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Experiences on the primary distal hypospadias surgery

Mahmut Ulubay

Department of Urology, Faculty of Medicine, Samsun Training and Research Hospital, Sağlık Bilimleri University, Samsun, Turkey

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*** Correspondence to:**
Mahmut Ulubay
Department of Urology,
Faculty of Medicine, Samsun Training and Research Hospital,
Sağlık Bilimleri University,
Samsun, Turkey
e-mail: mulubay61@hotmail.com

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ABSTRACT

The aim of this study is to contribute to a better understanding and treatment of hypospadias by a surgical technique. We applied a surgical technique for primary distal hypospadias, 118 cases in our clinic between 2007 and 2017. The surgical technique for the hypospadias: the first step is that extending the urethra from the proximal to the distal by means of glandular incision, the second step is to make an incision line under the glans and last one is giving an cosmetic appearance to penis. Glandular opening developed in two (1.6%) of these cases, and urethral fistula in four (3.2%). One of the cases of urethral fistula was accompanied by meatal stenosis; in addition, meatal stenosis was developed in a total of five cases and external meatotomy was performed in one of these. The other four cases were corrected with urethral dilation. The technique we apply is quite simple; and can easily be applied in the treatment of all forms of distal hypospadias. It is suggested that it represents a significant therapeutic option in distal hypospadias surgery since, in addition to being easy to perform; it also has low complication rates and provides satisfactory cosmetic and functional outcomes. It is well known that complication rates are declining significantly with advances in existing surgical techniques. We believe that further development is required in hypospadias surgery to get better results. Applied technique in our clinic might be a surgical option in terms of cosmetic appearance and general complications.

1. Introduction

Hypospadias is the second most common anomaly in males after undescended testis (1/300) (Bouty et al., 2015). Hypospadias is a condition in which the opening of the urethra appears anywhere along the ventral region of the penis due to penile structures failing to close fully during embryogenesis (Van der Horst and de Wall, 2017). Hypospadias is classified depending on the preoperative level of the meatus. Glandular, coronal and distal penile cases are known as distal hypospadias, while mid-penile, proximal penile, penoscrotal and perineal cases are known as proximal hypospadias (Duckett, 1989; Bouty et al., 2015). Seventy percent of all hypospadias are distal, and 30% are proximal (Duckett, 1989; Riedmiller et al., 2001). Surgical treatment of hypospadias is generally recommended between six and 18 months of age. This study discusses an approach for the surgical treatment of distal hypospadias. Although many different methods have been appliedup to this date in the surgical treatment of hypospadias, no perfect method has yet been identified (Keays and Dave, 2017). Hypospadias surgery has undergone a major evolution, but the aim of surgery has

remained unchanged. This is to achieve a functional and cosmetically acceptable penis in a single session. The aim of successful hypospadias repair is to achieve a vertical, cleft-type glandular meatus, a conical glans, a penis that remains straight in an erectile state, and a smooth and healthy skin.

The aim of this study is to review the performance, results, and complications of the method applied in the clinic for the repairing of distal hypospadias.

2. Material and methods

We applied a surgical technique in 118 cases in 2007-2017. All cases were distal hypospadias, and were treated by the same surgeon (Fig. 1). General anesthesia was performed in all cases. First, an incision of sufficient depth to install a urethral catheter as far as the opening of the original meatus was opened from the apex of the glans (Fig. 2). This incision was subsequently sutured with 4/0 polyglactin such as to connect it to the glans with a meatal ring (Fig. 2). This suture was left long for subsequent ureteric stent fixation. Following suturing, the openings remaining on either side of the glans were sutured. We used 8 or 10 F urethral catheters, depending on the width of the urethra. A flap was prepared using the flip-flap technique to close the ventral opening (Fig. 2). The circumcision line was completed as far as the dorsal aspect, and the penile skin was degloved (Fig. 3). Parallel longitudinal incisions extending from the meatus to the distal aspect were made in order to constitute the posterior wall of the urethra (Fig. 3). The glandular wings were dissected as laterally as possible for easier closure of the glans. The flap was then reversed and sutured distally with 6/0 polyglactin and audrethral tube was established with the attachment of suture to the openings on the sides (Fig. 3). A sling suture was placed on the extreme tip of the flap to create an external meatus. Subcutaneous support sutures were first used to close the glans, followed by a matrix suture with 4/0 polyglactin (Fig. 3). An external meatus was established with the help of the sutures applied to the tip of the flap. The circumcision line was closed with 5/0 polyglactin (Fig. 4). The penis was then wrapped in a moderately tight Copan self-adherent wrap. The urethral catheter was fixed by plaster to the adnominal wall to avoid pressure on the suture line.

