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Short term outcomes of snodgrass urethroplasty in distal and mid penile hypospadias

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ABSTRACT

Background: Hypospadias is common congenital condition. First attempted hypospadias surgery was done during first century A.D. Since then more than 300 techniques have been explained in the surgery for Hypospadias. The goal of surgery is focused on functional and cosmetic outcomes. In 1994 Snodgrass popularized the technique of urethral plate incision, tubularization and secondary dorsal healing for hypospadias repair. Aim of the study was to evaluate the short term outcomes of Snodgrass urethroplasty.

Methods: This was a retrospective study conducted by the department of Pediatric Surgery, Kempegowda Institute of medical sciences (KIMS) hospital, Bangalore from 2014 to 2017. Children with mid penile and distal hypospadias who had undergone Snodgrass urethroplasty were enrolled in the study. Children with previous surgery were excluded. The demographic data, duration of surgery, post operative requirement of anticholinergics, duration of catheterization and post operative stay were tabulated. Children were followed up for duration of 6 months to 3 years. Post operative complications were tabulated.

Results: 40 children were included in the study. Age ranges of children were between 9 months to 14 years. In most of the children hypospadias was diagnosed at birth. The mean duration of surgery was 97.25 minutes. The mean duration of hospitalization was 12.2 day. The overall complications rate was 20%. The most common complication was urethrocutaneous fistula. Out of the 40 children included in the study 4(10%) children required resurgery (urethrocutaneous fistula closure).

Conclusions: Snodgrass urethroplasty is a simple and effective technique. It is easy to learn and can be applied as a single stage procedure. The most common complications are urethrocutaneous fistula and meatal stenosis.

Keywords: Hypospadias, Snodgrass, Urethroplasty

INTRODUCTION

Hypospadias is the common congenital condition affecting male external genitalia.^{1,2} Hypospadias is derived from greek terms hypo meaning under and spadon meaning rent or fissure. Hypospadiology was a term coined by Duckett in 1995.³ In males Hypospadias is characterized by three anomalies of the penis (1) a ventrally located meatus anywhere between the glans and

the perineum, (2) ventral curve of the penis (chordee), and (3) the dorsal prepuce hood in association with a ventral deficit of the prepuce.^{2,4}

Recent evidence suggests an increase in incidence and severity of hypospadias in the last 30 years. This may be due to multiple factors including exogenous hormone usage and environmental pollutants. Various classifications of hypospadias have been mentioned and

published in literature. Hypospadias is classified depending on the site of opening of the urethral meatus. If the urethral meatus is on the glans penis, at the corona, or subcoronal it is termed as distal or anterior hypospadias. In Mid-penile hypospadias urethral opening is located on the distal penile shaft, midshaft, or on the proximal penile shaft. Proximal or posterior hypospadias have a penoscrotal, scrotal, or perineal urethral meatus. Distal hypospadias is the commonest variety. It accounts for 70–80% of all hypospadias. Mid shaft hypospadias accounts for 15-20% of cases. Posterior proximal forms are rare.⁵

In history the first attempted Hypospadias surgery was by Alexandrian surgeons Heliodorus and Antyllus during the first century A.D.⁶ Since then more than 300 techniques have been explained in the surgery for Hypospadias. The goal of surgery is focused on functional and cosmetic outcomes. Functional outcome is measured by the ability to void while in standing and to allow effective coitus in adulthood. The procedures can be broadly classified has advancement techniques, tubularization techniques and use of grafts or flaps.

Tubularized Incised Plate is based on the principle of urethral plate tubularization which was earlier known as Theirsh Duplay repair.^{7,8} In cases of inadequate width of the urethral plate alternative procedures such as Mathieu urethroplasty (Flip Flap technique) or vascularized island flap were performed. In 1994 Snodgrass popularized the technique of urethral plate incision, tubularization and secondary dorsal healing for hypospadias repair.⁹

In the present study the surgical outcomes of Snodgrass repair were evaluated. The post-operative complication and their management were also analyzed.

METHODS

This was a retrospective study conducted by the department of Pediatric Surgery, KIMS hospital Bangalore from 2014 to 2017. Children with mid penile and distal hypospadias who had undergone Snodgrass urethroplasty were enrolled in the study. Children with previous surgery were excluded. The demographic data of children were tabulated. The position of the meatus (type of hypospadias) and associated anomalies were documented. All children underwent routine blood investigation and ultrasonography of the renal system before surgery. On the day of surgery the children received intravenous antibiotics (Cephalosporin and Amikacin) one hour prior to surgery.

Snodgrass (TIP)

The penis is degloved after a circumferential subcoronal incision is done 2 mm proximally to the urethral native meatus. A U-shaped incision is done along the lateral margins of the urethral plate. The glans wings are then raised. Incision is done in the midline of the urethral

plate. This allows for tension free tubularization of urethral plate. The tubularization of the urethral plate is done with resorbable suture either 5/0 or 6/0.Dartos flap is used as second layer of cover over the tubularized plate. The dartos flap is transported from the dorsal aspect either by button hole technique or from the sides. Later Glans wings are approximated. Degloved penile skin is closed.

Catheters used In the present study were infant feeding tubes of varying sizes (6 French to 10 French) depending on the age of the child. Post operatively all the children received intravenous antibiotics for a duration of 3-5 days. Need of oxybutynin for bladder spasm was recorded. All Children were given Paracetamol suppository for pain relief initially and latter oral combination of aceclofenac and paracetamol. To prevent straining all children were started on laxatives from post operative day 1.All children underwent first dressing on post operative day 4. The duration of catheterization and duration of stay in hospital was recorded. The children were followed up for a period of 6months to 3 years. On follow up children were evaluated for complications (oedema, meatal stenosis, fistula, glans breakdown) and urinary stream.

