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PRIMARY ANTERIOR HYPOSPADIAS REPAIR WITHOUT WATERPROOF LAYER

Plastic Surgery

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ABSTRACT

Introduction: Hypospadias is one of the most common congenital anomalies of male genitalia. The Snodgrass Tubularized Incised Plate (TIP) urethroplasty has become a primary technique for repair of distal and middle hypospadias. Data regarding distal hypospadias repair by spongioplasty without a waterproof layer are limited. The current study was conducted to evaluate the procedure of spongioplasty without a waterproof layer in treatment of primary anterior hypospadias repair. **Materials & methods:** A descriptive observational study with prospective design was conducted at the Department of Paediatric Surgery and Department of Plastic Surgery at Calcutta National Medical College, Kolkata. In the study, 32 diagnosed cases of anterior hypospadias in the age group of 3-12 years admitted for spongioplasty without a waterproof layer in treatment of primary distal hypospadias repair were studied over one year duration. After ethical approval, data were collected including follow up at one month, and data were analyzed by SPSS version 20 software. Descriptive analysis in the form of proportion for categorical variables, mean or median for continuous variables was performed. **Results:** The mean age of the study participants was 6.2 ± 3.12 years. Mean operative time was 50 ± 8.25 minutes. Post-operatively, 29 patients had an uneventful recovery while, 3 patients developed Urethro-cutaneous fistulas and amongst which two had meatal stenosis as well. Cosmetic outcome was satisfactory among 90% of the subjects. **Conclusion:** Without using any waterproofing layer, the anterior or distal hypospadias repair in single layer is reliable, safer and quicker technique with satisfactory aesthetic outcome.

KEYWORDS

Anterior Hypospadias, Spongioplasty Without Waterproof Layer, Complication, Cosmetic Outcome

INTRODUCTION

Hypospadias is a congenital deformity of the external genitalia in males, characterized by aberrant growth of the urethral fold and the ventral foreskin of the penis resulting incorrect positioning of the urethral opening[1]. Dorsally hooded foreskin, a proximal urethral meatus, and a ventral penile curvature, arising from an arrest in penile development, makes a classical triad of hypospadias[2]. Hypospadias is regarded as the most common genital anomaly after undescended testis and affects 150 - 300 live births[2-4]. Hypospadias is classically divided with regard severity and the location of the meatus into proximal (posterior), mid-shaft (middle), and distal forms (anterior). Distal forms are responsible for approximately 80 % of the cases[5]. Surgical repair is undertaken mainly to augment function and cosmesis[6]. The procedure of choice used for repair of distal and mid penile hypospadias is the one described by Snodgrass. He described the technique of Tubularized Incised Plate (TIP), which has a low complication rate[7]. During the hypospadias repair, usually the intervening waterproof layer is used between the inner peri-urethral tissue cover and outer skin cover. Various tissues being used as this waterproof layer are the dartos fascia, tunica vaginalis, de-epithelialized penile skin, preputial flap, para-urethral tissue[8-12].

There are many studies in literature which assessed the efficacy of different surgical repair techniques for hypospadias. But, limited studies are available assessing the distal hypospadias repair by spongioplasty without a waterproof layer. In this context, this study was planned to evaluate the procedure of spongioplasty without a waterproof layer in surgical repair of primary anterior hypospadias.

METHODOLOGY

The present descriptive observational study with prospective design was conducted over one year duration at the Department ofPaediatric Surgery and Department of Plastic Surgery at Calcutta National Medical College, Kolkata, West Bengal. The study population was patients with diagnosed of anterior hypospadias in the age group of 3-12 years admitted for surgical repair during the study period at the institute. Patients beyond this age group and previously operated for hypospadias and those with chromosomal anomalies and concomitant congenital anomalies were not included in the study. All the eligible study population was approached and after applying the inclusion and exclusion criteria, 32 patients were selected and included in the study by complete enumeration technique. After getting the prior approval from the Institutional Ethics Committee (IEC) of Calcutta National Medical College and Hospital, Kolkata, study participants were explained in their own-language about nature of study and procedures in their own language. All the patients after proper clinical examination, pre-anaesthetic work-up and informed consent were taken up from the parents or legal guardian of the subjects for surgery under general anaesthesia. Appropriate post-operative care was given in each study subject and was followed up after one month post-operatively. Data were collected using pre-defined and pre-tested schedule by interviewing the subjects. Data were entered into MS Excel and analysed using the SPSS version 20 software. Descriptive analysis in the form of proportion for categorical variables, mean or median for continuous variables was performed.