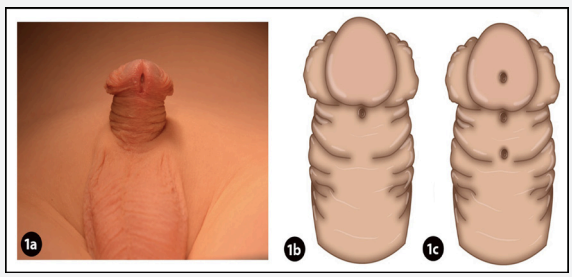

Fig. 1. 1a, 1b, 1c; all the patients to whom we applied our technique had distal hypospadias.

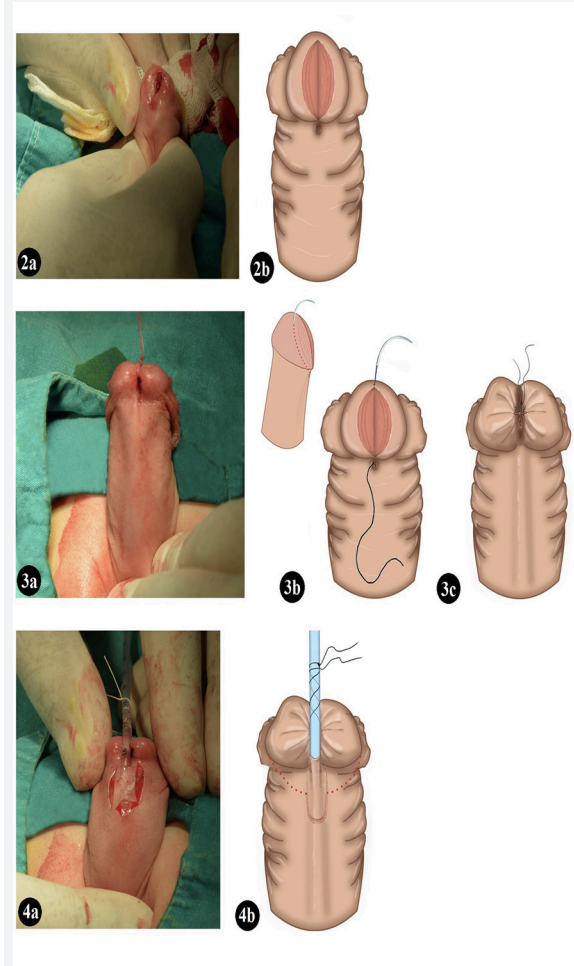

Fig. 2. 2a, 2b; an incision with a depth that allows the placement of the urethral catheter was made from the glans apex to the location of opening of the original mea. 3a, 3b,3c; the incision was sutured to join the mea ring with the glans apex. 4a, 4b; the flap was prepared with the flip-flap technique to close the ventral opening.

Broad-spectrum intravenous antibiotics were started 1 h before surgery and were maintained a day postoperatively. Oral antibiotics were used until removal of the catheter on the third day. Dressings were opened on the third day if no postoperative bleeding and wetting was present. The urethral catheter was removed on day 10. Urine cultures were performed preoperatively and between five days and one month postoperatively. Patient satisfaction, penile appearance, type of urination, meatal stenosis, urethral stenosis, urethrocutaneous fistula and penile deformity were assessed during a period of one-month, if anyone has a complication this period was extended. This retrospective study was conducted in accordance with the ethical principles defined in the Helsinki Declaration.

