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PROKSİMAL VE DİSTAL HİPOSPADİAS OLGULARINDA FARKLI CERRAHİ YÖNTEMLERİN ETKİNLİKLERİNİN KARŞILAŞTIRILMASI

COMPARISON OF THE EFFECT OF DIFFERENT SURGICAL METHODS IN PROXIMAL AND DISTAL HYPOSPADIAS

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ÖZET

Giriş: Hipospadias yaklaşık her 200-300 erkek doğumda bir görülen, üretral meatusun normal anatomik pozisyonundan daha proksimalde yerleşimi ile karakterize bir anomalidir. Hipospadias onarımı için tüm dünyada geçerli tek bir yöntem yoktur. Çalışmamızda retrospektif olarak 75 vakalık bir seride, lokalizasyonlara göre kullanılan yöntemler ve bunların sonuçlarının karşılaştırılması amaçlandı.

Gereç ve Yöntem: Kliniğimize 2002 – 2008 tarihleri arasında başvuran 75 primer hipospadias olgusuna cerrahi onarım uygulandı. Hastaların yaş aralığı 8 – 140 ay ve ortalama yaş 61.8 ay idi. Distal hipospadias olgularında üretral ilerletme (n=27) ve Mathieu tekniği (n=17) ile onarım uygulandı. Proksimal hipospadias olgularında onlay prepüsial ada flep (n=8), Asopa tekniği (n=19) ve deri grefti üretroplasti (n=4) yöntemleri ile onarım uygulandı.

Bulgular: Ortalama 54.6 ay (29 - 92) süre ile takip edilen olgularda tatminkar bir onarım sağlandı. Olguların hiçbirinde enfeksiyon, hematom, yara ayrılması ve divertikül tablosu ile karşılaşılmadı. Takiplerde %8 fistül ve %6.6 meatal stenoz olmak üzere toplam %14.6 komplikasyon oranı gözlendi. Komplikasyon oranı, proksimal hipospadias olgularında onlay prepüsial ada flep yönteminde (%25) ve distal hipospadias olgularında ürteral ilerletme tekniğinde (%3.7) en az gözlendi.

Sonuçlar: Çalışmamızda, proksimal hipospadias olgularında onlay prepüsial ada flep yöntemi ve distal hipospadias olgularında ürteral ilerletme tekniği daha başarılı bulundu.

Anahtar Kelimeler: Hipospadias, üretral ilerletme, onlay prepüsial ada flep, Asopa, Mathieu

ABSTRACT

Introduction: Hypospadias is a congenital anomaly observed in approximately one in every 200 to 300 male births. To date, there is no method universally agreed upon for repair of hypospadias. The aim of our study is to retrospectively compare the methods chosen according to the location of the meatus and their outcomes in a group of 75 patients.

Material and Methods: Between 2002 and 2008, seventy-five patients with primary hypospadias underwent surgical repairs. The age range of the patients was between 8 and 140 months, and the mean age was 61.8 months. The repairs in the patients with distal hypospadias were performed through urethral advancement (n=27) and the Mathieu technique (n=17). The repairs in the patients with proximal hypospadias were performed with onlay preputial island flap urethroplasty (n=8), the Asopa technique (n=19), and skin graft urethroplasty (n=4).

Results: Patients where a satisfactory reconstruction was achieved were followed up for an average period of 54.6 months (range: 29–92 months). None of the patients developed any infection, hematoma, wound dehiscence or diverticula. During the follow-up period, the total complication rate was 14.6%, of which 8% were fistulae and 6.6% were meatal stenoses. The lowest complication rates were observed with the onlay preputial island flap method (25%) applied in patients with proximal hypospadias and with the urethral advancement (3.7%) applied in patients of distal hypospadias.

Conclusion: In our study, the onlay preputial island flap urethroplasty in patients with proximal hypospadias and the urethral advancement in patients with distal hypospadias were found to be the most effective techniques.

