Sidik-Chaula Urethroplasty and the Manset Flap for Non-Glanular Hypospadias Repair

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Background: Hypospadias present with a wide array of meatal position and curvature. Choosing an operative technique for the different types of hypospadias has been challenging and controversial among the plastic, urologic, and pediatric surgeons. Regardless of the selected techniques, primary hypospadias repair still frequently results in complications requiring further surgery, such as fistula, residual chordee, and stricture. Owing to its practicality, the single stage urethroplasties are more-popular and widely used at present. However, our experience found higher rates of postoperative complications with the one-stage procedure compared to the two-stage for repair of non-glanular hypospadia. This article details the operative techniques of the two-stage Sidik-Chaula urethroplasty, a technique that we have implemented in our institution over two decades. It is applicable for the primary repair of any distal, middle, and proximal hypospadias. We also introduce the Manset Flap, a simple modification to the first stage of urethroplasty, which ease neourethra creation in the second stage. However, due to prior insufficient medical record-keeping, we are yet unable to produce a quantified rate of success and complications by utilizing this technique. A study is currently being done to produce the numbers.

Keywords: *Urethroplasty, Sidik-Chaula, hypospadia, manset, two-stage urethroplasty, stage one urethroplasty,*

Latar Belakang: Hypospadia dibagi menurut posisi *meatus* dan derajat kelengkungan penis. Pemilihan tekinik operasi yang tepat untuk berbagai tipe hypospadia menjadi sebuah tantangan dan perdebatan diantara ahli bedah plastik, bedah anak dan bedah urologi. Diluar konteks teknik, koreksi primer hypospadia sering kali berujung pada komplikasi yang memerlukan operasi lebih lanjut, seperti fistula, residu chordee dan striktur. *Single-stage urethroplasty* merupakan teknik yang paling popular dan sering dipakai. Bagaimanapun, pengalaman kami menunjukkan rerata komplikasi yang tinggi pada pasca operasi *one-stage urethroplasty* dibanding dengan *two-stage urethroplasty.*
Artikel ini memberikan penjelasan detail tentang teknik operasi *Sidik-Chaula Urethroplasty*, yang telah diimplementasikan di klinik kami selama dua dekade. Teknik dapat dipakai untuk koreksi dari hypospadia primer, middle dan proximal. Kami juga memperkenalkan *Manset Flap*, yang merupakan modifikasi dari *single-stage urethroplasty*, dimana aplikasi *neo-urethra* tahap kedua operasi dipermudah. Meskipun demikian, prosedur penyimpanan *medical record* pada institusi kami kurang adekuat, dimana kami belum dapat memberikan angka kesuksesan teknik ini. Sebuah studi sedang dilakukan dengan harapan dapat memberikan data yang dimaksud.

Kata Kunci: *Urethroplasty, Sidik-Chaula, hypospadia, manset, two-stage urethroplasty, stage one urethroplasty, hypospadias repair*

Hypospadia is defined as a three associated anatomical anomalies of the penis: (1) an abnormal ventral opening of the urethral meatus, (2) an abnormal ventral curvature of the penis known as chordee, and (3) an abnormal distribution of the foreskin with a redundant hoodlike foreskin in the dorsum while deficient in the ventral aspect[1]. The prevalence of hypospadia is around 0.3-0.8%, making it the most frequently occuring male external genitalia congenital malformation[2-4]. Surgery to repair anatomical defect is the only treatment for hypospadias. The aim of surgical correction is to achieve: (1) a cosmetically acceptable penile shaft, glans, and meatus; (2) allow a straight forward-directed urinary stream; and (3) a straight penis on erection for adequate sexual func-

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ion[5].

There are more than 300 surgical techniques for hypospadia correction described in the literature. As far as hypospadia surgeries stretch, there is nothing new that has not been previously described in the historical documents and books[6]. Attempt of creating a neourethra by puncturing technique, whereby a cannula is perforated through the glans tip and connected to the hypospadic urethra then left for a secondary epithelialization, was first described by Dieffenbach in the 19th century. The use of local tubularized flap was introduced by Theofil Anger in the 19th century. The Mathieu's now-popular meatal-based-flap-technique had been introduced back in the 1980s by Wood. Vascularized island flaps including the dorsal preputial flaps, and free-tissue transfer such as skin grafts has also been done in the 19th century. The techniques used today are adaptations and refinements of those described in the history, each surgeon adhering to their personal preference, combining techniques which suit them best in producing the lowest complication rates. Perhaps, no surgical concern in history has inspired as widespread and controversial opinion in regard to management as has hypospadias[7].

