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Original article

PREPUTIOPLASTY TECHNIQUE AND TIP URETHROPLASTY IN PROXIMAL HYPOSPADIAS.

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Abstract.

Introduction:

Researchers describe a novel procedure for the reconstruction of the prepuce in a cohort of patients who were either circumcised as children or were born with a short prepuce. This study aimed to evaluate efficacy and feasibility of "tubularized incised plate" (TIP) urethroplasty and "preputial reconstruction" among patients with "proximal hypospadias" and "ventral penile curvature (VPC)".

Methods:

Retrospective evaluation of 81 patients with "proximal hypospadias" who had undergone TIP preputioplasty. "Ventral curvature (VC)" was rectified by mobilising the urethral plate (UP) with proximal urethra and corpus spongiosum; depending on curvature severity, dorsal plication was also performed. Preputial reconstruction comprised a standard three-layer repositioning of the dorsal hood's margins.

Results:

Patients were more than 10 months old and less than 21 years old, with an average of 6 years. Mild curvature (30 cases), moderate curvature (39 cases), and severe curvature (12 cases) were corrected by mobilisation of the spongiosum and UP in 42 patients. In addition, 6 patients needed a single-stitch dorsal plication and 33 cases required mobilisation of proximal urethra. 6 patients and 3 patients had fistula in the urethra and dehiscence of the perpuce respectively.

Conclusion:

In "proximal hypospadias", preputioplasty and TIP is feasible without increasing the complication rate. The evaluation of the adequacy of the epidermis of the prepuce using three stay sutures can prevent postoperative phimosis.

Recommendations:

It is strongly recommended that babies with hypospadias are not circumcised as the foreskin is frequently needed during the operation.

Keywords: prepuce reconstruction, circumcision, glans coverage, hypospadias, tubularized incised plate urethroplasty, urethroplasty, Submitted: 2023-09-05, Accepted: 2023-09-23

1. Introduction.

Due to their religious beliefs, parents of many hypospadias patients in Asian nations and Hispanic people living in Western nations demand an intact prepuce [1]. Prepuce is typically used as a waterproofing epidermal layer from the dorsal side on the neourethra during "proximal hypospadias" repair. In "proximal hypospadias" with a properly developed "urethral plate (UP)" and spongiosum, the UP can be conserved while the "ventral cur-

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vature (VC)" is corrected, making the tubularized incised plate (TIP) procedure possible [2, 3]. A well-executed tension-free suture spongioplasty after spongiosum mobilisation is a highly efficient water-proofing measure in and of itself, or tunica vaginalis/scrotal dartos is used for waterproofing. In such instances, the prepuce can be conserved for preputioplasty. The majority of reported preputial reconstruction cases involve distal hypospadias [1, 4–9].

Prepuce possesses antimicrobial properties against prevalent microbial infections. Not only does circumcision result in the decline of the aforementioned functions, but also brings forth certain psychologic consequences, viz-a-viz sensation of emotional dissatisfaction and harm, sexual pleasure decrease, and an infantile deep mutilation sense [2, 3]. Several non-surgical circumcision alternatives have been noted in medical literature, including steroid application variations, systemic antibiotics in balanoposthitis cases and retraction therapy [10–14]. All subsequent treatments seek to retract the foreskin rather than completely removing it. The purpose of the present investigation was the evaluation of feasibility and efficacy of TIP and preputioplasty in patients with "proximal hypospadias" and "ventral penile curvature".

2. Materials and methods.

2.1. Study Design and Population.

In cases of "proximal hypospadias" with VC, a retrospective review was done in which reconstruction of the prepuce was done. Only patients with adequate dorsal hood size, a properly developed UP, corpus spongiosum, and atleast three follow-up visits were included in the study. A single surgeon performed all surgical procedures. Between three years, 81 inpatients with "proximal hypospadias" with minimum to maximum curvature underwent TIP and prepuce reconstruction. Patients were of more than 10 months old and less than 21 years old.

2.2. Data Collection.

The assessment of preputial width involves the application of three stay sutures. These sutures are placed at specific locations, namely the corona, the distal point of the preputial canopy where both the outer and inner preputial skin meet, and on the penile shaft skin at the corona level. Following the initial fixation of the inner preputial skin at the corona using the first stay suture, the second stay suture is employed to draw the preputial skin across the glans, while the third stay suture serves to retract the preputial skin. When the ability to retract the preputial hood and expose the glans without encountering any challenges indicates that the epidermis is sufficiently pliable.

