

## A Two Years Review of Patients with Hypospadias at Urology Department, Kilimanjaro Christian Medical Center in Moshi, Tanzania: What is the situation?

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**Background:** *Hypospadias is the commonest congenital malformation of the penis characterized by abnormal ventral opening of the urethral meatus, abnormal ventral curvature of the penis (chordee) and an abnormal distribution of the foreskin (Dorsal hood). This study was aimed at documenting the profile and outcome of patients treated for Hypospadias at Kilimanjaro Christian Medical Center(KCMC) for two years.*

**Methods:** *This was a two years hospital based descriptive retrospective cross sectional study conducted at KCMC referral hospital by using a structured data collecting tool. The data were analyzed using SPSS software.*

**Results:** *A total of 80 case notes of patients treated for Hypospadias in a period of two years were enrolled and reviewed, of which 47(59%) had distal Hypospadias, 21(26%) had proximal hypospadias and 12 (15%) had midshaft hypospadias. Majority of the patients, 44(55%) with hypospadias were treated by Snodgrass urethroplasty, 15 were treated by staged hypospadias, 9 by Duckett, 8 by modified Mathieu's and only 4 were treated by thierschduplay. Most our patients recovered without complications.*

**Conclusion:** *Distal hypospadias is the commonest presentation of hypospadias and it is mainly treated by Snodgrass urethroplasty together with the midshaft hypospadias whereas proximal hypospadias is mainly treated by staged hypospadias repair. Few patients can develop early and/or late complications after repair.*

**Key words:** Hypospadias, treatment outcome.

### Introduction

Hypospadias is derived from two Greek words hypo meaning below and spadone meaning crack, it is the most common congenital defect of the penis. It is characterized by the abnormal ventral opening of the urethral meatus, abnormal ventral curvature of the penis (chordee) and an abnormal distribution of the foreskin/dorsal hood <sup>1</sup>.

During the 3rd week of embryogenesis the cloacal membrane is formed and lies just below the umbilical cord of the fetus, this membrane is shifted caudally as the lower abdominal wall is formed in the 4th week. By the end of the 5th week several cloacal folds are formed on both sides of the cloacal membrane and are delimited anteriorly by the genital tubercle. In the 7th week the urorectal septum is formed which separates the cloacal membrane into the urogenital membrane ventrally and the anal membrane dorsally. Urethral folds are formed on the ventral aspect of the cloacal membrane around the urogenital sinus and lateral to the urethral folds genital swellings occur. Up to this point the sex of the fetus is cannot be distinguished between a male fetus and a female fetus.

After the 3rd month, with the help of androgens the male external genitalia starts to develop where the genital tubercle will elongate and develop into a penis, the urethral folds will lengthen ventrally and in between the urogenital sinus lies which later develops to form the urethral groove. The two urethral folds will fuse on the underside and a groove is formed. The groove will fuse posteriorly by the fusion of the genital swellings and anteriorly by the closure of the urethral folds. The closure of two urethral folds forms the spongy part of the penis and

above the spongy body of the penis two cavernous bodies are formed and this completes the penile erectile system. The two genital swellings will then fuse to form the scrotum and the line which is formed is called the median raphe. Hypospadias arises from the closure disorder of the urethral groove on the underside of the penis. The prevalence of hypospadias in the developed countries including United States and European countries is estimated to be 1 per every 200-300 male live births. Unfortunately there are not enough data on the prevalence of hypospadias in the developing countries including Tanzania<sup>2-3</sup>.

The etiology of hypospadias is multifactorial with several risk factors including environmental and genetic predisposition. It has been reported that if a person gives birth to a child with hypospadias the probability of having the second son with hypospadias is 14% and if the father had hypospadias the possibility of giving birth to a son with hypospadias is about 8%. Other risk factors include low birth weight of the baby, father exposed to pesticide, giving birth to twins or triplets, maternal iron supplements or pregnancy through artificial insemination<sup>1</sup>.

Its classification depends on the anatomical location of the urethral meatus, which could be anterior (Granular, coronal, and sub coronal), middle (distal, mid, shaft and proximal penile), posterior (penoscrotal, scrotal or perineal)<sup>1</sup>. The only available management for hypospadias is through surgical intervention. To the present there are about 250 known surgical techniques for hypospadias repair. Surgery is done to ensure functional purposes i.e. the patient should be able to urinate in a standing position and also participate in coitus and achieve a cosmetically presentable penis and the recommended age of repair is between 6-24 months of age due to psychosocial factors<sup>4-5</sup>. Studies done in the US reports the incidence of hypospadias to be 1:200-300 male live births and is estimated to reach 1:125 male live birth if the minor degrees of hypospadias are included<sup>2</sup>.