The Sidik-Chaula Two-stage Urethroplasty

In our institution, all distal (proximal to the coronal sulcus), middle and proximal hypospadias are preferrably repaired using a two-stage urethroplasty. We refer to the modified two-stage urethroplasty as the Sidik-Chaula technique. In the first stage, chordee is released and neorutehra is created using a distal intraglanular tunnel raised from a vascularizied preputial flap. The full-length urethra is then reconstructed in the second surgery utilizing a locally transposed cutaneous flap with minimal manipulation.

The tunnelization technique was first introduced by Ulrich T Hinderer in 1968[8]. He created the tunnel using an islanded dartos fasciocutaneous flap, and require a special set of instruments to create the glanular tunnel and to pass the neourethra into the tunnel[9]. Our modification can be performed using any sharp dissecting scissor without the need of custom-made instrumentations, and the neo urethra tube-flap is passed through the glans by placing a traction suture. Here we outline the two-stage Sidik-Chaula hypospadia repair technique. An additional subglanular bilateral flap approximation –called the Manset flap– is illustrated (Figure 1) This is specifically useful in cases of middle hypospadias.

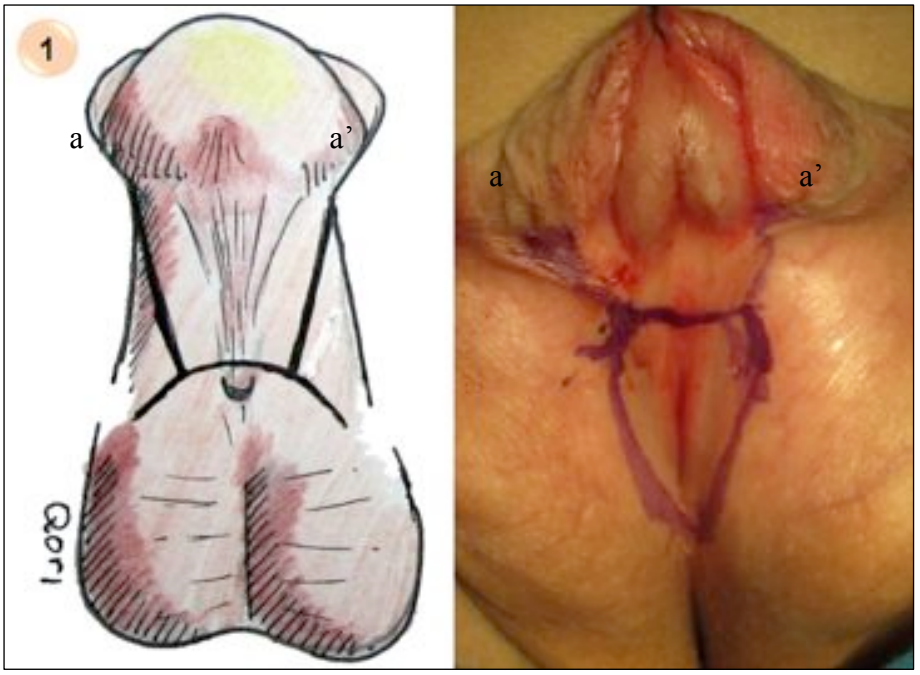

Figure 1. Double opposing horizontal-Y design.