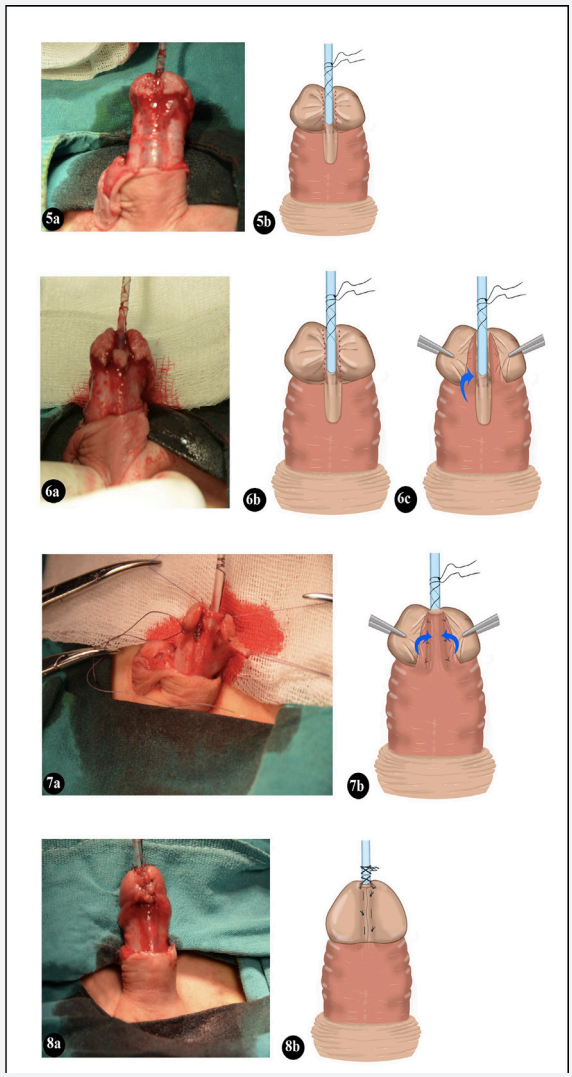

Fig. 3. 5a, 5b; the circumcision line was completed and the penis was degloved. 6a, 6b, 6c; parallel longitudinal incisions were made extending to distal from the mea to form theurethra posterior wall. 7a, 7b; the flap was inverted to form a urethral tube and theglandular wings were dissected as far as possible to the lateral. 8a, 8b; glans wasclosed in the form of a mattress suture after subcutaneous support sutures wereinserted.

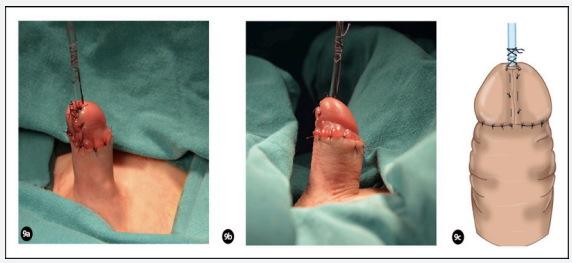

Fig. 4. 9a, 9b, 9c; the circumcision line was closed.

Statistical analysis

No statistical analysis was performed.

3. Results

One hundred eighteen cases were included in the study. Mean age at surgery was 6.08 years. The youngest patient was aged 10 months and the oldest 16 years. External meatal location was coronal in 27 cases, subcoronal in 52 and mid-penile in 39. Cases with advanced penile curvature were excluded. If no curvature was observed at erection tests following careful removal by dissection of the bands causing the curvature, such patients were included.

Mean duration of stent placement was 8 days (min 6, max 12 days), and mean length of hospital stay was five days (min. 3, max. 13 days). Two cases (1.6%) in the total were opened completely due to infection. Urethral fistula developed in four (3.2%) cases. Meatal stenosis was also not present in one of these cases but also occurred in five other cases. The patients in which opening was seen due to infection were aged eight and 14 years. These cases were subsequently corrected with secondary hypospadias repair. As usual re-operation was required in the fistula cases. External meatotomy was performed in one case of meatal stenosis. The others were treated with dilatation. Postoperative cosmetic appearances satisfactory to the family and the physician were achieved in all cases. Cases were followed-up for between one month and three years postoperatively.

4. Discussion

The earliest appropriate age for repair in cases of hypospadias is regarded as between eight and 18 months (Weber et al., 2009; Bush et al., 2013). However, in their retrospective study, Weber et al. reported that there is no ideal age affecting the success of hypospadias repair (Bush et al., 2015). The reason why the majority of cases of digital hypospadias in our clinic are aged over two years is that cases were not diagnosed in the newborn period or that physicians possessed incorrect information concerning the ideal operative age. Patients generally coming from rural areas in our region were noticeably older. Two cases with complete glans opening in our series were significantly older in comparison of the mean age of hypospadias surgery in the world. There are also studies suggesting that hypospadias repair is difficult at early ages when penises are so small, and that complication rates are high (Snodgrass et al., 2010; da Silva et al., 2014). No complications occurred in any of our cases performed under 18 months.

