

Complications of Hypospadias Repair in Children: A Single Center Experience

Chukwubuike Kevin Emeka^{1,*}, Eze Thaddeus Chikaodili¹, Okoloagu Nkiruka²

¹Department of Surgery, Enugu State University Teaching Hospital, Enugu, Nigeria

²Department of Ophthalmology, Enugu State University Teaching Hospital, Enugu, Nigeria

ABSTRACT

Background: Hypospadias repair is required for the correction of one of the most common congenital anomalies of the urogenital system and the repair is fraught with complications. The aim of study was to evaluate our experience with regards to complications witnessed in children who underwent hypospadias repair. **Materials and Methods:** This was a retrospective study of children who were operated upon for hypospadias, over a 5-year period, at the pediatric surgery unit of a teaching hospital in Enugu, Nigeria. The information analyzed included the patients' age at presentation (in months), age at surgery (in months), class of hypospadias based on location of the meatus, state of the prepuce (circumcised/uncircumcised), method of hypospadias repair, post-operative complications. The follow-up was for 12 months. **Results:** A total of 72 cases of hypospadias were repaired during the study period. The mean ages of the patients at presentation and at surgery were 4 months and 23 months respectively. Coronal hypospadias was the most common type and about two-thirds of the patients were not circumcised at presentation. All the patients had tubularized incised plate (Snodgrass) method of repair and majority of the repairs were single stage repair. Twenty-three (31.9%) patients developed complications following the repair and urethrocutaneous fistula was the most common post-operative complication. **Conclusion:** Complications can follow attempts at hypospadias repair. Urethrocutaneous fistula was the most common complication recorded in the present study. This is followed by meatal stenosis, bleeding, wound infection, flap necrosis, urethral stricture and recurrent chordee in decreasing order of frequency.

Keywords: Children, complications, congenital, hypospadias repair, urethrocutaneous fistula.

INTRODUCTION

Hypospadias is a congenital abnormality of the penis in which there is abnormal location of the urethra on the ventral aspect with variable

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*Corresponding Author

Chukwubuike Kevin Emeka

Department of Surgery, Enugu State University Teaching Hospital, Enugu, Nigeria.

E-mail: chukwubuikeonline@yahoo.com

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association of arrested development of the spongiosum, ventral prepuce and ventral curvature [1]. Hypospadias is one of the most common anomalies of the external genitalia affecting 1: 300 live male births. The incidence of hypospadias is documented to be increasing with environmental pollution as the culprit [2]. There are several methods of classifying hypospadias. Based on the location of the urethral meatus, hypospadias is classified into anterior (glanular, coronal), mid-penile (distal penile, midshaft and proximal penile) and posterior (penoscrotal, interscrotal, perineal) [3]. Hypospadias may be associated with undescended testis, inguinal hernia, persistent mullerian structures, pelviureteric junction obstruction and vesicoureteric reflux [4]. There are several methods of hypospadias repair and none of the techniques has been found not to have complications. Hypospadias repair is fraught with complications and has a long learning curve [4]. There are acute and long term post-operative complications of hypospadias repair. The acute complications include bleeding, edema, wound infection, wound dehiscence, flap/skin necrosis and so on. Urethrocutaneous fistula, meatal stenosis, urethral stricture and recurrent chordee are some of the long term complications of repair of hypospadias [3,5]. An annual case load of at least 40-50 is recommended to fine tune the skill of the operator [3,6]. The aim of study was to evaluate our experience with regards to complications witnessed in children who underwent hypospadias repair.