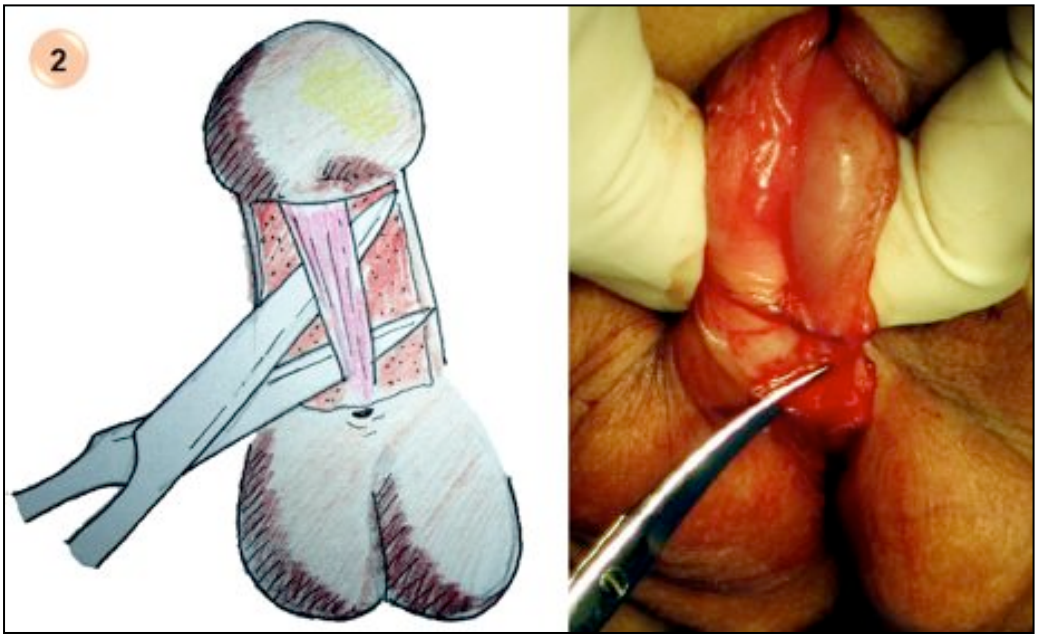

Figure 2. Ventral dissection and releases of chordee.

Place a traction suture into the dorsal penile glans. Draw a double-opposing horizontal-Y incison line 1-mm superior from the urethral meatus. The superior tip of the Y design (a and a') on both sides should reach the base of prepuce skin.

Once the skin is incised and degloved to Buck's fascia, dissect ventrally and identify the chordee (Figure 2). Release chordee until penis is fully straight. An artificial erection by intracavernous saline injection may be used, it aids in evaluating penile curvature.

Release chordee and all fibrous tissues on the lateral sides up to the coronary sulcus (Figure 3). Visualize the well vascularized corporus spongiosum. On the same plane, use a fine sharp scissor to create a neo-urethra by creating a tunnel in the glans .

