



Review Article

Three-week or one-week bladder catheterization for hypospadias repair? A retrospective-prospective observational study of 189 patients



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ABSTRACT

Purpose: While there is little scientific evidence over the optimal duration for transurethral bladder catheterization after hypospadias repair, most surgeons leave the catheter for 7–10 days. We herein describe our experience with bladder catheterization for three weeks after hypospadias repair, an approach not previously described in the literature.

Patients and Methods: We reviewed the charts of 189 patients who underwent hypospadias repair by a single pediatric urologist. The study population was divided as follows: group 1 consisted of children operated between March 2007 and September 2010 and whose catheters were left for one week ($n = 95$); group 2 consisted of those operated between September 2010 and July 2013 and whose catheters were left for three weeks ($n = 94$). The primary objective of the study was to compare complication rates between the two groups. Secondary outcomes were evaluation of the effect of age, surgical technique, curvature, and hypospadias degree as potential factors for postoperative complications.

Results: Median age at hypospadias repair was 18 months (range, 3–100 months) in group 1, and 16 months (range, 2–96 months) in group 2, $P = .209$. The complication rate was 22.1% ($n = 21$) for group 1 and 7.4% ($n = 7$) for group 2, $P = .005$. Complications observed in group 1 and 2 were meatal stenosis ($n = 4$ and 2, respectively) and urethro-cutaneous fistulas ($n = 17$ and 5, respectively). Coronal fistulas manifested more frequently in patients in group 1 compared to those in group 2 (13.7% vs. 3.2%, $P = .01$). Complications were observed in 20 patients out of 139 (11.5%) after Duplay, and in 8 patients out of 15 (53.3%) after Duckett ($P < .001$). In Duplay cases, complications were significantly associated with one-week bladder catheterization (OR: 5.00; 95% CI: 1.53–16.32; $P = .008$) and higher age group at operation (OR: 1.88; 95% CI 1.07–3.28; $P = .026$). In Duckett cases, number of surgeries, age, severity, curvature and catheter duration were not found to be associated with complications.

Conclusion: In cases of Duplay, a three-week instead of one-week catheterization and age below 6 months at hypospadias repair are associated with a better outcome and fewer complications.

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Hypospadias is a developmental anomaly characterized by a urethral meatus that opens onto the ventral surface of the penis, proximal to the end of the glans. The meatus may be located anywhere along the shaft of the penis, from the glans to the perineum. The only treatment for hypospadias is surgical. Modern repair is usually performed in a single stage procedure. Until today, there is still disagreement over the need of urine diversion after hypospadias repair [1]. Furthermore, although many pediatric urologists prefer urinary diversion, there is still controversy regarding its type and duration, the alternatives being: no diversion [1], suprapubic diversion [2,3], urethral stent (below the external sphincter of the bladder) [3], or transurethral bladder catheter [4]. While there is little scientific evidence to support one over another approach, most surgeons who advocate leaving a bladder catheter

recommend a duration of 7–10 days [5], an attitude we embraced in our early repairs. Based on the physiology of wound healing, and in attempt to further decrease our complication rate, we thought about changing our approach and leave the catheter for three weeks instead of one week. In this retrospective-prospective study, we review our findings of leaving a catheter for three weeks instead of one week after hypospadias repair, with the objective to determine if this decreases the incidence of postoperative complications.

1. Materials and methods

1.1. Study population

The medical records of all children who underwent hypospadias repair at a single academic medical center from March 2007 to July 2013 were reviewed. In the early period, children were left with a bladder catheter for one week (group 1) and constituted the

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retrospective part of our study. Since September 2010, we initiated the prospective part of our study, where all patients had the catheter left for 3 weeks (group 2). Chart review was performed after approval from the institutional review board, and included age, severity of hypospadias, intraoperative details, length of hospital stay, follow-up period, and complications. Surgical indications included all patient with hypospadias that presented after the age of 3 months. Patients with cripple hypospadias requiring buccal mucosal graft repairs, as well as those who had a MAGPI repair were excluded. Complications and cosmetic appearances were documented on outpatient clinic visits after 1 week, 3 weeks, and 6 months after the repair. A “very good” cosmetic result was defined as a normal appearance of a circumcised penis, with the meatus present on the distal part of the glans, with no curvature. “Good” result was defined as a near normal appearance of a circumcised penis, with meatus present on the glans, with no curvature. “Acceptable” result was defined as a near normal appearance of a circumcised penis, with meatus present just distal to the coronal sulcus, with no curvature left.

1.2. Data analysis

Statistical significance was set at a $P < .05$ using the Chi-squared test for categorical and the non-parametric Wilcoxon–Mann–Whitney U test for continuous variables. Multivariate analyses were conducted using logistic regression analysis. Statistical calculations were performed with IBM SPSS Statistics (version 20.0, IBM Corp., Armonk, NY).

