OUTCOMES IN DISTAL HYPOSPADIAS

Bălănescu R.N.1, 2, Niculescu Laura1, Bălănescu Laura1, 2, Moga Andreea1

1 “Grigore Alexandrescu” Clinical Emergency Hospital for Children
2 “Carol Davila” University of Medicine and Pharmacy, Bucharest, Romania

Abstract. Hypospadias is one of the most common congenital malformations of the external male genitalia, in which the urethra opens ventrally, anywhere from the glans to the perineum, the penis has an incompletely formed prepuce and may exhibit ventral curvature. Many surgical techniques for the reconstruction of this defect have been devised, each one having a different success rate. The aim of our study is to determine the complication rates and predictive factors for Mathieu and tubularized incised plate (TIP) techniques used in the repair of distal hypospadias. We assessed 62 patients diagnosed with distal hypospadias that were subjected to surgical correction by using either Mathieu or TIP urethroplasty during January 2011 and December 2012 in our clinic. The patients were divided into two groups according to the surgical technique which was performed. Urethroplasty complications, defined as fistula, urethral stricture and dehiscence, were statistically analyzed. There were 23 patients operated using the Mathieu technique and 39 patients using TIP repair. Mean age of presentation was 14 months for the Mathieu group and 20 months for the TIP groups. The urethral complication rate was slightly lower for the Mathieu group than in those cases solved by using the TIP technique (17.39% vs. 23.07%). There was just one case who presented with postoperative fistula in a patient belonging to the Mathieu group, while 5 patients operated with the TIP technique presented urethral stricture. No such cases were reported in the Mathieu group. Dehiscence was present in both groups (13.04% in the Mathieu group vs. 10.25% in the TIP group). We conclude that both techniques are acceptable and effective for the treatment of distal hypospadias, with complication rates being similar in the two groups.

Keywords: Mathieu, complications, Snodgrass

Introduction

Hypospadias is one of the most common congenital malformations of the external male genitalia, in which the urethra opens ventrally, anywhere from the glans to the perineum, the penis has an incompletely formed prepuce and may exhibit ventral curvature (Figure 1). The overall incidence of hypospadias is between 0.3% to 0.6%, with a higher risk in families where this anomaly has already occurred. Many surgical techniques for the reconstruction of this defect have been devised, each one having a different success rate. The correction of this malformation includes straightening of the penis, urethroplasty, glanduloplasty and ultimately circumcision, with the main goal of surgery being that of obtaining a functionally and cosmetically normal penis. Current literature is dominated by two techniques and attempts to improve them: the tubularized incised plate (TIP) and the modified Mathieu technique.

Laura Niculescu
30-32 Iancu de Hunedoara Blvd., sector 1, Bucharest e-mail: lauraniculescu@yahoo.com
flap sutured over the urethral plate. The primary complications of this method are also urethral fistula and stenosis [3] as well as a round and flattened urethral meatus [4]. These two techniques have been often compared [3, 5, 6, 7] in order to establish the superiority or the specific indication of one of them, the results so far having been ambiguous. (Figure 3)

This study proposes a comparison of the two techniques by assessing the patients with distal hypospadias operated between January 2011 and December 2012 in the Pediatric Surgical Department of the “Grigore Alexandrescu” Emergency Children’s Hospital in Bucharest, Romania.

Materials and Methods

A number of 62 patients diagnosed with distal hypospadias (coronal, subcoronal or distal penile) admitted to the Pediatric Surgical Department of the “Grigore Alexandrescu” Emergency Clinical Hospital for Children over a one year period were enrolled in our study, with data being collected from the clinical and operative records.

The admissions that did not end with surgery during hospitalization or surgical correction other than those two studied methods (TIP- Snodgrass and Mathieu) and proximal forms hypospadias were excluded from the study.

In the statistical analysis we included only the patients without history of prior surgery for hypospadias at the time of entry in the study. For the TIP - Snodgrass technique group we selected only the patients operated on from January to December 2011 in order to obtain two comparable groups. Our study’s limitation was the fact that the operations were not performed by the same surgeon.

