Stented versus non Stented Tubularized Incised Plate Urethroplasty

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Background/Purpose: In the standard tubularized incised plate (TIP) urethroplasty an indwelling catheter is left in place for few days to drain the bladder and to act as a scaffold for urothelial healing. Because the urethral catheter is usually associated with increased patient’s discomfort and liable to various complications such as obstruction, migration and infection, a stent free technique was tried. However, good results were achieved with this technique in patients before toilet training but it was unsuccessful in toilet-trained children due to excessive pain and urinary retention. This study was carried out to compare the results of the TIP urethroplasty for toilet-trained children with the use of the urethral catheter versus the stent free technique with addition of suprapubic diversion.

Materials & Methods: Between March 2004 and July 2006, 142 children with distal or mid-penile hypospadias were randomised to have TIP urethroplasty with either a urethral catheter (first group) or a suprapubic diversion (second group). The age of these patients ranged from 2.5 – 9.2 years. The first group included 64 patients while the second group included 78 children. The operative technique was similar in both groups. A dartos flap was used to cover the ventral surface of the neourethra. The urethral catheter was kept for 5–6 days while the suprapubic one was removed after 7–10 days. The median follow up period for these patients was 6 months.

Results: All children were discharged on postoperative day one or two with no major immediate post-operative complications. The most common complications that were reported later included urethrocutaneous fistula, mental stenosis and complete wound disruption. These complications were recorded in 6.3%, 5.1% and 4.7% respectively of cases in the first group and in 2.6%, 1.1% and 0% respectively of cases in the non stented second group. No significant difference was detected between the two groups regarding each individual complication (p>0.05 for each complication). However, the total number for re-operations that required to manage these complications was significantly higher in the stented group (p=0.04).

Conclusion: In the toilet-trained children the stent free TIP urethroplasty can be applied safely and it is associated with increased success rate but a suprapubic diversion should be added.

Index Word: hypospadias, urethral stent, tubularized incised plate

INTRODUCTION

After the initial description of the tubularized incised plate TIP urethroplasty in 1994, it became the procedure of choice for distal hypospadias repair, then it gained popularity for the management of more proximal defects and for redo operations.3,4 In most of the reported series, an indwelling catheter is left for a few days after this operation to drain the bladder and to give the chance for good urothelial healing. However, in an experimental study in a rabbit model the normal urothelial healing was achieved without any urethral stenting after the TIP urethroplasty.4 Moreover, the presence of the urethral catheter is usually associated with bladder spasm and increased patient’s...
discomfort and it is also liable to migration and obstruction. Therefore, the stent free technique was introduced and it was successful in children before toilet training. On the other hand, when it was applied to the toilet-trained children the complications and re-operation rates were significantly raised.

The present study was designed as a prospective randomised trial to compare the results of stented versus non stented TIP urethroplasty for the toilet-trained children with the addition of a suprapubic cystostomy to the unstented group to divert the urine away from the suture line.

PATIENTS AND METHODS

Between March 2004 and July 2006, we recruited 142 boys with distal and mid-penile hypospadias to have TIP urethroplasty. All these patients were toilet-trained and not operated before. Recurrent cases or those with more proximal defects were excluded from this study. The procedure was explained to the parents and an informed consent was obtained.

The operation was performed under general anaesthesia with caudal analgesia to decrease the post-operative pain. All patients underwent the standard TIP urethroplasty around a 6 or 8 Fr Nelaton’s urethral catheter. Thereafter, a longitudinal dartos flap was dissected from the under-surface of the prepuce and the dorsal skin. This flap was rotated with its intact blood supply to be applied over the whole ventral suture line and it was kept in place by 6/0 interrupted polyglactin sutures. Lastly, the excess skin was removed and the wound was closed. At this point, the patients were divided randomly by the sealed envelope method into two groups. In the first group, the urethral catheter was left indwelling and anchored to the glans by 4/0 silk suture and a light dressing was applied (stented group). Whereas, in the second group, the catheter was removed and the penis was dressed as in the first group. A 10 or 12 Fr suprapubic catheter was inserted in the urinary bladder via the cystocath (non stented group). All patients were discharged at postoperative day one or two and the urethral catheter was removed after 5-6 days while the suprapubic one was removed after 7-10 days. All boys were scheduled for out-patient assessment at 2 weeks, one month, 3 months and 6 months post-operatively. Patients with post-operative complications had a longer period of follow up.

Statistical Analysis: Comparisons between the two groups were made with Student’s t test, Chi-Square test, or Fisher’s exact test and p < 0.05 was considered to be significant. These tests were performed by using SPSS for Windows, version 10.0.

RESULTS

This study was carried out on 142 patients with 64 patients in the stented group and 78 children in the non stented group. The age of these boys ranged from 2.5–9.2 years. Patient characteristics are demonstrated in table 1. The two groups were comparable with no significant difference between them regarding the age or the site of the external urinary meatus.

The procedure was easily applied with no major inra-operative complications. The median follow up period of these cases was 6 months (range 3-12 months). In the early post-operative period, small urethrocutaneous fistulae were observed in 4 patients of the stented group (6.3%) and in two patients in the non-stented group (2.6%), this difference was found to be statistically non significant (p > 0.05) (table2). All of these fistulae were surgically repaired successfully later on. In addition, wound infection with complete disruption of the repair developed in 3 cases (4.7%) of the stented group, this complication was not reported in the non stented group, this difference was also statistically non significant (p > 0.05) (table2). On the other hand, we have lost 12 patients during the late follow up (6 months or more) of both groups, 7 of them were in the non-stented group. During the 6 months’ follow up of the available 130 patients, meatal stenosis was observed in 3 cases (4.7%) of the stented group (3/59) and in one patient only (1.1%) of the non-stented group (1/71). Again, this difference was also statistically non significant (p > 0.05). However, none of these cases developed urethrocutaneous fistula and all of them showed good response to regular meatal dilatation in the out-patient clinic except one case in the stented group, who underwent meatoplasty after failure of the meatal dilatation.

