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Migrated Double-J Stents in Pediatric Urological Procedures: A Two-Year Retrospective Analysis

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Abstract

Objective: To evaluate the incidence, risk factors, and management strategies of migrated double-J (DJ) stents in pediatric patients at our tertiary care hospital in Vadodara, Gujarat, India.

Methods: A retrospective observational study was conducted at our tertiary care hospital in Vadodara, from January 2023 to December 2024. Information on patient profiles, stent details, migration trends, and outcomes was collected and analyzed.

Results: Among 247 children who had DJ stents placed, 23 stents (9.3 percent) showed migration. The average age was 8.6 years (ranging from 2 to 14), with migration most

common in those with complex renal issues like ureteropelvic junction obstruction (52.2% or vesicoureteral reflux (34.8%). Migration occurred around 6.5 weeks (on an average) after placement (ranging from 2 to 12 weeks). In 16 cases upward migration happened, accounting for 69.6%, while downward toward urethra happened in 7 cases (30.4%). Endoscopic removal was done in 18 cases (78.3%, while 5 (21.7%) needed open surgery.

Conclusion: DJ Stent migration is a notable challenge in pediatric urological procedures. Proper patient selection, correct placement using imaging guidance, and regular monitoring can help reduce the risks.

Keywords: Double-J Stent, Migration, Pediatric Urology, Urological Surgery, Complications

Introduction

Double-J (DJ) stents are a cornerstone of pediatric urology, used to support the urinary tract in various conditions. However, their tendency to shift out of place can lead to problems, sometimes requiring further surgery^[1, 2]. Past studies suggest migration happens in 1.3% to 12% of cases, depending on the population^[3, 4]. In Vadodara, a bustling city in Gujarat, India, we face distinct hurdles due to a diverse patient mix and tricky urological cases. This study dives into the patterns of DJ stent migration at our hospital, aiming to pinpoint risk factors and refine how we handle it.

Materials and Methods

Study Design

A retrospective observational study was conducted at our tertiary care hospital in Vadodara, from January 2023 to December 2024.

Patient Selection

Inclusion criteria:

- Pediatric patients (aged 1-14 years)
- Underwent urological procedures requiring DJ stent placement
- Documented follow-up for at least 3 months post-procedure

Exclusion criteria:

- Patients with incomplete medical records
- Congenital anatomical abnormalities precluding standard stent placement
- Patients lost to follow-up

Data Collection

Comprehensive data was collected, including:

- Patient demographics
- Underlying urological conditions
- Stent characteristics (size, material)
- Surgical procedure details
- Migration timing and direction
- Management approach
- Clinical outcomes

Statistical Analysis

Data was analyzed using SPSS version 26.0. Descriptive statistics were used to characterize migration patterns. Chi-square and Fisher's exact tests were employed to identify potential risk factors.

Results

Table 1: Patient Demographics and Migration Incidence

Parameter	Value
Total Patients	247
Stent Migration Cases	23 (9.3%)
Mean Age (years)	8.6 ± 3.2 (range: 2-14)
Gender Distribution	Male: 14 (60.9%) Female: 9 (39.1%)

Table 2: Migration Characteristics and Management

Parameter	Value
Total Migrations	23
Mean Time to Migration	6.5 weeks (range: 2-12)
Migration Patterns	Retrograde: 16 (69.6%) Distal Urethral: 7 (30.4%)
Underlying Conditions	Ureteropelvic Junction Obstruction: 12 (52.2%) Vesicoureteral Reflux: 8 (34.8%) Urolithiasis: 3 (13%)
Management Strategies	Endoscopic Retrieval: 18 (78.3%) Open Surgical Intervention: 5 (21.7%)

Patient Characteristics

Total patients: 247 Stent migration cases: 23 (9.3%)

Patient demographics:

- Mean age: 8.6 ± 3.2 years
- Gender distribution:
 - Male: 14 (60.9%)
 - Female: 9 (39.1%)

Migration Characteristics

- Total migrations: 23
- Migration timing:
 - Mean: 6.5 weeks post-placement
 - Range: 2-12 weeks

Migration patterns:

- Retrograde migration: 16 cases (69.6%)
- Distal urethral migration: 7 cases (30.4%)

Underlying Conditions

Migration distribution by condition:

- Ureteropelvic junction obstruction: 12 cases (52.2%)
- Vesicoureteral reflux: 8 cases (34.8%)
- Urolithiasis: 3 cases (13%)

Management Strategies

Retrieval methods:

- Endoscopic retrieval: 18 cases (78.3%)
- Open surgical intervention: 5 cases (21.7%)

Complications:

- Minor urinary tract infections: 4 cases (17.4%)
- No significant long-term complications observed

Discussion

Our study reveals a DJ stent migration rate of 9.3%, consistent with existing literature reporting ranges between 1.3% and 12% [3-5]. The higher incidence in ureteropelvic junction obstruction cases suggests potential anatomical predispositions influencing stent stability.

The predominance of retrograde migration (69.6%) indicates potential technical challenges in stent positioning. This finding underscores the importance of precise surgical technique and imaging-guided placement [6, 7].

Endoscopic retrieval proved successful in 78.3% of cases, highlighting its efficacy as a primary management strategy. The low complication rate suggests that timely intervention can mitigate potential risks associated with stent migration [8, 9].

Limitations

- Single-center study
- Relatively small sample size
- Potential selection bias

Conclusion

DJ stent migration remains a notable challenge in pediatric urological practice. Our study emphasizes the need for:

- Meticulous surgical technique
- Regular follow-up
- Patient-specific stent selection
- Advanced imaging guidance

Future research should focus on developing innovative stent designs and placement techniques to minimize migration risks.

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