ORIGINAL ARTICLE

Hypospadias Repair in Ethiopia: A Five Year Review

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ABSTRACT

BACKGROUND: Hypospadias repair is one of the problematic issues in pediatric surgery. As a result of the multiple complications following the procedure, a variety of techniques have been used and newer methods continue to emerge. There is still controversy regarding the best method of repair. We aimed to determine the outcome of surgery and factors contributing to unfavorable outcomes in children with hypospadias.
MATERIALS AND METHODS: This is a retrospective review undertaken from September 2009 to August 2014. The research was conducted at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. All children who underwent hypospadias repair and had regular follow-up were included in the study.
RESULTS: A total of 202 boys aged less than 13 years were assessed. Most surgeries (80.3%) were performed in children older than 18 months. Transverse incised plate urethroplasty (TIP) was frequently performed for distal hypospadias (71.2 %), while transverse ventral preputal flap (TVPF) was the most common procedure done for proximal hypospadias (62.8 %). Overall success rate for first surgery was 55.9 %. There was a high rate of major post-operative complications (44.1%) of which urethrocutaneous fistula (UCF) was the most common (31.2%) followed by meatal stenosis and glans breakdown (7.4 % each). These complications were found to be higher in those who were operated at a later age and those with proximal hypospadias (p=0.03 and p=0.01 respectively). There was also a significant difference among the type of procedures with TIP and TVPF having the least complications (p<0.01).
CONCLUSION: From our experience, we found TIP a relatively safe and reliable method of repair for distal hypospadias while TVPF single stage repair was superior in the proximal ones. The high rate of complications in our institution was associated with higher burden of severe hypospadias and older age at surgery.
KEYWORDS: Penis, urethra, hypospadias, repair, Ethiopia

INTRODUCTION

Hypospadias is one of the most common congenital anomalies standing second among common human birth defect in some studies (1,2). It occurs 1 out of 250-300 male live births (3). The main reason of hypospadias repair is to enable urination in standing position, have a good cosmetic appearance and an effective insemination (4,5). Since there are multiple complications after hypospadias repair, more than 300 procedures were attempted and newer methods continue to evolve.There is no one standard procedure for all hypospadias repair. Over the past 2-3 decades, the surgery is refined. It now has a decreased risk of complications and stage of operations (1,4).

Currently, international trends are favoring one stage procedures for distal hypospadias. These procedures include transverse incised plate urethroplasty (TIP), mathiew's repair and onlay island flap, out of which TIP is the most accepted because of its low complication rate. However, for proximal hypospadias, there are still two groups. One group prefers one-staged procedures like transverse ventral preputal flap (TVPF) while others prefer two staged procedures (6,7).

The outcome of the procedure is judged by their early complications and short-term functionality (8). Common complications after hypospadias repair include urethrocutaneous fistula (UCF), meatal stenosis, failed glanuloplasty, failed urethroplasty, urethral strictures, infection and others less common ones.(9)

Multiple factors affect the outcome of hypospadias repair, including the site of the meatus, severity of chordee, adequacy of dorsal preputal skin and genital anomalies. Other factors are age of the patient and experience of the surgeon (10,11). Technical factors like type of surgery, use of second layer, duration of antibiotics and duration of stent are also important (2,12).

There has been only one study done regarding this issue in Ethiopia. Mekonen H. tried to evaluate the applicability of TIP repair for different types of hypospadias (13). In this study, we aimed to determine the outcome of hypospadias repair in our institution and to identify the effects of factors on postoperative complications.

PATIENTS AND METHODS

This is a retrospective, cross sectional study conducted on patients who underwent hypospadias repair from September 2009 to August 2014. The study was conducted at Tikur Anbesa Specialized Hospital, which is the biggest tertiary hospital and had the only pediatric surgery unit in the country during the study period.

Seven types of hypospadias repair were done at our hospital based on different factors like the site of hypospadias, the chordee, size of the penis, preputal skin presence, preference of the surgeon. In all patients, 6/0 or 5/0 PDS or polyglycolate sutures were used for the repair and all had stenting of the urethroplasty with NG tube without suprapubic diversion.

Patients who underwent primary surgery (no previous attempts at hypospadias repair) with a complete medical record and a regular follow-up were included in our study. Data was collected using predesigned questionnaire. The variables included were socio-demographic, type of hypospadias, type of the surgery and its outcome. Data entry and analysis was performed with SPSS version 23, and we used p-value <0.05 for statistical significance.

RESULTS

Of 246 patients who were operated on for hypospadias in the specified time, 202 were included in the study. Eighty percent of our patients were operated on after the age of 18 months. Many children came referred from outside of Addis Ababa (41.6%). The boys outside of Addis Ababa presented at a later age (41% after the age of 5 years) than those in Addis Ababa (22% after age of 5 years) (p=0.003). Mean follow-up time was 11.9 ± 11.9 months.

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Anterior hypospadias was the most common type (52%) followed by posterior (31.7%) and middle (16.3%) (Table1).