RESULTS

40 children with distal hypospadias were included in the study. Age ranges of children were between 9 months to 14 years. Distribution of age is depicted in Table1. Most of the Hypospadias were diagnosed at birth, only in 4 cases it was noticed later in life.

Table 1: Age distribution of children.

Age Distribution	Number	Percentage
<1 year	03	7.5%
1-5 years	22	55%
5-10 years	11	27.5%
>10 years	04	10%

Table 2: Type of hypospadias and number of children.

Type Of Hypospadias	Number	Percentage
Mid penile	10	25%
Distal Hypospadias	30	75%

Chordee, undescended testis, inguinal hernia, penile torsion was observed in 52.5%, 5.0%, 2.5% and 2.5% of cases respectively (Table 3). On preoperative USG renal anomalies were picked up in 4 (10%) children. Post operative 15 children required anticholinergics for bladder spasm.

In remaining 25 children only Non steroidal antiinflammatory drugs (NSAIDs) were sufficient. Duration of surgery ranged from minimum 80 minutes to maximum 115 minutes with an average of 97 minutes. Post operative hospital stay ranged between 9 to 14 days with an average of 12.2 days. All the children were discharged following catheter removal on the same day.

Table 3: Associated Anomalies.

Associated anomalies	Number	Percentage
Chordee	21	52.5%
Undescended Testis	2	5.0%
Hernia	1	2.5%
Penile Torsion	1	2.5%

Post operative complication was seen in 08 children (20%). Of these 08 children only 4 required resurgery (10%)

Most common complication was urethral fistula seen in 6 (15%) children. Out of these 6 children 4 required resurgery (i.e. fistula closure), remaining 2 were managed conservatively with urethral dilatation.

Next common complication was meatal stenosis seen in 2 (5%) children. All these children were managed conservatively with urethral dilatation.

The incidence of complication in mid and distal penile hypospadias was found to be statistically insignificant (p value 0.08).

Table 4: Complication and type of hypospadias.

Complication	Mid Penile Hypospadias	Distal Hypospadias	Total
Urethrocutaneous fistula	03	03	06 (15%)
Meatal Stenosis	01	01	02 (05%)
Total	04 (10%)	04(10%)	08 (20%)

DISCUSSION

The incidence of hypospadias is about 8.2 per 1000 live male births. In the last 30 years there is an increase in the prevalence of hypospadias. ¹⁰⁻¹⁴ The aim of hypospadias surgery is to obtain a functional and cosmetically normal penis. More than 300 different techniques have been explained in the treatment of hypospadias.

The principle of incising the urethral plate in the middle was introduced by Rich et al. ¹⁵ Snodgrass extended the incision of urethral plate from the meatus to the tip of the glans. This maneuver helps to construct urethra from the existing urethral plate. The relaxing incision done on the urethral plate heals with re-epithelisation without obvious scarring. ^{16,17} This explains why few patients have urethral stricture post Snodgrass repair.

The most common associated anomalies with hypospadias are undescended testes and inguinal hernia. In 7-9% of the patients cryptorchidism is present. In the present study 5% of the children had associated undescended testis. Hernia is seen in 9-16% of the children with hypospadias. 18-20 Only 2.5% of the children In the present study had associated hernia.

The two frequent complications seen with Snodgrass repair are urethrocutaneous fistula and meatal stenosis. Complication rate in Snodgrass repair range from 2-18%. ^{21,22} In the present study complication was seen in 20% of the children. Complication included urethrocutaneous fistula and meatal stenosis.

In our series, urethrocutaneous fistula was the commonest complication seen in 15% of the children. In the literature the median fistula rate was 5%, ranging from 0 to 16%

among the 54-case series reviewed.²³⁻²⁵ The factors influencing fistula formation was studied by Waterman.²⁶ He found that technique of primary repair was important and there was no difference between stent versus nonstent and age of child at the time of surgery. Two sites vulnerable to fistula are the subcoronal area and the penoscrotal junction.

Various factors responsible for urethrocutaneous fistula are improper mobilization of the flap during dissection, some degree of meatal stenosis and pressure necrosis due to tight dressing. In the present series, out of the 6 children with fistula three of them had fistula at subcoronal region. 4 children required resurgery for fistula closure and the remaining 2 children fistula closed by regular urethral dilatation. Fistula closure chances are high if it is a small fistula and the distal urethral meatus is patent and not stenotic.

Next common complication was meatal stenosis. Meatal stenosis was seen in 5% of the cases which was treated by regular meatal dilatation. It is believed that the reason for meatal stenosis is technical related. It occurs if the tubularisation of the urethral plate is done too far distally. Ideally it is good to create an appropriate sized oval shaped meatus.

Technical modifications to reduce meatal stenosis are formation of wide and oval neomeatus, eversion of the neomeatus, restrictive midline incision distally, postoperative bougienage of the neourethra, skin grafting, or buccal mucosal grafting.

It is said that the children post urethroplasty have an obstructive pattern of urine flow. But this requires a long term follow up.

CONCLUSION

Snodgrass urethroplasty is a simple and effective technique. It is easy to learn and can be applied as a single stage procedure. The most common complications are urethrocutaneous fistula and meatal stenosis. The complication in most of the cases can be treated conservatively. Long term studies are required to evaluate the voiding and sexual problems in these children.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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