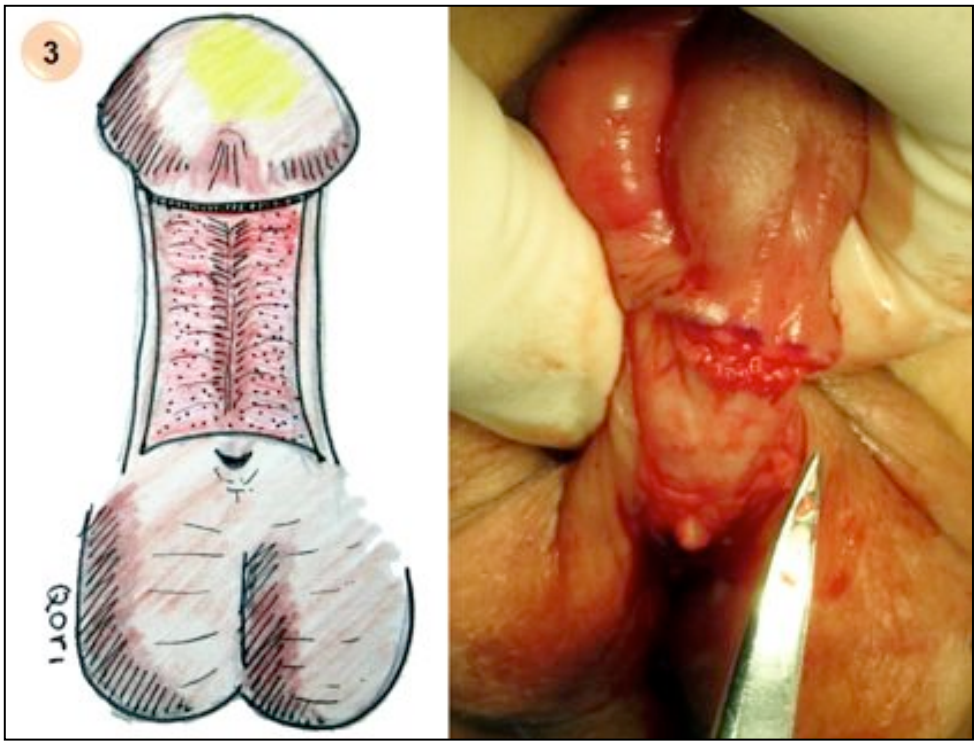

Figure 3. Releasing chordee and all fibrous tissues, visualized the corpus cavernous.

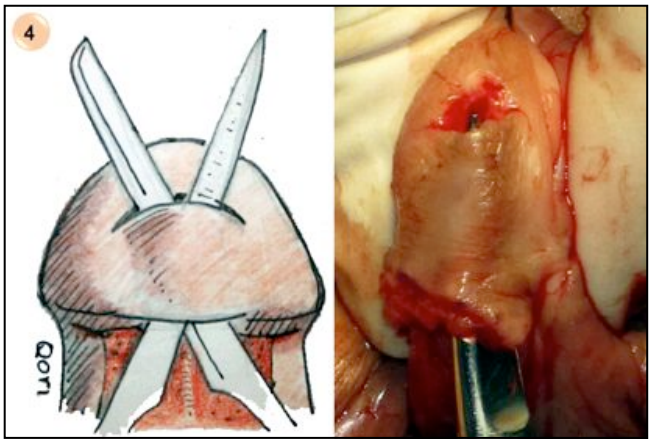

Figure 4. Sharp-dissection to create tunnel.

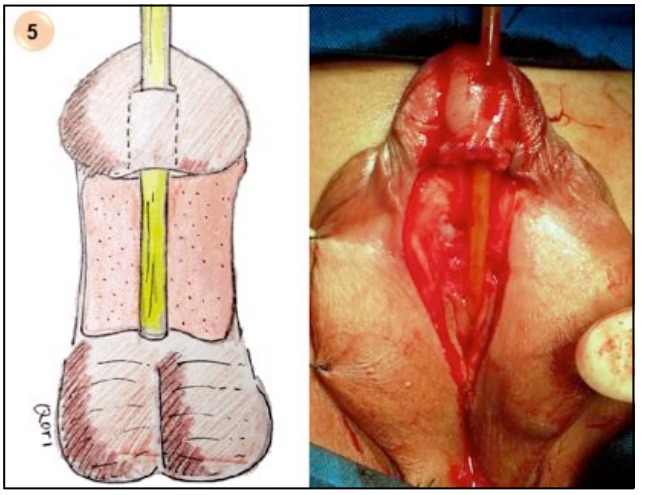

Figure 5. insert cathether through tunnel into native meatus.