Operative Technique[13]:

With stay stitch was placed over the glans, corners of the dorsal prepuce were held and line of the incision was marked, ventrally about 2mm below the meatus or more proximal if distal urethra was thin from deficient underlying dartos and corpus spongiosum. Oblique dorsal incision was made to preserve sufficient inner prepuce to transfer ventrally and create uniform collar.Degloving was done dorsally along the Buck's fascia and ventrally just under the shaft skin, preserving available dartos up to peno-pubic and peno-scrotal junctions. Artificial erection was done to check chordee. If curvature <30°, it was corrected by dorsal plication. Following this, tourniquet was placed at the base of the penis and visible junctions of glans wings to urethral plate were marked. Dissection continued down to surface or corpora and then laterally on each side to approximately 3 and 9 O'clock position. If glans width was less than 14mm, or if there was tension on glans wings approximation, then extended dissection was next done at 3 and 9 O'clock, further releasing the wings for a distance of approximately 4mm distally. Urethral plate was separated from glans wings and was then incised in midline from within the meatus to the tip of the plate down to the surface of underlying corpora. Distal plate incision should not extend into the glans. 8Fr Nelaton's catheter was passed into the bladder and tied to glans traction suture. 8Fr Nelaton's catheter was used for patients under the age of 6 years while 6Fr was used for the patients above 6 years of age. Urethral plate tubularization was done in two sub-epithelial layers using 6-0 Polyglactin. Continuous stitching proceeds proximally to meatus where it was tied. Glansplasty approximates the wings with 6-0 polyglactin sub-epithelial interrupted stitches, beginning distally and continuing to corona proximally. Glans

wings were not sutured to underlying neo-urethra. Residual shaft skin then excised and collar was approximated with 6-0 polyglactin interrupted sub-epithelial stitches, and a single epithelial 6-0 polyglactin stitch at corona. Dorsal prepuce was split in midline to the edge of inner preputial collar (Byar's flaps) and then fixed in midline using 6-0 polyglactin sub-epithelial stitch. Ventral midline skin was closed to recreate median raphe, and remaining excess skin laterally on either side was excised.

RESULTS

In the present study 32 diagnosed cases of anterior hypospadias in the age group of 3-12 years admitted for spongioplasty without a waterproof layer in treatment of primary distal hypospadias repair were studied. The mean age of the study participants was 6.2 ± 3.12 years. Amongst all the patients 15 had coronal hypospadias, 6 had sub-coronal hypospadias, 7 had distal penile hypospadias and rest had glanular hypospadias. 15 patients were previously circumcised. Mean operative time was 50 ± 8.25 minutes. No intraoperative complications were encountered. For the post-operative course, 29 patients had an uneventful recovery while 3 patients developed urethra-cutaneous fistulas, amongst which 2 had meatal stenosis as well. No stricture was seen in any of the patients. Satisfactory cosmetic outcome was observed among 90% of the subjects.

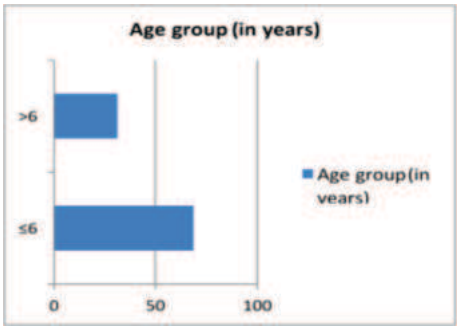

Figure 1: Distribution of study subjects according to age (n=32)

Table 1: Distribution of study subjects according to types of Hypospadias (n=32)

Types of Hypospadias	Frequency	Percentage
Granular	4	12.5
Coronal	15	46.9
Sub-coronal	6	18.7
Distal	7	21.9
Total	32	100

Table 2: Distribution of study subjects according to post-operative complications (n=32)

Complications	Frequency	Percentage*
Uneventful	29	90.6
Urethra-cutaneous fistulas	3	9.4
Urethra-cutaneous fistulas with meatal stenosis	2	6.2
Urethral strictures	-	-

*multiple responses

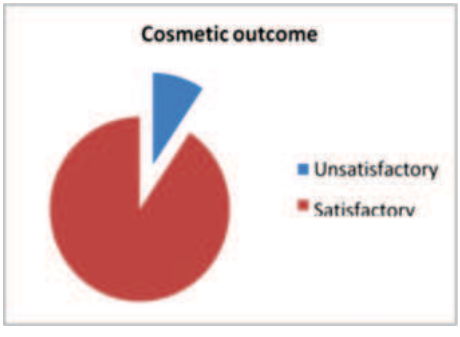

Figure 2: Distribution of study subjects according to cosmetic outcome (n=32)

DISCUSSION:

Hypospadias is among the most prevalent birth defects in males. It causes serious psychological problems coupled with physical difficulties with urination and Sexual functions in later stages of life. The mainstay in treatment of hypospadias is to restore both aesthetic and functional normalcy. Hypospadias have been surgically repaired for more than 150 years and for which more than 300 procedures are described in the literature. As for today, the most commonly accepted procedure for the repair of the distal hypospadias is the one suggested by Snodgrass, Tubularized Incised Plate procedure (TIP), a single stage procedure, which has the lowest rate ofuretro-cutaneous fistulas and meatal stenosis[14]. Waterproofing layers have been a mainstay as a shield against the development of urethra-cutaneous fistulas. But, there are some inherent complications like separate incisions with intensive dissection, skin necrosis, more operating time and increased morbidity to each procedure and carries considerable cosmetic outcome. In the present study, we assessed the spongioplasty procedure without a waterproof layer in treatment of primary distal hypospadias repair.