According to the operative records, the TIP – Snodgrass urethroplasty was performed in one layer with separate or continuous suture on a probe that was maintained postoperatively for an average duration of 8 days. In 50% of cases the neourethra was covered with dartos. The modified Mathieu urethroplasty was done on a urinary catheter that was maintained postoperatively only for a two days average period. The covering of the neourethra with dartos was used in 75% of cases.

Urethral complications of the two surgical methods were defined as the need for surgical repair of urethral fistula, urethral stenosis or partial/total dehiscence of the urethra. Patient follow-up was for a minimum period of six months after the last intervention; in this respect we included in the statistical analysis the redos from January to July 2013 for the patients enrolled in the study.

Statistical analysis was performed using MedCalc software (version 8.0.0.1, MedCalc Software, Ostend, Belgium). The data collection followed the national legislation concerning the processing of personal data (Law 677/2001 updated in 2013).

Results

The study group included 62 patients of whom 23 patients were operated by using the modified Mathieu technique (Group 1) and 39 were treated using TIP - Snodgrass technique (Group 2). The age and the distribution of the clinical forms are shown in Table I.

<table>
<thead>
<tr>
<th></th>
<th>Mathieu</th>
<th>TIP - Snodgrass</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients</td>
<td>23</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>Age at the operation</td>
<td>14 (6, 43)</td>
<td>20 (13, 38)</td>
<td>0.7</td>
</tr>
<tr>
<td>Hypospadias type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subcoronal</td>
<td>0 (0%)</td>
<td>3 (7.69%)</td>
<td>0.45</td>
</tr>
<tr>
<td>Coronal</td>
<td>15 (65.21%)</td>
<td>18 (46.15%)</td>
<td>0.23</td>
</tr>
<tr>
<td>Penile</td>
<td>8 (34.78%)</td>
<td>18 (46.15%)</td>
<td>0.53</td>
</tr>
<tr>
<td>Stenting time</td>
<td>1 (1,2)</td>
<td>8 (7, 9.75)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Age is presented in month as median (percentile 25, 75).

Stenting time is presented in days as median (percentile 25, 75).

Table I. Characteristics of patients

Age ranged from 6 to 43 months in Group 1 and from 13 to 38 months in Group 2. The two groups showed no statistically significant differences in terms of age at the time of the intervention (p = 0.7). Subcoronal hypospadias prevailed in the group of patients operated by using the modified Mathieu technique, while in the TIP Group there was an equal number of cases with subcoronal and penile hypospadias (46.15%). 8 patients (34.78 %) in the Mathieu group and only 1 patient in group Snodgrass were not stented in the postoperative period (p<0.001).

There were 4 patients (17.39 %) in the Mathieu group with postoperative complications that required surgical reintervention, including one patient with urethral fistula (4.34 %). In the Snodgrass group postoperative complications were found in 9 patients (23.07 %) with
a number of 5 cases (12.82 %) with urethral stenosis that required dilatations. The other postoperative complications recorded was total or partial dehiscence that required redo urethroplasty in 3 patients(13.04 %) in the Mathieu group and 4 patients (10.25 %) in the Snodgrass group (Figure 4).

Fig. 4. Postoperative complications

In order to determine the prognostic factors for complications requiring reoperation we performed a logistic regression on the two groups of patients in which the dependent variable was the presence/absence of redo and independent variables (predictors) were age at the time of the operation, surgical technique (modified Mathieu and Snodgrass) and hypospadias type. None of the above-mentioned parameters did significantly correlate with the prognosis (Table II).

Tabel II. The influence of age, hypospadias type and technique on prognosis

<table>
<thead>
<tr>
<th></th>
<th>coefficient</th>
<th>OR</th>
<th>CI OR</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.007</td>
<td>1.007</td>
<td>0.99-1.02</td>
<td>0.35</td>
</tr>
<tr>
<td>Hypospadias type</td>
<td>0.68</td>
<td>1.97</td>
<td>0.63-6.1</td>
<td>0.24</td>
</tr>
<tr>
<td>Surgical technique</td>
<td>-0.39</td>
<td>0.67</td>
<td>0.17-2.62</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Dependent variable presence/absence of urethral complications (0=without redo; 1=redo)
Age = continuous variable
Hypospadias type: coronal=0, subcoronal=1, penile=2
Surgical technique: TIP-Snodgrass=1, Mathieu=2

Discussions

The aim of this study is to evaluate the results obtained by using the modified Mathieu and the TIP-Snodgrass techniques in the repair of distal hypospadias of patients admitted to the Pediatric Surgical Department of the "Grigore Alexandrescu" Emergency Hospital for Children, Bucharest, Romania. We enrolled 39 patients in the TIP-Snodgrass group and 23 patients in the Mathieu group, both groups being comparable to the data published in literature [3, 4, 5, 7].