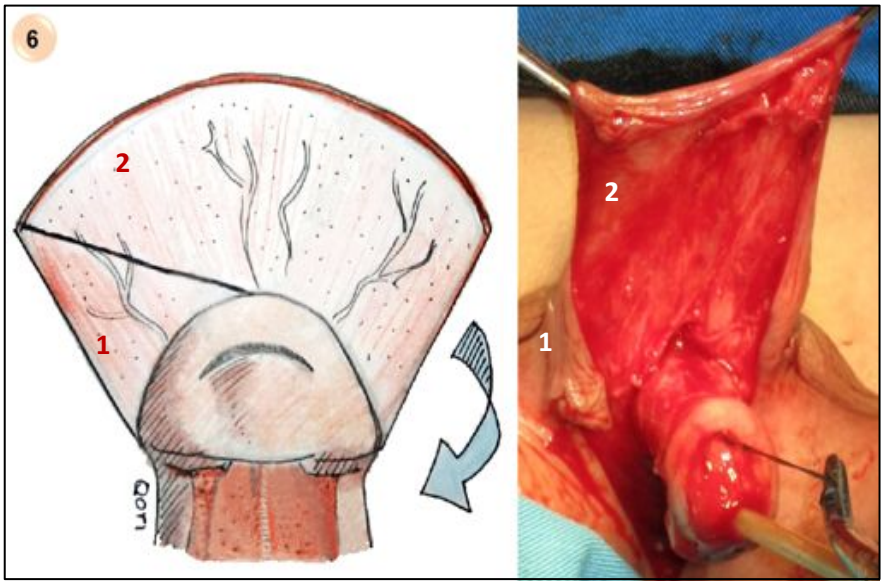

Figure 6. Elevating and dividing preputial flap.

In creating the tunnel, do not dissect bluntly. Perforate through the glans ventrally by sharp dissection, from the proximal to the glans tip, then cut further laterally if required to achieve the desired tunnel diameter (Figure 4).

Pass a urine cathether from the newly made tunnel on the tip of glans, through, then into the native meatus. Secure catheter by inflating the balloon (Figure 5).

Extend the incision made on step 1. Start at the base of preptium, cut dorsally in a circumferential fashion, release the interal foreskin from external foreskin, following the coronal sulcus. Then elevate the flap by fully degloving the penis. Divide the flap into a triangular (1) and rectangular (2) flaps (Figure 6). Perform dissection carefully, avoid injuring the intrinsic vascularity of the skin flap.

The rectangular preputial skin flap is rotated and advanced ventrally, then inset flap underneath the cathether. This will be used to create a tube-flap (Figure 7).

Using the catheter as a template, wrap the insetted rectangular flap invertly around the cathe-ther and create a short tube (Figure 8). The epithelial surface of the flap is resting against the catether wall, while the raw surface lies on the outside.

Leave the thread of the first suture of tube-flap uncut for traction control. Pass the tube-flap into the tunneled penile glans. Use the traction suture and pull the tube-flap through

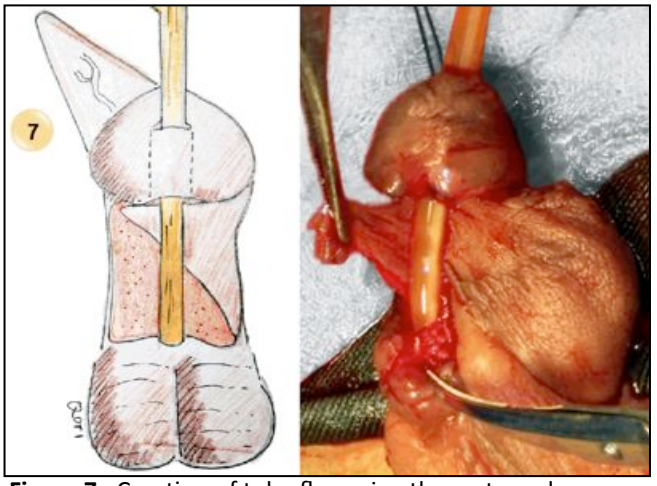

Figure 7. Creation of tube flap using the rectangular preputial flap.

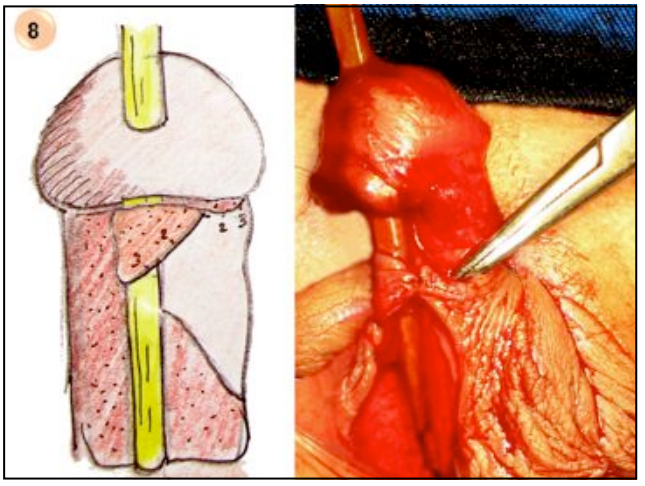

Figure 8. Wrap the rectangular flap around the catheter to create short tube.

