Tubularized incised plate repair of distal hypospadias in toilet-trained children: should a stent be left?

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OBJECTIVE

To evaluate the role of stenting in toilet-trained children undergoing tubularized incised plate (TIP) repair of distal hypospadias, as a stent-free TIP in boys who are not toilet-trained has been successful with no unusually prolonged discomfort.

PATIENTS AND METHODS

The study included all toilet-trained children with distal penile shaft hypospadias who were not suitable candidates for meatal advancement procedures and who underwent TIP repair, by one surgeon, between March and August 2001. Patients were prospectively randomized at the end of surgery to either leaving a stent for 1 week (stented) or no stent (unstented). The study included 64 children (35 stented and 29 unstented; median age 6 years, range 2–17). In the stented group the stent was placed in the bladder for continuous bladder drainage. An adjunct penile block instead of caudal or epidural analgesia was used in all patients, to avoid drug-induced urinary retention. The early evaluation included an assessment of bladder spasms, dysuria, urinary retention and extravasation. Regular meatal dilatation was provided only to patients with voiding difficulty and an obvious tendency to stenosis.

RESULTS

The median (range) follow-up was 6 (3–11) months. Voiding was painful in the first week in five (14%) and 13 (45%) of the stented and unstented patients, respectively ($P < 0.01$); there were bladder spasms in three (8%) and none, respectively ($P > 0.05$). None of stented patients developed urinary retention or extravasation, compared with seven (24%) and five (17%) in the unstented group, respectively ($P < 0.05$). Meatal dilatation was required in two (6%) and five (17%) of the stented and unstented patients, respectively ($P > 0.05$). There were complications requiring re-operation in nine boys (14%), of whom seven (10%) developed small fistulae and two (4%) had meatal stenosis. Although the re-operation rate was lower in the stented (9%) than in the unstented group (20%), the difference was not statistically significant ($P > 0.05$).

CONCLUSIONS

The use of a stent in TIP repair in toilet-trained children is advantageous; it significantly eliminates the risk of urinary retention and extravasation, and reduces the overall patient discomfort. It is also associated with a lower re-operation rate.

KEYWORDS

hypospadias repair, stent, Snodgrass procedure, outcome

INTRODUCTION

Numerous operative techniques have been developed to correct distal hypospadias; whilst most are variations on a basic theme, the tubularized incised plate (TIP) repair has become the most popular technique in many institutions [1–4]. Snodgrass [5], in his initial description, used a silicon catheter as a stent for 10 days. Significant morbidity has been associated with urethral stents, including infection, bladder spasm and migration. Furthermore, indwelling catheters require special care to avoid accidental forcible slippage or inadvertent pressure on the neourethra. In contrast, hypospadias repair with no bladder drainage is associated with total ambulation and a short hospital stay. Nevertheless, a stent-free repair may compromise the comfort and increase the incidence of urinary retention after surgery [6].

Disagreement on the need for urethral stents in hypospadias repair remains and their use continues to be dictated according to the surgeon's preference [7,8]. Steckler and Zaontz [3] reported excellent results with a stent-free TIP repair in children who were not toilet-trained, with no unusual prolonged discomfort. The role of the stent has not been evaluated in toilet-trained children. In the present prospective randomized study, the role of the stent in TIP repair was evaluated in toilet-trained children.

PATIENTS AND METHODS

The study included all toilet-trained children with distal penile shaft hypospadias who were unsuitable candidates for meatal advancement procedures and who underwent a TIP repair between March and August 2001 by one surgeon. The surgical technique was similar to that described previously [5]. In all repairs, urethroplasty used interrupted 7/0 polyglactin sutures in two layers; a dartos fascia from the dorsal prepuce was used to cover the neourethra.

Patients were randomized at the end of surgery into two groups, stented (35 children) and unstented (29 children). In the stented group a soft plastic urethral catheter of a suitable size was passed into the bladder and secured to the glans traction suture for 1 week. The catheter was connected to a collecting urinary bag. In the unstented group the bladder was emptied and the catheter removed at the end of the surgical procedure, and the patients allowed to void spontaneously.

An adjunctive penile block with 0.25% bupivacaine instead of caudal or epidural analgesia was used in all patients, to avoid

drug-induced urinary retention. Rectal acetaminophen was given for postoperative analgesia.

The early evaluation included observation for bleeding, infection, bladder spasm and stent migration or accidental forcible slippage, painful voiding, urinary retention and extravasation. Patients were then examined weekly in the first month, then monthly in the first 3 months, and when necessary thereafter. Regular meatal dilatation weekly for 2–3 months was provided only to patients with voiding difficulty and who had an obvious tendency to stenosis and a narrow stream on visual observation. A local anaesthetic gel containing lidocaine hydrochloride was applied and the meatus gently dilated with a suitably sized Nelaton catheter.

At 3 months of follow-up the urinary stream was assessed by observing the patient during voiding, the site and the shape of the meatus were determined, and the neourethral calibre was measured using a well-lubricated plastic catheter. The presence of complications requiring re-operation was recorded. Fisher's exact test (two-tail) was used to compare categorical data, with $P < 0.05$ considered to indicate statistical significance.