Table 1: Type of Hypospadias

Category	Specific type	Frequency (%)
Anterior	Glandular	10 (5 %)
	Coronal	57 (28.2%)
	Distal penile	38 (18.8%)
Middle	mid penile	18 (8.9%)
	Proximal penile	18 (7.4%)
	Penoscrotal	50 (24.8%)
Proximal	Scrotal	9 (4.5%)
	Perineal	5 (2.5%)

Most of the patients had chordee (53.5 %), but the severe forms of chordee (30.7 %) were associated mostly with the proximal hypospadias ($p<0.01$). Other congenital anomalies occurred in 18.3 % among which UDT accounts for 9.9 %, DSD 4.5 % and inguinal hernias 2%. A few children were previously admitted for hypospadias related complications (3.5%) and 16.3% of the children were circumcised.

The most frequently performed procedures for hypospadias were TIP (47%), TVPF (25.7%), 2 staged procedure (9.4%) and MAGPI (5.9%).

TIP urethroplasty was frequently performed for distal hypospadias (71.2 %), and transverse ventral preputal flap (TVPF) was the most common procedure done for proximal hypospadias (62.8 %) ($p<0.01$) (Table 2).

For most mild chordee, simple skin release was done (94.7%) and for severe forms scared tissue removal with urethral plate dissection was performed (54.1%) ($p<0.01$). Most commonly used tissue for the second layer was dorsal preputaldartos muscle (48.5%) in turn followed by ventral dartos muscle (30.2%). Type of stich used for urethra was PDS in 14.9 % and vicryl in 84.7% while for the glans chromic catgut was used in 1.5%, PDS in 6.4% and vicryl in 92.1%.

Table 2: Procedure performed for each type of hypospadias

	Hypospadias Type				
Procedure type	**Anterior**	**middle**	**posterior**	**Total**	**P value**
MAGPI	12 (11.4%)	0 (0%)	0 (0%)	12 (5.9%)	
Mathiewi's	9 (8.6%)	0 (0%)	0 (0%)	9 (4.5%)	
Thiersch-Duplay	7 (6.7%)	3 (9.1%)	0 (0%)	10 (5%)	0.00
TIP	76(72.4%)	16 (48.5%)	3(4.7%)	95 (47%)	
Transverse preputal island flap	0 (0.0%)	11 (33.3%)	41(64.1%)	52 (25.7%)	
Onlay island flap	1 (1.0%)	2 (6.1%)	2 (3.1%)	5 (2.5%)	
2 staged	0 (0.0%)	1 (3.0%)	18 (28.1%)	19 (9.4%)	

Preoperatively, 62.9% of the boys took antibiotics (60.4% IV and 2.5% PO). Postoperatively, 93.6% took antibiotics (27.2% IV only, 19.8 % PO only and 46.5% IV changed later to PO). The IV antibiotic choice was ceftriaxone alone in 90% of the cases and Ampicillin with gentamycin in 10% of the cases, where as the PO antibiotic was cotrimoxazole.

Antibiotic cream was applied after removal of dressing in 82.7% of the patients. Catheters were removed in a mean of 7 days (min 1 and max 15 days). The overall success rate of our patients for the first surgery was 55.9%. There was a high rate of major postoperative complications (44.1%) requiring further surgical intervention (Figure 1). Complications were more common in Mathiew's repair and two-stage repair (88.9% and 78.9 % respectively) ($p<0.01$). Another significant association was with age at operation. Those operated at age older than 18

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months had higher rate of complications (47.8%) than in those below this age (29.3%) (p=0.03). Additional association with post-op complication was with severity of hypospadias and chordee. Of the patients with proximal hypospadias, 57.8% had complications while only 34.3% of distal hypospadias developed complications (p=0.0). The same case with chordee as 59.7% of severe chordees developed complications while only 34% of those without chordee developed complications (p<0.01).

Presence of other congenital anomalies, peri-operative antibiotics, previous circumcision, past admission with hypospadias complication, type of tissue used for second layer, type of stich used for urethra (PDS Vs. Vicryl), the length of catheter stay and use of antibiotics cream after dressing removal did not have significant difference in outcome (p= 0.13, p=0.68, p=0.13, p=0.06, p=0.5, p=0.9, p=0.1 and p=0.9 respectively). There is also no significant association of the date of surgery with presence of complications (p=0.47).

The most common complications were UCF occurring in 31.2% of patients, followed by meatal stenosis and glans breakdown in 7.4% each. We found a significant association of severity of chordee with development of UCF (50% in severe chordee, but only 18.1% of those with no chordee) and Glans breakdown (16.1% in severe chordee but 4.3% in those without chordee) (p<0.01 and P=0.01 respectively).

We also found a significant association of severity of hypospadias with the development of UCF, glans breakdown and meatal stenosis. UCF and glans breakdown were common in proximal hypospadias (49.2% and 60% respectively) but meatal stenosis occurred more in distal hypospadias (73.3%) (p=0.02, p<0.01 and p=0.04 respectivey). The type of procedure also had an association with glans breakdown and UCF (p=0.04 and p<0.01). Onlay island flap and two staged procedures had higher glans breakdown (20% and 21.1% respectively) while Mathiew's repair and two staged procedures had highest rate of UCF. (77.8% and 68.4% of them respectively)

Thirty seven percent of the patients underwent repeat procedures, while 7% are still waiting for surgery. The procedures were UCF repair, meatoplasty and redo urethroplasty. In total, 23.8% underwent two procedures, 9.9% three, 2.5% four and 1% five surgeries.