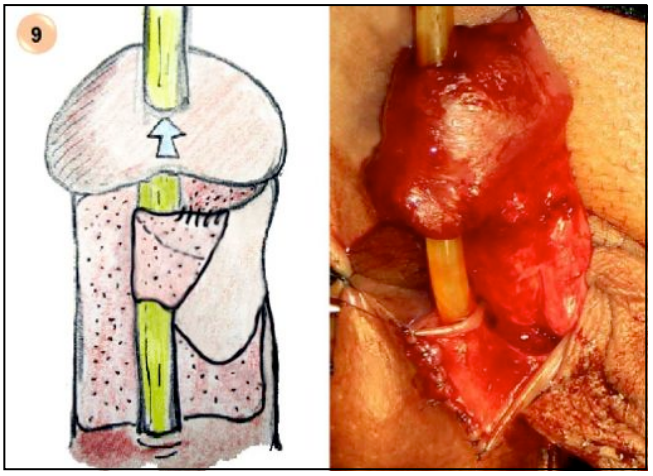

Figure 9. Pass tube flap into the glans neo-tunnel.

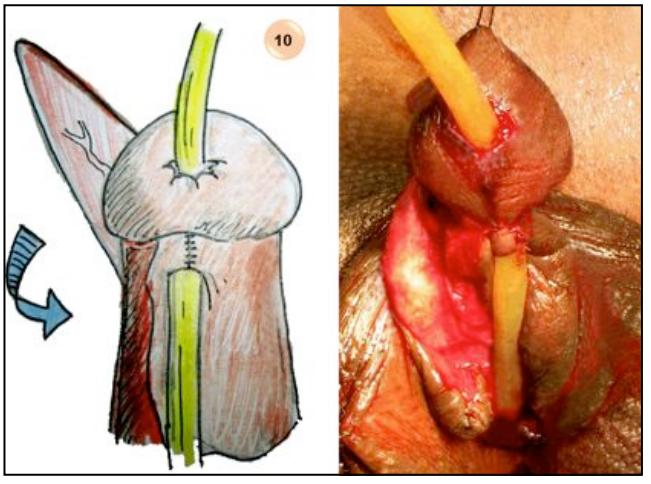

Figure 10. Sub-coronal addition of Manset flap.

the tunnel until the distal edge of tube protrude out to the tip of tunnel. Suture circularly without overeversion of tube-flap (Figure 9).

In cases of mid hypospadia, where after the chordee release the proximal flap is retracted and ventral coronal sulcus is exposed, a subcoronal soft tissue 'pad' called the Manset just inferior to the tube-flap is added, by bilateraly approximating part of the rectangular flap in the ventral midline (Figure 10).

The rest of the rectangular flap beneath the cathether is pulled across the midline, sutured to the penile shaft, and approximated to the posterior half of the native uretrhal meatus. In the distal part, the flap is sutured circumferentially to the subcoronal mucosa. The triangular flap is then used to cover the remaining raw surface (Figure 11).

Finally, the traction suture is secured against the catheter. Lay the penis against the abdomen. Dress with butterfly shaped antibiotic tulle, povidone iodine soaked gauze, dry gauze, and secure circularly with pore tape by applying light circumferential pressure. Secure and connect the catheter tubes.

The Manset Flap

In most cases of middle hypospadias, after a double opposing Y incision is made above the urethral meatus, the proximal flap is retracted proximally when the chordee is fully released. This leaves the ventral coronal sulcus hanging with no soft tissue beneath it. A subcoronal soft tissue 'pad' is then added just inferior to the tube flap subcoronally, by bilateraly approxima-