Patients included in the study were operated on by several pediatric surgeons, this representing a limit of our study due to the lack of uniformity of technique practiced but at the same time an advantage since it provides an overview of the results.

Optimal age for correction of this malformation is still a controversial topic, with the European Society of Pediatric Urology recommending the correction of hypospadias at 6-18 (24) months [10]. According to the American Association of Pediatrics that age is optimal for surgery from the point of view of emotional development, separation of parent - child is minimal and shortens the period in which the child "bears" the malformation, thus less affecting his self-perception. The postoperative behavioral problems such as aggressive or regressive attitude, night terror or anxiety appear particularly at the age of 1-3 years [9]. Studies on the influence of age on the operative success exhibit different results, with works arguing that postoperative results are better in children aged 1 than in 5 year olds [11] or in young children compared to adolescents [12], while other studies show that age does not influence prognosis[13]. Analyzing age of patients included in our study, this was not statistically significantly when associated with prognosis (p >0.35).

Looking for the success rate of hypospadias repair in our study, by assessing the need for redo because of urethral complications, we recorded results comparable to those published in literature. In the Mathieu group overall complication rate was 17.39 %, while in the TIP - Snodgrass group the complication rate was 23.07%. A meta-analysis published in 2013 that included 12 studies similar to ours on 690 patients showed an overall urethral complication of 16-17 % for Mathieu technique and 20-21% for TIP - Snodgrass technique [3].Urethral fistula was low for both techniques, 4.34% for Mathieu group and zero for the Snodgrass group, when compared to other studies that recorded similar complications in 10% of patients operated with the modified Mathieu technique [7] and 11.5 % [3] of the patients operated by using the TIP procedure. Postoperative urethral stenosis was recorded only in the TIP - Snodgrass group with a frequency of 12.82 %, a number which was higher than those published in other series[8]. The rate of partial or complete urethral dehiscence that ended with redo urethroplasty was high in both groups, this aspect requiring to be deepened to discover and correct the factors which led to these results.

We performed a logistic regression in order to identify potential predictor factors for the occurrence of complications. The chosen independent parameters (location of the meatus, surgical technique Mathieu versus TIP) did not correlate significantly with the outcome, an aspect which was confirmed by a meta-analysis results [3, 6] but are still disputed in recent individual studies[8].

Conclusions

Success rate of hypospadias repair in the Pediatric Surgical Department of the "Grigore Alexandrescu" Emergency Hospital for Children is comparable to those published in the international literature, with the particularity of a low rate of urethral fistulas but a higher percentage of postoperative dehiscence. Age and hypospadias type (coronal, subcoronal or penile) do not significantly influence the postoperative outcome. Both surgical techniques (modified Mathieu and TIP - Snodgrass) are effective and have similar rates of complications recorded was total or partial dehiscence that required redo urethroplasty in 3 patients(13.04 %) in the Mathieu group and 4 patients (10.25 %) in the Snodgrass group (Figure 4).

Fig. 4. Postoperative complications

In order to determine the prognostic factors for complications requiring reoperation we performed a logistic regression on the two groups of patients in which the dependent variable was the presence/absence of redo and independent variables (predictors) were age at the time of the operation, surgical technique (modified Mathieu and Snodgrass) and hypospadias type. None of the above-mentioned parameters did significantly correlate with the prognosis (Table II).