Various techniques have been used for many years in the treatment of distal hypospadias. In the light of the wide diversity of treatments, it appears that the search is still continuing, that there is no consensus on one correct method and that the field is still open to further developments. The currently most frequently employed

techniques are the meatoplasty and glanduloplasty (MAGPI), Mathieu and tubularized incised plate (TIPU) methods. Hypospadias surgery requires a specific experience because of the possibility of complications. Surgeons performing hypospadias surgery therefore wish to employ the method involving the fewest complications and the best cosmetic and functional outcomes. At the same time, it is important for the technique to be easy to perform. Several novel surgical techniques have been described for lower complication rates and a better cosmetic appearance (Snodgrass et al., 2010; Warren and Nicol, 2016). Despite the development of these novel techniques, complications may still be observed following hypospadias surgery at between 6% and 30%, depending on the severity of the anomaly (Park et al., 1994; Snodgrass, 1994). Complication rates of between 1.2% and 6% have been reported by even the best surgeons with the MAGPI technique (Park et al., 1994). An operative time of 115 min and a complication rate of 14.8% have been reported for the Mathieu technique. There are also complaints of a poor meatal cosmetic appearance (Snodgrass, 1994; Wilkinson et al., 2012; Hueber et al., 2015; Pfistermuller et al., 2015). A complication rate of 7% and a mean operative time of 75 min have been reported in even the best centers with the TIPU method. Severe problems are also encountered in cases with curvature with this technique (Snodgrass, 1994). Operative time in our clinic using the described technique is approximately 45 min.

We observed lower complication rates with the technique we have applied in our clinic compared to all these other three methods. We noted three basic problems that can give rise to complications in all the techniques. The first is a smaller suture line steam in order to prevent fistula development. The second is to create a comfortable urethra and external meatus causing urethral and meatal stenosis, and the third is to achieve a conical glans.

The main benefit of the presented technique reduces the suture line steam, for this aim we placed the suture that is applied to the incision from the apex of the glans to the original meatus. Very few sutures were then applied to the lateral aspect of the reversed flap. These sutures generally remained beneath the glans when this was closed. On the other hand, there are many different surgical techniques have been used for the treatment of hypospadias, as seen in the previously used surgical techniques (Elganainy et al., 2010; Wilkinson et al., 2012; Pfistermuller et al., 2015). But they have left long suture line steam on the penis in comparison of the presented technique. This means a high complication rate after surgery would be seen in the used surgical approaches. One of the most important points for surgeons is an efficient surgery involving few number of sutures, short suture line steam and one of the best clinical outcomes after surgery. This surgeon who is an expert on it has done a long period of hypospadias surgeries in our hospital, we did not see any serious surgical complication in comparison of the previous (Park et al., 1994; Elganainy et al., 2010; Wilkinson et al., 2012; Warren and Nicol, 2016). Some of the complications in our cases are given. The risk of fistula developing in case of a severe infection was quite low, if the glans was not opened (3.2%). Glans opening occurred in only two cases in our series (1.6%). These patients were aged eight and 14 years. It was attributed to genital secretions, infection, and nocturnal erection. On the other hand, we showed that the erections do have an adverse impact on our technique even in the adult age group. Since we treated these two cases of opening using the same technique in the second surgery of hypospadias. We also observed the applicability of this technique in circumcised cases and no such opening occurred in younger patients.

The glandular wings were dissected as laterally as possible in order not to compress the urethral stent so as to prevent urethral narrowing and meatal stenosis. Particular care was taken in closing the glans to ensure that the stent could move freely. Finally, the tip of the flap was used in establishing an external meatus appropriate to the original. Care was taken that meatal integrity had formed when we removed the urethral stent. Ibuprofen was administered for analgesia during the time the stent was in place. The urethral stent was normally left in place for 10 days and fixed to the abdominal wall with plasters in order to avoid compressing the ventral suture line.

The first dressing was opened on the third postoperative day in the absence of any bleeding or wetting. Following dressing placement, patients were discharged if they were staying nearby, and were called back for follow-up on the second day. If patients lived in rural areas and it was not possible for them to reach hospital quickly, they were hospitalized until removal of the urethral stent.

The technique we apply is quite simple. The suture that was put on the incision between the glans apex and mea provides the placement of the urethral stent in glans and the creation of two appropriate wings on both sides of glans. The depth of this incision must be so adjusted that the urethral stent can be easily inserted and so that it forms sufficient glandular wings for easy closure of the glans. Even if the cosmetic appearance of the glans appears compromised following this incision, a very acceptable esthetic appearance is restored after circumcision and flap reversal. The glans is closed in two layers in our technique. This prevents both opening of the glans and also fistula formation. Moreover, the desired cosmetic appearance of the glans can thus be achieved. The dressings were not opened except in case of bleeding on the third day postoperatively, and care was taken to keep them immobile. Rifamycin was used in the dressing.

In conclusion, the technique used in our clinic can easily be applied in the treatment of all forms of distal hypospadias. We think that it represents a significant therapeutic option in distal hypospadias surgery since, in addition to being easy to perform; it also has low complication rates and provides satisfactory cosmetic and functional outcomes.

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