Preputioplasty is typically conducted subsequent to the restoration of the neourethra by the process of tubularization of the urethral plate (UP) and spongioplasty. This procedure may involve the application of waterproofing techniques using either the vaginal tunica or scrotal dartos. The prepuce is restored using a three-layer approach, adhering to the established technique of revitalising the margins [15]. Initially, the initial suture is positioned at the corona, where the first stay suture is administered at the inner preputial epidermis. Subsequently, distal suturing is conducted up to the third stay suture. The second layer of sutures involves the closure of Dartos, which is subsequently followed by the sutures for the outer epidermis. Regardless of the child's age, interrupted sutures using 7/0 polydioxanone sutures are employed. A compression dressing is applied, and all patients are prescribed a 10-day course of cephalosporin as prophylactic antibiotics. The patients are discharged from the hospital within a period of three to five days and are instructed to return after a span of seven to ten days for the purpose of removing the urethral catheter. After undergoing surgical procedures, patients receive regular follow-up appointments at intervals of 1, 3, 6, and 12 months, and afterwards on an annual basis. Following a three-month period, patients or parents are advised to initiate the retraction of the prepuce at subsequent visits, provided that the skin has adequately healed. This retraction should be performed during bathing, and if the preputial skin is constricted, the application of cortisone ointment is recommended.

The assessment includes the evaluation of various factors, such as cosmesis, retractability of the prepuce, and potential problems, including fistula, phimosis, residual/recurrent ventral penile curvature (VPC), and meatal stenosis.

3. Results.

The meatuses of the patients were found to be situated in the proximal penile region in 45 cases, the penoscrotal region in 15 cases, and the scrotal region in 21 cases. The voiding dysfunction, as assessed by the Gittes test before undergoing urethroplasty, was classified as mild in 30 cases, moderate in 39 cases, and severe in 12 cases. Correction of ventral curvature (VC) was achieved in 42 cases by mobilising the urethral plate (UP) along with the spongiosum. In 33 cases, additional mobilisation of the proximal urethra was performed. For 6 patients with scrotal hypospadias and severe curvature, a single-stitch dorsal plication was carried out following complete mobilisation of the urethra. Degloving was not performed in a cohort of 30 individuals presenting with moderate curvature. Furthermore, in 24 instances, waterproofing procedures were conducted using the tunica vaginalis, whereas in 15 cases where the spongiosum exhibited hypoplasia, scrotal dartos was utilised for the same purpose.

Every individual in the study exhibited a well-developed and retractable prepuce, accompanied by an adequately sized preputial aperture. The satisfaction rate regarding the surgical outcome and cosmesis was found to be 88% among patients and/or their parents. There were no reports from patients or parents indicating the presence of any persistent deformity or reoccurrence of ventral penile curvature (VPC) or phimosis. A total of three patients (3.70%) experienced a complete preputial dehiscence necessitating the need for circumcision, while six patients (7.40%) presented with a fistula that required surgical intervention for fistula repair. A total of nine individuals who presented with a constricted prepuce and subsequently had topical cortisone cream administration experienced successful results in preventing the development of phimosis. The incidence of complications among individuals who underwent urethroplasty was found to be 7.4 percent. Nine adult patients reported engaging in sexual intercourse without experiencing any pain. The duration of the follow-up period varied between 6 months and 2 years, with an average duration of 1.5 years.

4. Discussion.

The positive outcomes observed in our study on TIP procedure for "proximal hypospadias" [2], coupled with the Indian population's preference for an intact prepuce, have motivated us to incorporate preputioplasty in these particular instances. The fundamental surgical premise behind procedures for congenital anomalies is the restoration of anatomical structures to a state that closely approximates normalcy. The acceptability of circumcision is diminishing among both the general public and the medical community. It is suggested that preserving and reshaping the prepuce can be a viable alternative to attain aesthetically pleasing results [4]. The child also derives psychological advantages as he perceives himself to be on par with his peers. If the hypospadias correction procedure proves to be ineffective, it is possible to utilise the inner prepuce as a means to successfully accomplish the repair. The preputial epidermis was employed for the subsequent surgical procedure in six instances. The human foreskin possesses a high density of nerves and blood vessels. The tissue in question plays a vital part in the human sexual response and appropriate copulatory conduct, as it is a sensitive erogenous tissue [12].

Latest surgical approaches for hypospadias repair aim to maintain the integrity of the urethral plate. Presently, a growing number of individuals diagnosed with "proximal hypospadias" are receiving the Tubularized Incised Plate (TIP) procedure, which has demonstrated acceptable rates of complications at 14% [2, 3, 16]. The ideal approach for treating proximal hypospadias is TIP urethroplasty, as stated in reference [17].