Keywords: Hypospadias, urethral advancement, onlay preputial island flap, Asopa, Mathieu

INTRODUCTION

Hypospadias is a congenital anomaly observed in approximately one in every 200 to 300 male births and the condition is characterized by the more proximal placement of the urethral meatus compared to its normal anatomical position.[1,2]

In patients with hypospadias, the surgical repair of the anatomic defect is the only treatment option. The aim of the surgical repair is an appropriate restoration of the anatomically abnormal position of the urethra into a normal penile urethra, as well as an aesthetic appearance and adequate functional outcome.[3-5] Although more than 300 different surgical techniques

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have been described in the literature, no consensus has been reached on a standard technique that gives satisfactory results.[6,7] Thus, the surgeon chooses a specific technique based on his experience and the particular anatomy of each patient.

The aim of our study is to retrospectively compare the methods chosen according to the locations of the meatus and the outcomes of these methods in a group of 75 patients.

MATERIALS AND METHODS

Within the scope of the present study conducted at the Ankara Diskapi Yildirim Beyazit Education and Research Hospital, Plastic and Reconstructive Surgery Department between January 2002 and November 2008, surgical repairs were performed in 75 patients with hypospadias. Patients who were previously treated for hypospadias were excluded from the study. The age range of the patients was between 8 and 140 months, and the mean age was 61.8 months. Patients were followed up for a period between 29 and 92 (mean: 54.6) months. The types of the hypospadias varied between glanular (19 patients), coronal and subcoronal (25 patients), mid-penile (23 patients), and proximal (8 patients). The methods used for the repair of hypospadias were urethral advancement, perimeatal-based flap urethroplasty (Mathieu technique), onlay preputial island flap urethroplasty, preputial island flap (Asopa technique), and skin graft urethroplasty (Table 1).

The urethral advancement technique was first described by Beck and later modified by various authors.[8] This technique involves the release of the meatus and the distal urethra from the tunica albuginea of the cavernous body and the ventral skin island, followed by the advancement of the meatus to the glans tip. The Mathieu technique[9] is a flap repair with a perimeatal base. The meatally based flap is used to form a neourethra on the ventral face of the penis. While the urethral plate forms the roof of the neourethra, the lateral edges of the flap are sutured to the urethral plate to form the neourethral floor. In the Asopa technique,[10] the chordee tissue causing the curvature is completely removed and the prepuce is elevated like a vascular island flap preserving only the blood vessels and a bit of the alveolar tissue. The inner surface of the flap is formed into a tube and used for the reconstruction of the urethra, while the outer surface is used to close the ventral surface defect. In onlay preputial island flap urethroplasty, the flap prepared from the inner surface of the prepuce is formed into a vascular island flap with or without the skin island on it. This flap is transferred to the ventral surface of the penis and sutured to the edges of the existing urethral plate in order to form a neourethra. In the cases where the inner surface of the prepuce is used, the ventral surface defects on the neourethra are closed with the skin of the penile shaft or using Byars preputial flaps. In cases where it is prepared together with the skin island, the existing skin island is used.[11,12] In all the patients in our study where we performed repairs through this method, the flap was used together with the flap skin island. Skin graft urethroplasty has first been used by Nove-Josser and was then improved by Devine and Horton.[13,14] The graft prepared from the inner surface of the prepuce is rolled into a tube around a catheter. Then, this graft is sutured to the urethra at the proximal aspect and to the triangular flap prepared from the glans at the distal aspect. The ventral surface of the penis is closed with the flaps prepared form the outer surface of the prepuce.

The choice of the method to be used in the repair of hypospadias was based on the location of the meatus and the characteristics of the ventral and proximal penile skin, urethral plate and chordee. In patients with distal hypospadias, the Mathieu technique and urethral advancement method were used. In patients with midpenile and proximal hypospadias, the onlay preputial island flap urethroplasty, the Asopa technique, and skin graft urethroplasty were applied. In patients with a narrow urethral plate and severe chordee, onlay preputial island flap urethroplasty or the Asopa technique were used depending on whether the urethral plate was excised. The excision of the urethral plate was performed for the correction of the condition in patients with severe chordee. In patients with penoscrotal and scrotal hypospadias, skin graft urethroplasty was performed with the grafts prepared from the inner prepuce (Table 1).

