

Dorsal Inlay Technique and Meatal Preservation in Failed Hypospadias: A New Surgical Technique

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Keywords:

Hypospadias; Dorsal inlay technique; Urethroplasty; Penoscrotal hypospadias

Abbreviations:

TIP: Tubularized Incised Plate Urethroplasty; CIC: Clean Intermittent Catheterization; RUG: Retrograde Urethroplasty; DIG: Dorsal Inlay Graft Urethroplasty

1. Abstract

1.1. Background: Hypospadias is a genetic disease which occurs in about 3 out of 1000 live births. The success rate of long-term hypospadias repair in single-stage procedures is more than 90%. The surgical complications include fistula, diverticulum, meatal stenosis, chordee, and urethral stricture that need secondary repair.

1.2. Case presentation: In the present study, a 21-year-old patient was reported, who underwent dorsal inlay technique with meatal orifice preservation as a new technique of urethroplasty.

1.3. Conclusion: In this technique, the buccal graft in the dorsal area of the urethral stenosis was placed and there was no complication in the patient's follow-up.

1.4. Background: Hypospadias is a genetic disease which occurs in about 3 out of 1000 live births. Recent studies have indicated an increase of its incidence in different countries [1]. The golden time of hypospadias repair is the first year of life [2]. The success rate of long-term hypospadias repair in single-stage procedures is more than 90%, and today, with the improvement of surgical techniques, its complications have been greatly reduced [3]. The surgical complications include fistula, diverticulum, meatal stenosis, chordee, and urethral stricture that need secondary repair [4]. The main causes of surgical failure include necrosis and ischemia of dorsal inlay graft or tunica vaginalis flap, urine extravasation, hematoma, and surgical site infection [5]. Using appropriate sur-

gical techniques and postoperative care are also very effective in reducing complications and increasing the surgical success [6]. In the present study, a 21-year-old patient with a history of penoscrotal hypospadias repair was reported, who suffered from urethral stricture with 5 cm length and underwent dorsal inlay technique urethroplasty with meatal orifice preservation.

2. Case presentation

The patient is a 21-year-old man with a history of penoscrotal hypospadias repair at the age of 8 using tubularized, incised plate urethroplasty [TIP] method in which, his urethral meatus was located in a normal place then his urethral stricture symptoms gradually began one year after the repair. He underwent urethral dilatation twice by a surgeon, followed by clean intermittent catheterization [CIC]. The examinations showed that the tip of the urethral meatus was narrow with a length of 5 cm. Other parts of the urethral were normal in flexible cystoscopy. The RUG image of the patient can be seen in (Figure 1A). The patient underwent a preoperative visit the week before the surgery, and a urine culture was performed for him, which was negative. Half an hour before the surgery, 1 gram of cefazolin was administered. The patient underwent general anesthesia. The retaining suture was applied to the patient's glans, then the skin of the penis was degloved. In the ventral surface, the urethra was opened in the midline from the proximal part of stricture to the 5 mm below the urethral meatus. The urethral plate width was 8 mm, and the stenosis length after opening the urethral

was 5.5 cm. The bottom of the urethral plate was incised at the dorsal level in the midline without damage to the corpus cavernosum, and this incision was extended from the proximal stenosis to the meatus. Following the incision of the urethral plate, the meatal orifice was opened and its caliber was estimated at about 18 French (Figures 2. A, B). The buccal mucosa which was 6 cm in length and 1.5 cm width was harvested from the left side of the mouth and defatted respectively. The Buccal mucosa inserted between the split parts of urethral plate in the midline and sutured by the interrupted method with a 4-0 vicryl to the underlying corpus cavernosa. (Figure 2C). The ventral surface of the urethra was tab-

ularized with a 4-0 vicryl thread around the urinary catheter using the interrupted method. (Figure 2D) Dartos fascia was sutured surrounding the midline incision as the next supporting layer and the tunica vaginalis was retrieved from the left testicle and applied as the third layers. (Figure 2 E, F) The skin of the penis was returned to its place and sutured with monocryl suture 3-0. (Figure 2G) There was little bleeding during the operation and the patient did not have any complications during the first month of operation. The bandage around the penis was maintained for up to three days. The Foley catheter was removed four weeks after the surgery when retrograde peri-catheter urethrogram was completely normal without contrast leakage (Figure 1 B, C).