Tabel II. The influence of age, hypospadias type and technique on prognosis

<table>
<thead>
<tr>
<th></th>
<th>coefficient</th>
<th>OR</th>
<th>CI OR</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>0.007</td>
<td>1.007</td>
<td>0.99-1.02</td>
<td>0.35</td>
</tr>
<tr>
<td>Hypospadias type</td>
<td>0.68</td>
<td>1.97</td>
<td>0.63-6.1</td>
<td>0.24</td>
</tr>
<tr>
<td>Surgical technique</td>
<td>-0.39</td>
<td>0.67</td>
<td>0.17-2.62</td>
<td>0.56</td>
</tr>
</tbody>
</table>

Dependent variable presence/absence of urethral complications (0=without redo; 1=redo)
Age = continuous variable
Hypospadias type: coronal=0, subcoronal=1, penile=2
Surgical technique: TIP-Snodgrass=1, Mathieu=2

The aim of this study is to evaluate the results obtained by using the modified Mathieu and the TIP-Snodgrass techniques in the repair of distal hypospadias of patients admitted to the Pediatric Surgical Department of the "Grigore Alexandrescu" Emergency Hospital for Children, Bucharest, Romania. We enrolled 39 patients in the TIP-Snodgrass group and 23 patients in the Mathieu group, both groups being comparable to the data published in literature [3, 4, 5, 7].

Patients included in the study were operated on by several pediatric surgeons, this representing a limit of our study due to the lack of uniformity of technique practiced but at the same time an advantage since it provides an overview of the results.

Optimal age for correction of this malformation is still a controversial topic, with the European Society of Pediatric Urology recommending the correction of hypospadias at 6-18 (24) months [10]. According to the American Association of Pediatrics that age is optimal for surgery from the point of view of emotional development, separation of parent - child is minimal and shortens the period in which the child "bears" the malformation, thus less affecting his self-perception. The postoperative behavioral problems such as aggressive or regressive attitude, night terror or anxiety appear particularly at the age of 1-3 years [9]. Studies on the influence of age on the operative success exhibit different results, with works arguing that postoperative results are better in children aged 1 than in 5 year olds [11] or in young children compared to adolescents [12], while other studies show that age does not influence prognosis[13]. Analyzing age of patients included in our study, this was not statistically significantly when associated with prognosis (p >0.35).

Looking for the success rate of hypospadias repair in our study, by assessing the need for redo because of urethral complications, we recorded results comparable to those published in literature. In the Mathieu group overall complication rate was 17.39 %, while in the TIP - Snodgrass group the complication rate was 23.07%. A meta-analysis published in 2013 that included 12 studies similar to ours on 690 patients showed an overall urethral complication of 16-17 % for Mathieu technique and 20-21% for TIP - Snodgrass technique [3].Urethral fistula was low for both techniques, 4.34% for Mathieu group and zero for the Snodgrass group, when compared to other studies that recorded similar complications in 10% of patients operated with the modified Mathieu technique [7] and 11.5 % [3] of the patients operated by using the TIP procedure. Postoperative urethral stenosis was recorded only in the TIP - Snodgrass group with a frequency of 12.82 %, a number which was higher than those published in other series[8]. The rate of partial or complete urethral dehiscence that ended with redo urethroplasty was high in both groups, this aspect requiring to be deepened to discover and correct the factors which led to these results.

We performed a logistic regression in order to identify potential predictor factors for the occurrence of complications. The chosen independent parameters (location of the meatus, surgical technique Mathieu versus TIP) did not correlate significantly with the outcome, an aspect which was confirmed by a meta-analysis results [3, 6] but are still disputed in recent individual studies[8].

Conclusions

Success rate of hypospadias repair in the Pediatric Surgical Department of the "Grigore Alexandrescu" Emergency Hospital for Children is comparable to those published in the international literature, with the particularity of a low rate of urethral fistulas but a higher percentage of postoperative dehiscence. Age and hypospadias type (coronal, subcoronal or penile) do not significantly influence the postoperative outcome. Both surgical techniques (modified Mathieu and TIP - Snodgrass) are effective and have similar rates of postoperative complications.

ACKNOWLEDGEMENT: This paper is supported by the Sectoral Operational Programme Human Resources Development (SOP HRD) 2007-2013, financed from the European Social Fund and by the Romanian Government under the contract number POSDRU/107/1.5/S/82839".
References