MATERIALS AND METHODS

This was a retrospective study of children who were operated upon for hypospadias at the pediatric surgery unit of Enugu State University Teaching Hospital (ESUTH), Enugu, Nigeria. The study covered a 5-year period, from January 2016 to December 2020. Children who had initial, repeat and recurrent hypospadias surgeries were recruited into the study (although this may have introduced bias). Referrals from peripheral hospitals were also accepted into the study. However, children older than 15 years of age and those with ambiguous genitalia were excluded from this study. ESUTH is a tertiary hospital located in Enugu, South East Nigeria. The hospital serves the whole of Enugu State, which according to the 2016 estimates of the National Population Commission and Nigerian National Bureau of Statistics, has a population of about 4 million people and a population density of 616.0/km². The hospital also receives referrals from its neighboring

states. Information was extracted from the case notes, operation notes, and operation register and admission-discharge records. The information analyzed included the patients' age (in months) at presentation, age at surgery (in months), class of hypospadias based on location of the meatus, state of the prepuce (circumcised/uncircumcised), method of hypospadias repair, post-operative complications. The follow-up was for 12 months. Our usual protocol for patients who underwent hypospadias repair is to be followed up for 12 months. Ethical approval was obtained from the ethics and research committee of ESUTH and informed consent from the patients' caregivers was not required due to retrospective nature of the study and identities of the patients were not compromised. Statistical Package for Social Science (SPSS) version 21 (manufactured by IBM Corporation Chicago Illinois) was used for data entry and analysis. Data were expressed as percentages, mean, and range.

RESULTS

Patients' demographics

A total of 72 cases of hypospadias in children were repaired during the study period. The mean ages of the patients at presentation and at surgery were 4 months (range: 1 months to 18 months) and 23 months (range: 12 months to 72 months) respectively.

Type of hypospadias (n=72)

There were 38 (52.8%) cases of coronal hypospadias; distal penile 12 (16.7%); glanular 8 (11.1); midpenile 8 (11.1); and proximal penile 6 (8.3%).

Presence/absence of the prepuce at presentation (Circumcised/uncircumcised)

Twenty-one (29.2%) patients were circumcised whereas 51 (70.8%) patients were not circumcised.

Methods of hypospadias repair

All the patients had tubularized incised plate (Snodgrass) method of repair. However, 58 (80.6%) patients had a one-stage repair whereas 14 (19.4%) patients received a two-stage repair.

Post-operative complications

Twenty-three (31.9%) patients developed complications following the repair. Table 1 shows the complications.

Table 1. Post-operative complications.

Post-Operative Complications	Number of Patients (%)
Urethrocutaneous fistula	13 (18.1)
Meatal stenosis	3 (4.2)
Bleeding	2 (2.7)
Wound infection	2 (2.7)
Flap necrosis	1 (1.4)
Urethral stricture	1 (1.4)
Recurrent chordee	1 (1.4)

DISCUSSION

The term hypospadias originated from the Greek. 'Hypo' means 'under', 'spadon' means a 'rent' or 'fissure' [7]. Hypospadias may be defined as incomplete virilization of the genital tubercle leading to an ectopic urethral opening on the ventrum of the penis, anywhere from the glans penis to the perineum with or without ventral curvature and a ventral prepuceal defect [3]. Surgery is the only modality of treatment of hypospadias. Historically, Alexandrian surgeons practiced penile amputation distal to the urethral opening [8]. There is need to repair hypospadias because of cosmetic and functional reasons [9].

In the present study, an average of 14 cases of hypospadias was repaired in a year. This is at variance with the report of other series on hypospadias [10,11]. The cohort of patients recruited and the specific method of repair described in a particular study may explain the differences in the number of hypospadias repairs. Specialized hypospadias referral hospitals repair large numbers of hypospadias per year. For instance, one study from Senegal described 41 cases of hypospadias repaired specifically by Duckett technique [11]. There is delayed presentation of patients to the hospital in the present study. The age of presentation to the hospital in low income countries is higher than in developed countries because of ignorance, illiteracy and poverty [12]. The mean age at hypospadias repair, in the index study, was 23 months of age. This age at repair is belated and may represent the late presentation of the patients that is prevalent in developing country like Nigeria. The best age for hypospadias repair is 6 months to 18 months. Developmental milestones, size of the penis, response to surgery, anesthetic risk and toilet training are the considerations that affect timing of hypospadias repair [3]. There is good tolerance to anesthesia and surgery by the age of 6 months. At the age of 18 months, the child is

well aware about his genitalia and has achieved some toilet training. If the 6 months to 18 months period is missed, another opportunity presents at 3-4 years of age [3].