RESULTS

The median (range) age of the patients was 6 (2–17) years; the postoperative complications in both groups are given in Table 1. The bladder spasms occurred in the first 2 days after surgery and completely disappeared with oxybutynin. None of the stented patients developed urinary retention or extravasation, but the unstented group had both, the differences being significant. Patients with urinary retention or extravasation were managed by urethral catheterization, with no anaesthesia, for 2–7 days, and no cystostomy was required. Urinary retention was defined as a full bladder on physical examination associated with pain. Urinary retention was diagnosed the night after surgery in one patient and on the first day in the remaining six. Urinary extravasation was noted on the first day in one patient, on the second in two and on the third in two. No retention or extravasation was diagnosed after the third day.

The tendency to meatal stenosis with a subsequent requirement for meatal dilation was lower in the stented (6%) than in the unstented group (17%), but the difference was not significant.

Complications, n (%)	Stented (35)	Unstented (29)	P
Early			
dysuria	5 (14)	13 (45)	< 0.01
bladder spasms	3 (8)	–	> 0.24
urinary retention	–	7 (24)	< 0.001
urinary extravasation	–	5 (17)	< 0.01
required meatal dilatation	2 (6)	5 (17)	> 0.22
Late			
meatal stenosis*	1 (3)	1 (3)	1.00
fistula*	2 (6)	5 (17)	> 0.22

TABLE 1
Complications after surgery in the stented and unstented groups

**Require re-operation; one patient may have had more than one complication.*

The median (range) follow-up was equal in both groups, at 6 (3–9) months. Complications requiring re-operation occurred in nine patients (14%), of whom seven (10%) developed small fistulae and two (4%) had meatal stenosis. The fistula was repaired successfully in three boys and four are awaiting surgery. The two patients with meatal stenosis underwent ventral meatotomy under local anaesthesia with lidocaine and prilocaine cream. Although the re-operation rate was lower in the stented (9%) than in the unstented group (20%), the difference was not significant ($P > 0.05$). Of the 11 patients who required urethral catheterization, five developed a fistula; the correlation between fistula formation and urethral manipulation was statistically significant ($P < 0.001$).

DISCUSSION

Rabinowitz [9] used an unstented Mathieu hypospadias repair in 59 boys, achieving excellent cosmetic and functional results with few complications. Buson *et al.* [8] evaluated the surgical outcome of stented and unstented Mathieu hypospadias repair in 102 patients; overall, of 65 patients in whom a stent was used, three (4.6%) had complications, in contrast to a complication rate of 18.9% in the unstented group, a statistically significant difference. Hakim *et al.* [7], in a multicentre study, reported excellent results in 97% of 336 hypospadias patients repaired with the Mathieu technique; the results were unaffected by urethral catheterization. Minevich *et al.* [10] reported a single-institution experience of 201 stented Mathieu hypospadias repairs; the total re-operation rate was minimal (1.5%) and compared favourably with unstented repairs. The authors thought that urethral stenting decreased the risk of fistula formation while adding only minimal morbidity. Controversy remains about the indications for urethral stents in hypospadias repair.

The present results indicate that, although distal hypospadias can be repaired with no stent in toilet-trained children, the complication rate is lower when a stent is left indwelling for 1 week. The overall re-operation rate (14%) was higher than that in other published series of TIP repair, but this partly explained by the high (20%) re-operation rate in the unstented group.

Early complications were significantly more common in unstented patients. The only catheter-related discomfort in the series was bladder spasms, in three patients in the stented group (8%). Because of the low incidence of bladder spasms in the series, oxybutynin therapy is not recommended routinely for all stented patients. There were no infections, migration or forcible catheter slippage. In contrast, nearly half of the unstented patients developed dysuria and catheterization was required in 38% of children because of retention and/or extravasation. Catheterization was possible in these patients and cystostomy was not required. This could be attributed to good lubrication and the graduated depth of the central relaxing incision, being shallower proximally, thus preventing the creation of a false passage by the catheter. Steckler *et al.* [3] evaluated the unstented TIP repair in babies (not toilet-trained); catheterization was not used and was not necessary. The lack of a stent was not associated with any urinary retention. In contrast, there was a high incidence of urinary retention in the present toilet-trained children; possibly, toilet-trained

children respond to painful voiding by withholding voiding, and this contributes to developing urinary retention. Buson *et al.* [8] reported an 19% retention rate in unstented Mathieu repairs in a series of patients with a median age of 17 months. In that series patients who developed urinary retention were older than those with no retention.

Although late complications in the unstented group were twice as common as in the stented group (20% vs 9%) the difference was not significant, probably attributable to their being few patients in the series. Nevertheless, the use of the stent in TIP repair in toilet-trained children significantly eliminated the risk of urinary retention, extravasation and subsequent urethral manipulation. The last has been regarded as a potential cause of fistula [8]. In the present study there was a significant correlation between urethral manipulation for urinary retention and/or extravasation, and fistula formation. Of the 11 patients who required urethral catheterization five developed a fistula.

The overall incidence of discomfort, including bladder spasms, dysuria, retention, extravasation and requirement for meatal dilatation, were significantly lower in the stented than in unstented patients ($P < 0.001$). The TIP repair in toilet-trained children should be routinely stented, but the duration remains to be determined. As there was no retention and/or extravasation beyond the third day after surgery, another randomized study is now being conducted to evaluate a short-term (3 days) vs long-term (1 week) stenting.

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Abbreviation; **TIP**, tubularized incised plate.