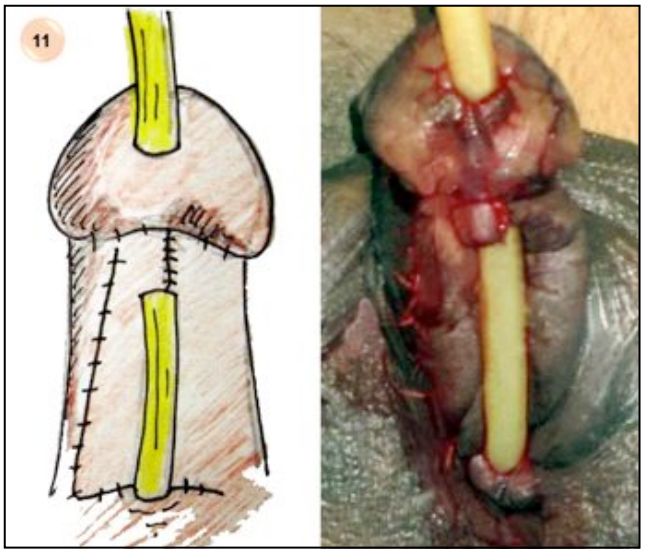

Figure 11. Close remaining raw surface with triangular preputial flap.

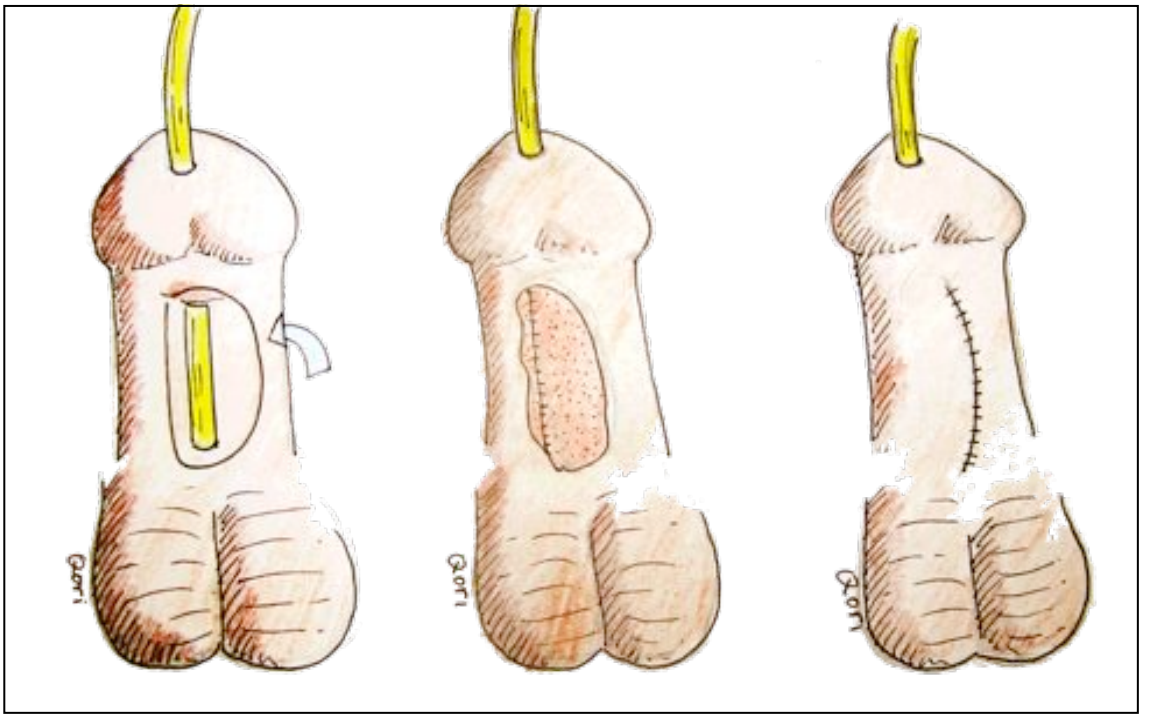

Figure 12. The addition of Manset subcoronally in the first stage operation avoid the need of cutting into the ventral glans in the second stage urethroplasty.

ting part of the rectangular flap in the ventral midline. This part is called the Manset (cufflink) flap. The advantage of this Manset is apparent only in the second stage of urethroplasty, where it preserves the ventral coronal sulcus of the glans from being cut in designing the neourethra (Figure 12).