In the present study, we found the mean age of the study participants was 6.2 ± 3.12 years and majority (68.7%) of the children were less than 6 years of age (Figure 1). The study by Arya K *et al*[15] reported that most of their cases (83.33) were of less than 8 years of age. Verma A *et al*[16] in their study observed that found the mean age of the study participants was 6.14 years, which corresponds to our study finding. In 1996, the American Academy of Pediatrics Section on Urology advised that surgical intervention for hypospadias repairs be performed between both the ages of six and 12 months[17]. It has been observed that early repair (typically before 12 months of age) is associated with less anxiety and better psychosexual outcomes than late repair[18]. In the present study, we found higher mean age, which may be influenced by sample composition or late referral for surgical repair.

Duckett[5] reported that among all the cases of hypospadias, 50% were of anterior (distal), 30% middle and 20% posterior (Table 1). Standoli L *et al*[19] reported 80% anterior, 14% middle and 6% posterior hypospadias. In the present study we included all the distal hypospadias cases, out of which, 46.9% were coronal and 18.7% sub-coronal types. On contrary to our study, Verma A *et al*[16] found higher percentage of sub-coronal types. The mean operative (spongioplasty procedure without a waterproof layer) time in our study was 50 minutes while in thestudy by Fathy M *et al*[20] it was 46.25 minutes +/- 7.58 minutes when operating without the use of Dartos flap, which corroborates with our finding. In a study by Javid *et al*[21] it was 62 minutes +/- 8.72 minutes (TIP using Dartos flap) while Ghanem *et al*[22] reported operative time of 180 minutes in 49 cases.

There are many advances in surgical repair of hypospadias. In spite of these advances, none of the approaches are complication free[23]. Post-operative complications of TIP urethroplasty repair may vary from urethra- cutaneous fistula (UCF), urethral stricture, meatal stenosis and persistent chordee[24]. We had no incidence of post-operative infection while in a study by Fathy M *et al*[20] it was 10-15%. In a study by Hamid *et al*[21], the incidence of wound infection was 19.2% and in study by Saleem *et al*[25] it was 6%.

In our study the incidence of urethra-cutaneous fistulas was 9.4%, while in that by Fathy M *et al*[20] it was 10 % when operated without Dartos flap and 15 % when operated with Dartos flap. Bhat *et al*[24] reported only 2.5% cases where urethra-cutaneous fistulas were encountered while operating without Dartos flap.

When Dartos flap is used, it increases the tissue bulk at the suture line causing more chances of hematoma, skin necrosis, torsion and longer operative time. Meatal stenosis was also observed in 2 of the cases having urethra-cutaneous fistula, which may be the result for adhesion of the urethral plate from both the sides. It can be prevented by ending the suture line approximately 3 mm proximal to the neo-meatus, which also forms a slit like meatus.

Although, surgical repair of distal hypospadias carries minor risks, but outcomes in the majority of cases are successful and, despite some variations among different procedures, complication rates are comparatively low. Satisfactory cosmetic outcome was observed among 90% of the subjects (Figure 2), which is similar to the study by Arya K *et al*[15]. The present study being a single centre study may limit the generalization of results, thus, a multi-centric study with more sample size is recommended for further research.

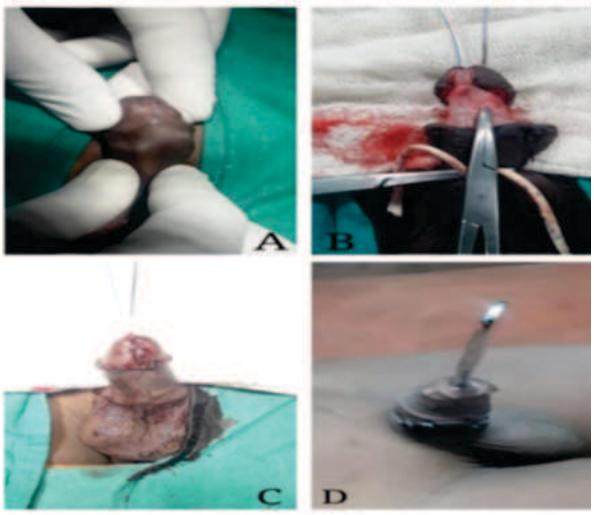

Figure 3: A-Coronal Hypospadias, B-Single layer urethroplasty, C-completion of Urethroplasty, D-Meatus at tip with dilator in situ

CONCLUSION:

Our study thus shows that even without using any waterproofing layer, the anterior or distal hypospadias repair in single layer is reliable with similar results as those done with waterproofing layer, with less operative time and no difference in occurrence of urethra-cutaneous fistula or meatal stenosis, also no chances of skin necrosis or epididymo-orchitis. It is a safer and quicker technique with satisfactory aesthetic outcome.

Conflict of Interest: None to declare

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