The total number of re-operations that were required to correct the previous complications was significantly higher (P=0.04) in the stented group (8/59, 13.6%) (4 cases of urethrocutaneous fistula, 3 cases of re-do operations for cases with complete wound disruption and one case of meatoplasty) when compared to the non-stented group (2/71, 2.8%) (2 urethrocutaneous fistula).
Table 1 Patients' data

<table>
<thead>
<tr>
<th></th>
<th>Stented Group (64 patients)</th>
<th>Non-stented Group (78 patients)</th>
<th>Significance (p)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range (years)</td>
<td>2.7 – 9.2</td>
<td>2.5 – 8.6</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD (years)</td>
<td>4 ± 1.2</td>
<td>3.8 ± 1.2</td>
<td>P=0.33 (t test)</td>
</tr>
<tr>
<td><strong>Site:</strong></td>
<td></td>
<td></td>
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<tr>
<td>Distal penile</td>
<td>50 (67.9%)</td>
<td>53 (78.1%)</td>
<td>P=0.19</td>
</tr>
<tr>
<td>Mid penile</td>
<td>14 (32.1%)</td>
<td>25 (21.9%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>64 (100%)</td>
<td>78 (100%)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 Postoperative complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Stented Group</th>
<th>Non-stented Group</th>
<th>Significance (P)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urethrocutaneous Fistula</td>
<td>4/64 (6.3%)</td>
<td>2/78 (2.6%)</td>
<td>P=0.41</td>
</tr>
<tr>
<td>Complete Disruption</td>
<td>3/64 (4.7%)</td>
<td>0/78 (0%)</td>
<td>P=0.09</td>
</tr>
<tr>
<td>Meatal Stenosis</td>
<td>3/59 (5.1%)</td>
<td>1/71 (1.1%)</td>
<td>P=0.33</td>
</tr>
<tr>
<td>Re-operation</td>
<td>8/59 (13.6%)</td>
<td>2/71 (2.8%)</td>
<td>P=0.04*</td>
</tr>
</tbody>
</table>

*Fisher's exact test

DISCUSSION

The most common complications of the TIP urethroplasty are urethrocutaneous fistula, meatal stenosis and/or complete wound disruption with failure of the procedure. In the previous studies the reported incidence of the urethrocutaneous fistula after this operation ranged from 5 - 9%, 8-12 this was significantly dropped to 0 - 1.8% when dartos flap was used to cover the ventral surface of the neourethra.13,14 These results are comparable to ours as the fistula rate was 6.3% in the stented group and 2.6% in the unstented one.

Many authors reported an incidence of meatal stenosis ranging from 0-5% 8-13,15 after the TIP operation and this is also in agreement with our results (5.1% in the first group and 1.1% in the second one), the complete disruption of the wound was detected in 4.7% of our cases in the stented group but in no cases of the unstented boys and it was attributed to extensive wound infection and mechanical pressure on the suture line by the urethral catheter. However, this complication is usually considered as an uncommon event after this operation but it was reported also in 3 % of cases in a study by Elsherbiney et al 12 and in 2% of cases after re-do operations. In addition, in a multi-centre study by Snodgrass et al partial glans dehiscence was reported in 1.4% of cases with distal hypospadias. 10

In the present study, we have shown that the incidence of each of these complications was raised in association with the urethral catheter but our statistical analysis revealed that this difference is not a significant one with regard to each individual complication (p>0.05). However, this should be taken with caution, as these complications already developed in low incidences with a small difference between the two groups, so we need a more population number to prove or disprove the statistical significance.

In the current study, we have also demonstrated that the re-operation rate (the total number of re-operations that required to correct the previous complications) was significantly reduced in the un-stented group (p=0.04). We have used this parameter rather than the total number of
complications to exclude mild cases of meatal stenosis that were amenable to simple dilation. Therefore, the absence of the urethral catheter seems to be more beneficial for the patients as most of these cases had not been exposed to another surgery with its inherent risks. This privilege can be attributed to the absence of many factors that could contribute to the previous post-operative complications. These include, catheter-associated infection, the mechanical pressure of the catheter over the suture line with its ischaemic effect and the possibility of its obstruction in the early phases of wound healing with the bad consequences of wound soiling. In addition, the presence of the urinary diversion via the suprapubic catheter has kept the urine away from the suture line during the initial healing process and eliminated the risk of urinary retention that was observed in other studies. In a study by El-Sherbiny et al, a 24% of toilet trained children developed urinary retention after the unstented technique. Meanwhile, in another study by Leclair et al this incidence was 2.5% but 89% of their patients were less than 2 years and the age of children with this complication ranged from 9 – 27 months. Conversely, in two studies by Samuel et al. and Stecker & Zaontz no cases of urinary retention were reported after unstented TIP urethroplasty in children before toilet training. Therefore, it was supposed that the absence of the voluntary control with automatic bladder activity in young children helps to markedly reduce the risk post-operative urinary retention in this group of patients.

CONCLUSION

We can conclude that the absence of the urethral catheter after the TIP urethroplasty seems to be more beneficial for the patient and increase the success rate of this operation. In addition, the use of the suprapubic catheter can be easily justified in the toilet-trained children but more studies are needed to recommend its routine use for patients in diaper.

REFERENCES