1.3. Study objective

This is a single center, single surgeon nonrandomized observational retrospective-prospective study examining hypospadias outcomes in the pediatric population after changing one technical parameter: the duration of urethral catheterization. The primary outcome of the study was to compare complication rates between cases where the catheter was left for one week (group 1) and cases where it was left for three weeks (group 2), with the hypothesis that extended catheterization after hypospadias repair will result in lower rates of fistula formation and meatal stenosis. Secondary outcomes were evaluation of the effect of age, surgical technique, curvature, and hypospadias degree as potential factors associated with postoperative complications.

1.4. Operative technique

All hypospadias repairs were performed by the same senior surgeon (PD), with 20 years of experience in hypospadias repair. No preoperative testosterone therapy was used.

In all cases, we begin by complete degloving of the penis and release of cutaneous and fibrous curvature if present. In cases where a straight penis is obtained, we proceed with a modified Duplay procedure with spongioplasty in a Y-to-I wrap, as previously described by Dodat et al. [6,7]. After dorsal midline urethral plate incision, urethroplasty was performed using running 6-0 Polydioxanone (PDS) in a subepithelial fashion from a proximal to distal direction toward the normal opening on the glans. Apart from the spongioplasty, no additional protective intermediate layers were used in the repair. In case where artificial erection shows persistence of severe curvature despite complete penile degloving, the repair is not amenable to a Duplay procedure. In this case, a tubularized transverse preputial island flap, as described by Duckett, was then applied [8]. According to its size, the neourethra was created over a 6 or 8 Fr polyvinyl chloride enteric feeding tube that was left indwelling in the bladder and fixed on the glans using non-absorbable suture (6-0 Prolene). A hydrocolloid dressing was wrapped around the penis for hemostasis and the catheter was then allowed to drip urine freely between two diapers. All patients were discharged home on the same day on anticholinergics (oxybutynin 0.2

mg/kg tid on a scheduled rather than as-need basis) and antibiotic prophylaxis (amoxicillin 15 mg/kg tid) until the catheter's removal.

2. Results

2.1. Study population

During the study period, a total of 189 patients underwent hypospadias repair and were divided into two groups according to the duration of the transurethral bladder catheter: group 1 (95 patients) and group 2 (94 patients). Demographic factors are presented in Table 1. Median age at hypospadias repair was 18 months (range, 3–100 months) in group 1, and 16 months (range, 2–96 months) in group 2, $P = .209$. In those cases with reoperative procedure, median age was 24 months (range, 3–84 months) with an interval of 8 months since the original repair (range, 4–24 months). All reoperative cases were new patients that were referred to us.

2.2. Complications

All patients returned for their follow-up visits. The median outpatient follow-up period was 36 months (range, 19–56) in group 1, and 14 months (range, 6–38) in group 2. We received no complaints of catheter-related bladder spasms in either group. The complication rate was 22.1% ($n = 21$) for group 1 and 7.4% ($n = 7$) for group 2, $P = .005$. Complications included meatal stenosis (4 in group 1; 2 in group 2) and urethro-cutaneous fistulas (17 in group 1; 5 in group 2). No postoperative wound infection, urinary tract infection, urethral diverticulum, glans dehiscence or complete wound dehiscence was observed. Coronal fistulas manifested more frequently in patients in group 1 compared to those in group 2 (13.7% vs. 3.2%, $P = .01$). No significant difference between the two groups was found in case of mid-shaft fistulas (1.1% vs. 1.1%, $P = .994$), peno-scrotal fistulas (3.2% vs. 1.1%, $P = .317$) and meatal stenosis (4.2% vs. 2.1%, $P = .414$). All complications took place within the first six months postoperatively. We have not observed late complications. Meatal stenoses were managed with urethral meatotomy. Urethro-cutaneous fistulas were managed with excision of the fistulous tract followed by approximation of healthy urethral tissue and three weeks bladder catheter drainage, resulting in a successful closure in all cases. No additional procedures were performed or needed in either group.

Complications were observed in 20 patients (11.5%) after Duplay, and in 8 patients (53.3%) after Duckett ($P < .001$). Number of surgeries, age group, hypospadias severity, curvature and catheter duration were not found to be statistically associated with complications in cases operated by Duckett procedure (Table 2.1). As for cases operated by Duplay, univariate analysis showed that complication incidence was significantly associated with increasing age group, and manifested more frequently in patients in group 1 compared to group 2 (Table 2.2).

Multivariate analysis of factors associated with postoperative complication after a Duplay procedure showed that a one-week bladder catheterization was associated with five times more complications compared to three-week bladder catheterization (OR 5.00, 95% CI 1.53–16.32), and about twice the possibility of complications with increasing age (OR 1.88, 95% CI 1.07–3.28). Primary vs. reoperative procedure and hypospadias degree were not significantly associated with development of complications in those operated by Duplay procedure (Table 3).

3. Discussion

Hypospadias is the most common congenital malformation in males [9]. The modern repair involves a single stage procedure with the aim to provide satisfactory cosmetic and functional results [8,10]. Despite the advanced surgical techniques, postoperative complications still occur. Complete dehiscence, urethro-cutaneous fistula, and meatal stenosis are the most common complications, and typically develop within 6

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