When the Manset is not insetted subcoronally in the stage-one operation, it will require some part of the ventral coronal sulcus and glans to be incised and elevated as part of the neourethral flap. Aside from technically easing the second stage surgery, adding a Manset flap has reduced the risk of fistula which often forms around this ventral corona. As a comparison, we illustrate a second stage urethroplasty when no Manset flap added beneath the coronal sulcus (Figure 13).

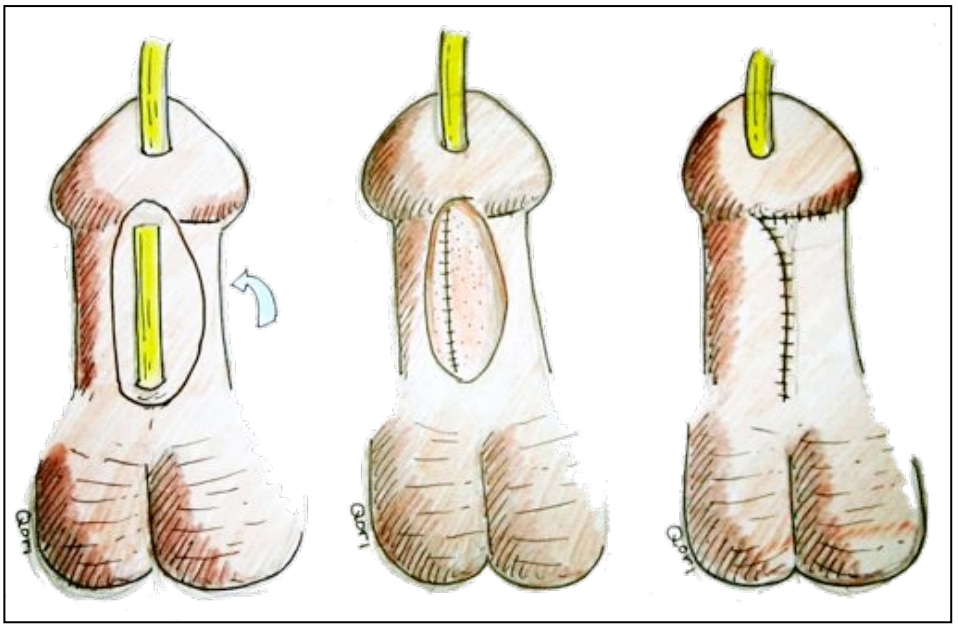

Figure 13. Second stage Sidik-Chaula urethroplasty if a Manset flap is not insetted beneath the coronal sulcus. Some part of ventral corona and glans is cut and transposed as part of the neourethra design The addition of Manset subcoronally in the first stage operation avoid the need of cutting into the ventral glans in the second stage urethroplasty.

DISCUSSION

The debate over choosing a one-stage or two-stage procedures for hypospadias repair is never ending, nor do we intend to cease it. Neither approach is applicable to all cases and many surgeons use the combinations, each with their own success and failure rates. A 2010 systematic review study is in line with this, stating that a 20-year review of the available surgical techniques for hypospadias correction shows that 'no urethroplasty techniques appear to be definitely superior10. The ongoing controversies have in fact stimulate a great deal of advancements, refinements, and improvements within the scope of hypospadia surgery.

In our division, any cases of hypospadia with urethral meatus located proximal to the corona of the glans undergo surgical repair by means of two-stage operations named the Sidik-Chaula urethroplasty. With no statistical backing at this point, using this technique in more than two , we observe a generally lower complications. Rate of fistulas is lower by staging the operation instead of doing the single stage. Stricture complications are rare because a preputial flap is used instead of grafts. Satisfactory chordee release are achieved in most cases. And aesthetic outcome are acceptable to the patients.

Lack of structured patient follow-ups and tracking, as well as failure in keeping a hypospadia database in the past is a major drawback. This have cost us a great deal of objective data to quantify the results of the hundreds of cases done, making it impossible to solidly demonstrate the reliability of our two-stage procedure. A more structured data record and a prospective study is underway to provide us with some figures, hopefully in the near future. If reaffirmed that the Sidik-Chaula urethroplasty can provide pleasing results with acceptable complication rates, this adds one new alternative method of definitive hypospadias repair into the literature.

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