent removal | 6 |
| Foreign body removal | 6 |
| Total | 312 |

Therapeutic intervention was performed in 128 patients (41.0%), while diagnostic cystoscopy only was performed in 184 patients (59.0%).

**Table 6: Postoperative Complications**

| Complication | Number | Percentage |
|---|---|---|
| Mild hematuria | 13 | 4.2% |
| Fever | 6 | 1.9% |
| Urinary retention | 3 | 1.0% |
| UTI | 3 | 1.0% |
| No complication | 287 | 92.0% |
| Total | 312 | 100% |

Minor postoperative complications occurred in 25 patients (8.0%). All complications were managed conservatively.

## Discussion

Pediatric lower urinary tract symptoms are common and may arise from congenital obstruction, infection, inflammatory pathology, or functional abnormalities. Early diagnosis is important to prevent long-term renal damage and bladder dysfunction.[15,16]

In the present study, the majority of patients were between 1 and 5 years of age. Similar findings were reported by Smith et al. and Nasir et al., where obstructive voiding symptoms commonly presented during infancy and early childhood.[17,18]

Poor urinary stream and recurrent urinary tract infection were the most frequent presenting complaints in this study. Comparable observations were documented in previous studies evaluating pediatric LUTS and cystoscopicassessment.[19,20]

Posterior urethral valve was the most common cystoscopic finding, accounting for 112 cases (35.9%). This reflects the predominance of congenital obstructive pathology among male children with LUTS. Similar frequencies have been reported in previous pediatric urology studies.[21,22]

Therapeutic intervention was performed in 128 patients (41.0%), demonstrating the dual diagnostic and therapeutic utility of pediatric cystoscopy. Early fulguration has been associated with improved bladder dynamics and preservation of renal function.[23,24]

Urethral stricture and bladder trabeculation were also common findings in the current study. Chronic bladder outlet obstruction may produce secondary bladder wall changes and recurrent urinary infection. Cystoscopy permits accurate assessment of the severity and extent of these abnormalities.[25,26]

Normal cystoscopic findings were observed in 44 patients (14.1%), indicating that cystoscopy also helps exclude significant pathology in cases with inconclusive radiological investigations. Similar findings were observed by Robinson et al. in flexible cystoscopy studies.[4]

The complication rate in the present series was low, with minor complications observed in 25 patients (8.0%), including transient hematuria, fever, temporary urinary retention, and urinary tract infection; all were managed conservatively, and no major urethral injury or mortality occurred. Previous studies have similarly demonstrated the safety profile of pediatric cystoscopy.[5,27]

The present study highlights the importance of pediatric cystoscopy in comprehensive lower urinary tract evaluation, especially in resource-limited settings where advanced urodynamic studies may not be widely available. Early cystoscopic assessment may facilitate prompt diagnosis and timely management, thereby improving long-term urinary and renal outcomes.[28,29]

## Limitations

This was a single-center study limited to male children. Long-term follow-up regarding renal function and bladder dynamics was not available. Multicenter studies are recommended.

## Conclusion

Pediatric cystoscopy is a highly valuable and safe diagnostic modality for lower urinary tract symptom evaluation in children. It provides direct visualization of lower urinary tract pathology and enables simultaneous therapeutic intervention. Posterior urethral valve was the most common finding in this study. Early cystoscopy evaluation can significantly improve diagnosis, management, and outcome in pediatric patients with LUTS.

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