The consideration of prepuce reconstruction arises when the foreskin may be brought together

in the middle without any stress at the level of the coronal fissure. Preputioplasty should not be performed when there is a significant gap between the ventral portions of the foreskin [4]. The implementation of our three-stay suture approach aims to minimise the occurrence of phimosis or preputial dehiscence. This is achieved by assessing the sufficiency of the dorsal canopy and the distal boundary of preputial repair during the surgical procedure. Phimosis has not been observed within the context of this series. The preputioplasty approach we employed consists of three layers and is similar to the techniques used by other researchers who have also employed a midline closure of the outer epidermis that imitates the median raphe [1, 4–6]. Giplin et al. (year) conducted a study in which they implemented Z-plasty closure as a technique to mitigate tension on the suture line and minimise phimosis [7].

Preputioplasty is indicated for individuals presenting with coronal or glanular hypospadias due to its ability to achieve a cosmetically satisfactory outcome resembling that of a typical penile appearance [8]. According to Klijn et al. [6], preputioplasty is discouraged in situations of distal hypospadias because to the higher likelihood of complications compared to circumcision. According to Snodgrass et al. [1] and Erdenetsetseg and Dewan [5], it has been proposed that circumcision be performed as an alternative to total de-gloving in cases where dorsal plication is necessary for chordee repair. Preputioplasty is indicated for instances characterised by minimal or absent ventral curvature, although it may also be contemplated for cases presenting with modest curvature.

However, in our perspective, we believe that moderate to severe penile curvature and the positioning of the meatus should not be considered as constraints for preputioplasty, provided that the urethral plate (UP) is in good health and there is adequate development of the corpus spongiosum, tunica vaginalis, and scrotal dartos for the purpose of waterproofing. It is possible to correct penile curvature without the need for transection of the UP. In all instances, it is possible to rectify penile curvature while maintaining the integrityof the underlying penile tissue. When encountering situations where the spongiosum alone was considered inadequate due to its underdevelopment, the scrotal dartos was employed as an alternative.

Based on our empirical observations, it was shown that the implementation of penile degloving and correction of ventral penile curvature (VPC) did not provide any adverse impact on the outcomes of preputioplasty. Nevertheless, in instances with little curvature when the ventral curvature could be rectified through the mobilisation of the urethral plate and spongiosum, we refrained from performing a procedure that involves removing the skin covering the penis. In such cases, the surgical procedure known as preputioplasty may be conducted subsequent to the preparation of the skin margins. However, it is crucial to exercise caution throughout the process of penile degloving in order to prevent any harm to the skin vessels located on the ventral side. The preputioplasty operation was conducted in cases of "proximal hypospadias" following VC correction and penile de-gloving. In contrast, previous studies have focused on performing this procedure in cases of distal hypospadias, either without curvature or with minimal curvature [1, 4–9]. Around 88.88% of the patients observed notable outcomes, while three adult patients reported engaging in sexual activity without experiencing pain. The outcomes of our study on preputioplasty in cases of "proximal hypospadias" with curvature demonstrate similar efficacy to the findings reported by Erdenetsetseg and Dewan (70.6% excellent and 15.7% acceptable) [5], as well as Papouis et al. (83.5%) [9] in their study on preputioplasty in cases of distal hypospadias without curvature.

One drawback of our study is the subjective and semi-objective nature of parameter characterisation, which relied on visual estimation and the input of parents/patients rather than precise measurements. One notable advantage of our study is the implementation of a consistent surgical approach, as all cases were performed by a solitary surgeon. This approach effectively mitigates potential discrepancies in outcomes that may arise from employing several surgeons. Additionally, the utilisation of same suture material and sutures

further enhances the reliability and comparability of our results.

5. Conclusion.

The feasibility of performing preputioplasty with tubularized incised plate (TIP) in cases of "proximal hypospadias" accompanied with penile curvature has been observed, without any notable increase in problems linked to urethroplasty. The surgical procedure known as preputioplasty, in conjunction with urethroplasty and spongioplasty, is employed to restore the appearance of the penis to a cosmetically desirable state. This approach is often preferred by parents or patients affected by hypospadias, since it tends to yield greater satisfaction. The implementation of our three-stay suture technique serves to evaluate the prepuce and determine the distal boundary for preputial suturing, hence diminishing the occurrence of phimosis and preputial dehiscence. Consistent preputial retraction during bathing has the potential to decrease the occurrence of surgical phimosis during a three-month period of skin healing and the application of local cortisone cream. In cases when the inner prepuce is not employed in urethroplasty and there is a parental preference for maintaining an intact prepuce, the recommended course of action is preputioplasty.

6. Limitations.

The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

7. Recommendation.

It is strongly recommended that babies with hypospadias are not circumcised as the foreskin is frequently needed during the operation.

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9. List of abbreviations.

TIP- tubularized incised plate
VPC- ventral penile curvature
VC- Ventral curvature
UP- urethral plate

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11. Conflict of interest

The authors report no conflicts of interest in this work.

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