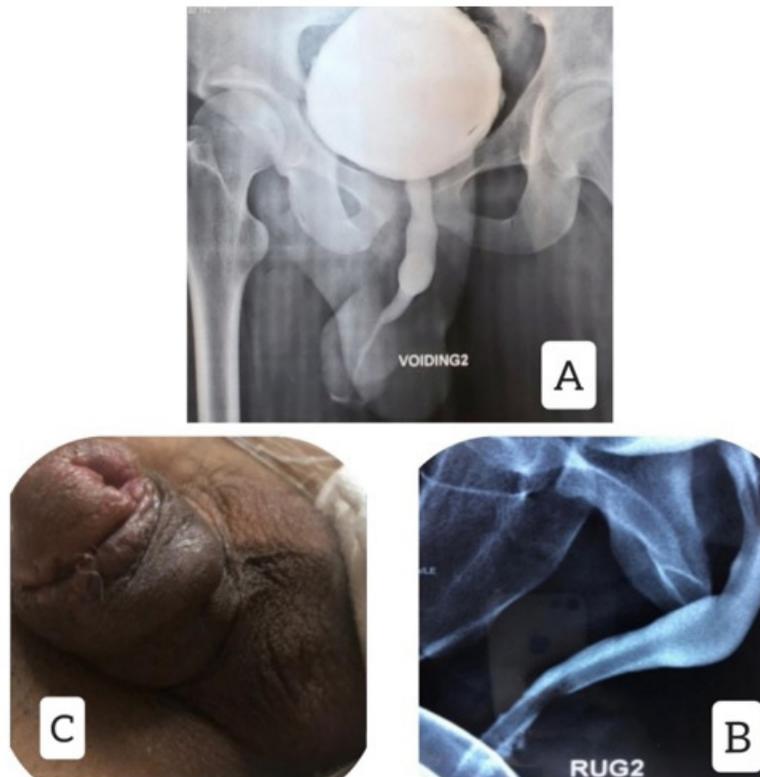


Figure 1: A: Pre-operation VCUG, shows distributed stricture in penile urethra. B: Post-Operative pre-catheter RUG shows no leakage one month after surgery. C: post-Operative appearance of gain of penis without any fistula and meatal stenosis one month after surgery

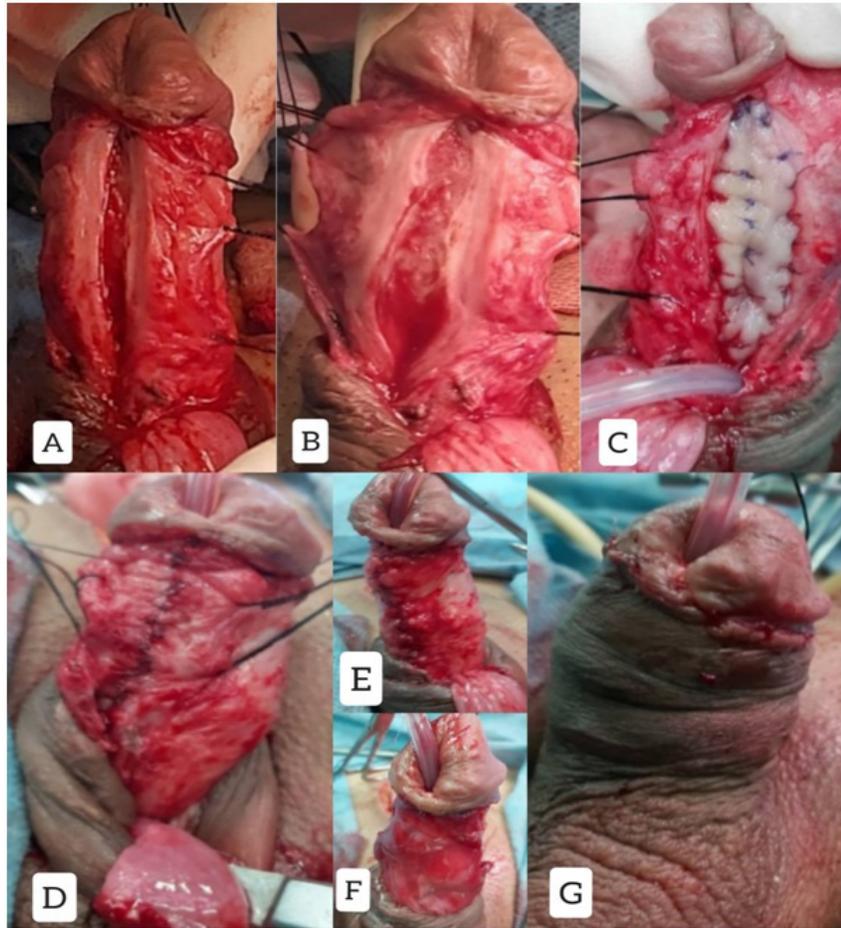


Figure 2: Operation process: A, B: longitudinal ventral incision of urethra and palate of urethra with meatal orifice preservation; C: Buccal inlay quilted with Vicryl 4-0; D: Tubularization of urethra with Vicryl 4-0; E: Spongioplasty of urethra; F: Wrapping of urethra by Tunica Vaginalis; G: Suturing the penile skin in circumcision line.