Coronal hypospadias was the most common type in the current series. This is consistent with other reports on hypospadias [13,14]. The exact reason for the predominance of coronal hypospadias is not known. However, embryologically, the closing zipper theory of epithelial fusion of the urethral folds in the proximal and glanular urethra, which meet at the coronal area, has been postulated [15,16]. The ectodermal in-growth of the glanular urethra may explain its stratified squamous epithelium [17].

Majority of the patients were not circumcised at presentation. Increased awareness on the part of the mothers, midwives and birth attendance may explain the beauty of this non-circumcision of newborns with hypospadias. The prepuce is necessary for the repair of hypospadias. Hypospadias repair following neonatal circumcision is a challenging reconstruction [18]. However, in distal hypospadias, performing circumcision in newborns with hypospadias has been found not to affect the outcome of the repair or the risk of complications [19].

In the current study, all the patients received tubularized incised plate method of urethroplasty. This is in line with the report of other series on hypospadias [13,20]. Tubularized incised plate urethroplasty which was described by Warren Snodgrass in 1994, has gained worldwide acceptance for repair of distal and mid penile hypospadias because of its relatively simple surgical concepts, low complication rates and good cosmetic outcome [21,22]. It is noteworthy to state that the choice of the method of hypospadias repair is at the discretion of the surgeon which may be related to his experience and expertise.

Regarding the complications that may follow hypospadias repair, urethrocutaneous fistula was the most frequent. This is consistent with report of other researchers [23,24]. Urethrocutaneous fistula usually occurs at the site of the native (hypospadiac) urethral meatus on the coronal level in tubularization urethroplasty and at the site of anastomosis in flap urethroplasty [12]. The etiology of urethrocutaneous fistula is unknown. However, local infection, local ischemia, inadequate procedure, poor tissue handling and distal obstruction due to meatal stenosis/encrustation have been implicated. The following risk factors such as location of hypospadias (more in proximal types), type of repair, suture materials used and suture techniques have been associated with urethrocutaneous fistula [25]. Meatal stenosis, urethral stricture, hematoma and infection are other possible risk factors [26]. Although meatal stenosis can be regarded as an uncommon complication of hypospadias repair but when it occurs, it can be difficult to treat [27]. Several techniques (V and W plasty) have been described in a bid to prevent meatal stenosis [27,28]. Bleeding in hypospadias repair can lead to hematoma formation which can result to devascularization of flaps and grafts and ultimately failure of hypospadias repair [29]. Excessive bleeding usually results from bleeding from resected corpus spongiosum, trauma to corpus cavernosum or inadequate hemostasis [12]. During hypospadias repair, bleeding can be minimized by dissecting in a proper plane, applying tourniquet at the base of the penis, use of bipolar diathermy and use of diluted adrenaline (1: 100,000 dilution). Infection is a potential disaster to hypospadias repair. Inadequate vascularity, humidity, high temperature and proximity to a potentially contaminated area may predispose to wound infection [30]. Infection can be prevented by preoperative povidone iodine scrubbing, prophylactic antibiotics, avoidance of hematoma and local application of mercurochrome at least 48 hours before surgery [31]. Flap necrosis is a major complication of hypospadias repair and can result from devascularization of the flap which can occur while raising the flap, hematoma formation, infection, vascular spasm and tight pressure dressing [12]. Flap necrosis can be superficial or deep [12]. Recurrent chordee refers to persistent ventral curvature of the penile shaft seen after repair. This can result from inadequate initial correction of chordee or deficit/atretic tissues in the ventral aspect of the penile shaft.

CONCLUSION

Complications can follow attempts at hypospadias repair. Urethrocutaneous fistula was the most common complication recorded in the present study. This is followed by meatal stenosis, bleeding, wound infection, flap necrosis, urethral stricture and recurrent chordee in decreasing order of frequency. Future studies are needed to focus on the specific risk factors that may predispose these post-operative complications.

LIMITATIONS OF THE STUDY

1. In our centre, low numbers of hypospadias cases are repaired per year. We are yet to attend the recommended 50 cases per year.
2. The inclusion of repeat cases of hypospadias repair may have affected the complication rate.

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