Another study done on the epidemiologic survey of hypospadias in Danish boys from 1977-2005 revealed a prevalence of 3.8 per 1000 male live births. This study also showed an increase in the prevalence of hypospadias from 0.24% in 1977 to 0.52 in 2005 which is double the prevalence in the course of 27 years<sup>6</sup>.

In Netherlands a study was conducted in 2002 to review the rise in hypospadias rates, where it was found a hypospadias rate of 38/10 000 (CI 28- 48) live births in Rotterdam, which is a bit higher than expected. This rate is about 6 times higher than Southwestern Netherlands (6.2/10 000) and 4 times higher than 16 European regions (9.6/10 000)<sup>7</sup>. Also other studies suggested a geographical pattern of hypospadias where the prevalence ranges from 0.26 in 1000 live births both males and females to 2.11 in Hungary and 2.6 in Scandinavian countries<sup>8</sup>.

On the management of hypospadias many studies have been done, there are about 250 suggested surgical techniques on hypospadias repair whilst others suggesting a two stage surgical repair others showed the importance of one stage hypospadias repair. According to one review article, 92% of pediatric Urologists prefer tubularized incised plate /Snodgrass for the surgical repair of distal hypospadias without penile curvature while 4% prefer Mathieu's technique (flip flap), 3% prefers Onlay island flap and 2% prefers urethral advancement, glanuloplasty or meatal advancement for distal hypospadias repair<sup>9</sup>.

Another study was done in Nigeria on the challenges of surgical repair in hypospadias, In 51 cases that were managed in a period of ten years, 22 cases were operated using preputial island flap, Mathieu technique in 16 cases, MAGPI was used in 5 cases, Snodgrass in 1 case and 7 cases were managed by using staged method<sup>5</sup>. As in distal hypospadias without penile curvature many pediatric surgeons prefer tubularized incised plate urethroplasty/Snodgrass (87%) while 16% of the surgeons would prefer an Onlay island flap. In one article on the current concepts of hypospadias, on management of proximal hypospadias without penile curvature 43% preferred tubularized incised plate and the other 43% preferred Onlay island flap and in the treatment of

proximal hypospadias with moderate curvature 35% preferred Onlay island flap while 24% used tubularized incised plate due to a high rate of complications. In the same article 40% of surgeons prefer transverse tube island flap (Duckett repair) 11% preferred Onlay island flap, 3% preferred TIP and nearly half of the surgeons preferred staged repair for the treatment of proximal hypospadias with severe curvature.<sup>9</sup>

One study that was done in Egypt where 30 patients with proximal hypospadias underwent modified Koyanagi technique reported a success rate of 90% where only 3 patients out of 30 developed complications, 2 of them developed urethrocutaneous fistula and in one patient meatal recession occurred. Another study that was also done in Egypt suggested a two stage repair using Byars' method as the versatile technique for the repair of proximal and distal hypospadias with fewer complications and gives the satisfactory cosmetic appearance<sup>11</sup>.

Our study was aimed at documenting the magnitude and outcome of patients treated for Hypospadias at Kilimanjaro Christian Medical Center (KCMC) from January 2012 to December 2013.

### **Methods**

This was a descriptive; hospital based retrospective study that reviewed all case notes of patients treated for hypospadias during the study period. All case notes of patients treated for Hypospadias at Kilimanjaro Christian Medical Centre in Moshi from Jan 2012 to Dec 2013 were enrolled. Case notes with incomplete information which does not fulfill the requirement of this study were excluded from the study.

Ethical clearance and permission was obtained from Community Department, Kilimanjaro Christian Medical University College and Urology department at KCMC Referral Hospital. Confidentiality regarding patients' information was maintained; case notes of all patients treated for Hypospadias at Kilimanjaro Christian Medical Centre in Moshi from Jan 2012 to Dec 2013 were enrolled. All patients' information was kept confidential; no patient's direct identifiers were used in the data collection instrument.

A structured questionnaire was used to collect data from patients' case notes. Data were entered into computer for analysis where by SPSS version 18 was used to analyze the information. Cross-tabulations were generated, and where comparisons were made, significance was considered at p-value of less than 0.05.

### **Study limitations**

This study was done at Kilimanjaro Christian Medical Centre in Moshi, thus the findings may not reflect a true image of hypospadias country wise. Incomplete documentation denied review of some case notes.

### **Results**

During the study period from January 2012 to December 2013, a total of 2009 patients were treated at our department with 96 (4.8%) presenting with hypospadias. A total of 80 Case notes were retrieved from the medical records department during the study period, 49 (61.2%) were aged between 0-5 years, and only 3(3.8%) were between 16-20 years (Table 1). Fourteen (17.5%) of the patients had coexisting congenital anomaly. Undescended testis was the commonest anomaly associated with hypospadias, some participants presented with UDT together with inguinal hernia while few presented with inguinal hernia with hypospadias only.