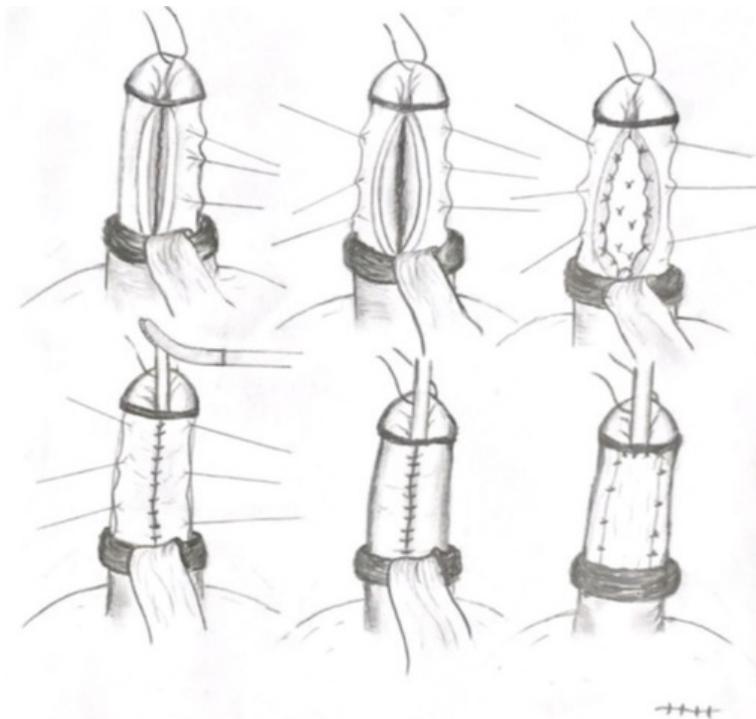


Figure 3: Schematic illustration of inlay urethroplasty with meatal orifice preservation. Description is the same as figure 3.

3. Discussion

TIP surgery was first used in 1990 in a 9-month-old child for hypospadias repair and has since been developed by various surgeons [7]. Although this method has had significant advances and has known as a popular method among urological surgeons, it also has some complications, such as meatus stenosis, fistula, etc. [7]. There is an alternative method called dorsal inlay graft urethroplasty [DIG] used for hypospadias repair. In the latest meta-analysis study published in 2020 by Alashafei et al., it was found that this method has no significant difference with TIP in terms of postoperative complications [8]. However, different modifications have been offered for each of these methods so far. For instance, LennertVan Putte et al. in 2016, used DIG method for buccal mucosa without degloving and with meatal preservation, and that the patient was followed up without complication for up to 8 months after the surgery [9]. However, in the mentioned case, unlike the present study patient, meatus was completely healthy. In cases where the stenosis involved the meatus itself, usually the meatus location is also repaired. In the DIG modification method introduced in the current study, the urethral plate incision was extended at the dorsal level to the meatus. At the ventral level, meatus was preserved and following the buccal mucosal graft inlay, the orifice meatus was enlarged.

In another technique developed by McAninch, a skin flap was placed in the ventral fossa navicularis without opening the meatus with a transverse incision in the subglandular region, the stenosis of the area was repaired [10]. The method proposed in the present study has some advantages, including not incising the glans and thus reducing bleeding and glans dehiscence. On the other hand, due to the use of tunica vaginalis and dartos fascia as supporting layers on the urethral, diverticulitis and fistula are less likely to occur.

4. Conclusion

If the stenosis does not severely affect the meatus itself, for example in lichen sclerosus and hypospadias with anterior urethral stenosis and concomitant involvement of meatus, it can be preserved during the DIG surgery. In this technique, as shown in the pictures [figure 2&3], by preserving meatus, the buccal graft in the dorsal area of the urethral stenosis was placed and there was no complication in the patient's follow-up.

5. Declarations

5.1. Consent for Publication: All of the ethical aspect like consent for publication was respected.

5.2. Consent of Patient: written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of this written consent is available for review by the editor of this journal

5.3. Ethical Approval: not applicable due to this report we illustrate new technique.

5.4. Availability of Data and Material: we confirm that all of the material methods is available but due to case report we don't have any data.

5.5. Competing Interests & Funding

No sources of funding have to be declared.

5.6. Authors contributions

All of the authors [JH, RS, ES, AS, AM] contribute in doing this case report and also read & approved the manuscript.

5.7. Acknowledgment

Not applicable

5.8. Conflict of Interest

No

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