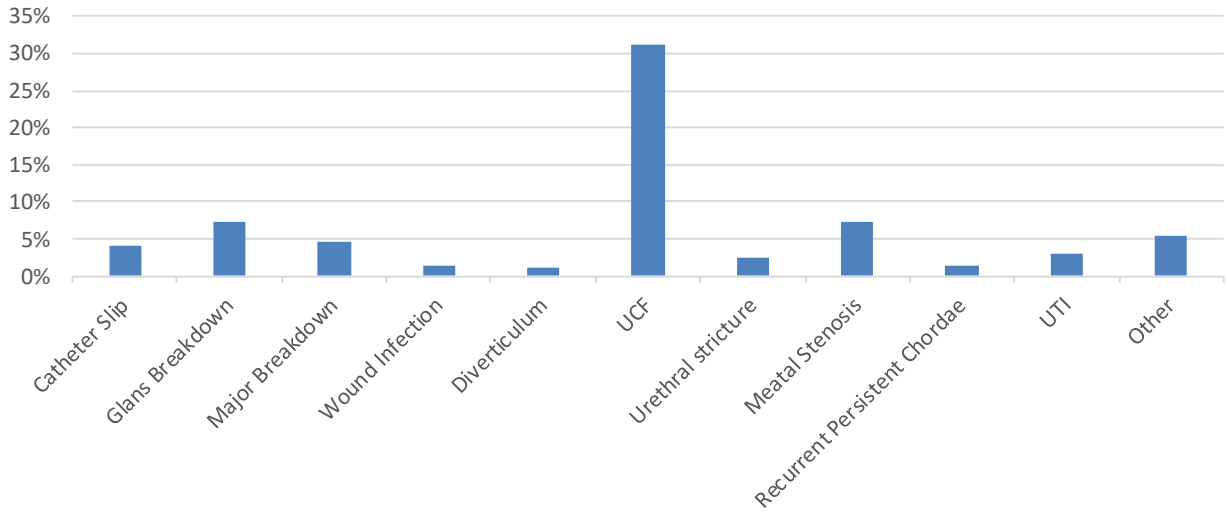

Figure 1: Post-hypospadias repair complications

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DISCUSSION

The aim of any hypospadias repair is to attain cosmetically acceptable penis with a conically shaped glans that has a urethral meatus at the tip and an erect penis. More than 300 types of repair were done over the past 3 decades to attain this feature (1). However, higher rates of complications still occur in hypospadias as compared to other reconstructive operations (13). There is still no consensus on the procedures of choice.

There was a high complication rate in our study 44.1%. Results from other literature vary, ranging from 4-60%, but the higher rates were mainly in the studies done on severe hypospadias. (6,7,9,13–22). We have also observed this association of proximal hypospadias and severe chordee with a higher complication rate. The prevalence of proximal hypospadias was much higher (31.7%) compared to other studies like Kahan et al's (<15%) (10,23,24). This could be due to the fact that we saw a lot of severe cases referred from all over the country while on the other hand, some of the distal hypospadias do not even look for medical attention. This higher prevalence of proximal hypospadias could be one of the reasons our study had a high complication rate.

The current recommended age for repair is 6-18 months. Younger age at surgery has better outcomes, with some studies even showing minimized complication in those as young as 4-6 months.(4,11,21). Most of the children in our study were operated on late, at age older than 18 months and these children had more complications. The main reason for the delay of management was because most children presented to us at an older age (>18 months) and these children were mainly coming from far away, outside of Addis Ababa. However, in addition to these socio-economic factors, there is an institutional problem, as there is a long waiting list for surgery delaying surgeries for more than one year.

For most of the anterior hypospadias frequently performed repair was TIP followed by MAGPI. These two procedures were also found to have less complications which is consistent with other studies (6,14,15,25–27). For middle hypospadias TIP and TVPF were performed. TIP was again found to have less complications, demonstrating the wide range of application for this technique (16,22,28).

For the severe hypospadias, most commonly use two staged procedures while some favor single stage procedures (6,7). In our set up, TVPF (single stage) was the most frequently performed followed by two staged procedures. We observed a better outcome with TVPF.

Even though the study was retrospective, we had a good sample size and detailed data was taken. However, we were still short of details in some areas, like duration of antibiotic use, size of stiches, use of intraoperative magnification and microsurgical instruments. Another drawback was we that could not compare the repairs done by different surgeons, some of which were fellows.

In conclusion, the preferred type of repair is TIP for distal hypospadias and single stage TVPF for proximal hypospadias and both were found to have lesser risk of complications. However, there was a high rate of complications in our institution. This is attributed to higher burden of severe hypospadias and older age at repair.

To attain better outcomes, we need to address the issue of operating within the therapeutic age window. Other aspects of hypospadias repair such as cosmetic, functional and psychosexual impact need to be evaluated further with a long-term study.

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