**Table 1.** Age distribution of the participants (n=80)

Age category	Frequency	Percentage
0-5	49	61.2
6-10	17	21.2
11-15	11	13.8
16-20	3	3.8

**Table 2.** Types of Hypospadias

Type of hypospadias	Frequency	Percentage
Proximal hypospadias	21	26.2
Mid haft hypospadias	12	15.0
Distal hypospadias	47	58.8
<b>Total</b>	<b>80</b>	<b>100.0</b>

**Table3.** Type of Surgeries Done in Relation to the Type/Severity of Hypospadias

Types of surgeries	Proximal hypospadias	Mid shaft hypospadias	Distal hypospadias	Total
Snodgrass	4	6	34	44(55%)
Duckett	1	4	4	9(11.3%)
Thiers duplay	1	0	3	4(5%)
Modified Mathieu's	0	2	6	8(10%)
Staged hypospadias repair	15	0	0	15(18.7)

**Table 4.** Treatment Outcomes of Surgery (n=80)

Characteristics	Frequency	Percentage
<b><i>Early complications of surgery</i></b>		
Bleeding	4	5.0%
Wound infection	3	3.8%
Wound dehiscence	5	6.2%
None	68	85.0%
<b><i>Late complication of surgery</i></b>		
Urethrocutaneous fistula (UCF)	13	16.2%
Meatal stenosis	4	5.0%
Both UCF and meatal stenosis	2	2.6%
None	61	76.2%

## Discussion

Our study did not include surgeons experience as a factor which can influence the treatment outcome due to various reasons beyond this study. We found that all patients in this study were diagnosed at birth, most of our patients were in the age group of 0-5 years 49 (61.2%). This is similar to what was found by Djakovic and his colleagues in 2008, in which they recommended that surgery should be done between 6-24 months of life in order to achieve psychosocial

stability in these patients; contrary to this study as some of the patients underwent surgery in their late teenage life<sup>4</sup>.

Out of 80 patients, 14 presented with other anomalies where 8 had undescended testes, 2 presented with inguinal hernia and 4 had both undescended testes and inguinal hernia. These results are similar to another study which was published in 2002 on the developmental anomalies and disabilities associated with hypospadias showed that inguinal hernia had a prevalence rate of 12.4% and undescended testes were present in 7.3% of the patients. This study also showed that these anomalies were closely associated with proximal hypospadias<sup>12</sup>.

There are many controversial issues in the management of hypospadias from different studies. In the treatment of distal hypospadias, many pediatric urologists prefer Snodgrass hypospadias repair as it gives good functional and cosmetic appearances with fewer complications, some prefer Mathieu's and few prefer Duckett and meatal advancement. This is similar to our practice of which most urologists prefer Snodgrass making it the most popular method especially for distal hypospadias<sup>9, 11</sup>. This study found that for midshaft hypospadias, Snodgrass technique was used to treat majority of patients and the rest were treated by Duckett and Mathieu's urethroplasty. This is the same to the findings by Hayashi and Kojima in 2008 in which pediatric urologists also preferred Snodgrass than other surgical techniques in the treatment of mid penile hypospadias, another study done in Croatia also proved Snodgrass to be the most effective surgical treatment for midshaft hypospadias, this study also suggested that Snodgrass is effective for treating all three types of hypospadias with fewer complications<sup>4, 9, 11</sup>.

Other studies done in Egypt showed that Modified Koyanagi was the treatment of choice with the success rate of up to 90% and fewer complications. The results in this study shows that our urologists prefer staged hypospadias repair for proximal hypospadias by 71% although some patients<sup>15</sup> (19%) were treated by TIP and Duckett<sup>10</sup>. Our study found few early complications compared to late complication such as urethrocutaneous fistula which was found by 16.2%, this is similar to other studies which have reported that hypospadias repair as non rewarding surgery regardless of the urologist experience<sup>5, 9</sup>.

## Conclusion

Hypospadias is still the commonest congenital malformation of the penis affecting male babies worldwide and raising a concern among families in the community. Distal hypospadias the commonest type and is treated by Snodgrass with few complications. Other treatment options are depending on the indication and surgeon's preference. The government should create awareness among the community and encourage the parents on the importance of seeking medical attention earlier in life to avoid psychosocial impact on these children. Surgeons should be encouraged to use Snodgrass urethroplasty as treatment of choice for distal and mid penile hypospadias. More research needs to be done on the suitable surgical intervention for proximal hypospadias.

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