All patients with hypospadias were operated under general anesthesia. A 6 to 10 Fr intraurethral catheter and tourniquet was applied to all the patients prior

Table 1. Patient characteristics and complications.

	Mathieu	Urethral Advancement	Onlay preputial island flap	Asopa	Skin graft	Total
Number of cases	17	27	8	19	4	75
Mean age at intervention (months)	46 (8-96)	67 (12-108)	59 (18-90)	66 (11-108)	71 (45-140)	61.8 (8-140)
Mean follow-up (months)	64 (56-87)	56 (48-72)	58 (36-84)	47 (32-84)	48 (29-86)	54.6 (29-92)
Fistula	1/17 (%5.8)	_	1/8 (%12.5)	3/19 (%15.7)	1/4 (%25)	6/75 (%8)
Meatal stenozis	_	1/27 (%3.7)	1/8 (%12.5)	2/19 (%10.5)	1/4 (%25)	5/75 (%6.6)
Total complications	1/17 (%5.8)	1/27 (%3.7)	2/8 (%25)	5/19 (%26.3)	2/4 (%50)	11/75 (%14.6)

to the surgery. During the surgery, care was taken to seal the repair area against leaks and to approach tissues atraumatically. Bleeding control was achieved using bipolar cautery. The urethroplasty was performed using 6-0 polyglactin sutures. Following the surgery, dressings were applied to all the patients in a way not restricting the circulation. The intraurethral catheter was removed after 5–7 days. During the follow up, patients were evaluated in terms of infection, hematoma, wound dehiscence, fistula, meatal stenosis and diverticula.

RESULTS

Patients in whom a satisfactory reconstruction was achieved were followed up for an average period of 54.6 months (range: 29–92 months) (Figure 1, 2, 3). All patients remained free of infection, hematoma, wound dehiscence or diverticula. During the follow up period, complications were observed in 11 patients (14.6%), among which 6 (8%) had fistulae and 5 (6.6%) had meatal stenoses. The majority of the fistulae (25%) were observed in the patients where a skin graft urethroplasty was performed, while no fistulae were observed with the urethral advancement technique. The majority of meatal stenoses were observed in patients who had undergone skin graft urethroplasty (25%) without using the Mathieu technique. The lowest total rate of complications (25%) was observed with the onlay preputial island flap method in patients with proximal hypospadias and with the urethral advancement technique (3.7%) in cases of distal hypospadias (Table 1).

DISCUSSION

The selection of the surgical technique for the repair of hypospadias is based on the location of the meatal orifice, form of the glans, and the surgeon's preference. In approximately 65–80% of the patients with hypospadias, the location of the urethral meatus is either coronal or subcoronal.[1,15,16]

For the repair of distal hypospadias - as in general for the repairs of hypospadias - there is no consensus on an ideal method yet.[7,15] The Snodgrass Tubularized-incised plate (TIP) urethroplasty, the Mathieu technique and the urethral advancement technique are all commonly used methods with low complication rates.[17-19] The TIP technique is currently the most commonly applied method.[4,20-22] However, the increased risk of developing meatal stenoses in patients with a urethral plate that is not large enough to allow tubularization is a significant disadvantage of this method. [3,22,23]

Wilkinson et al.[17], who conducted a number of studies using the Mathieu and Snodgrass TIP techniques, have observed higher rates of fistulae with the Mathieu technique (TIP: 3.8%, Mathieu: 5.3%), while the rate of meatal stenoses were higher with the TIP technique (TIP: 3.1%, Mathieu: 0.7%) in the short term. In the long-term follow-up, no difference was observed in terms of the rate of fistulae (TIP: 3.6%, Mathieu: 3.4%), although

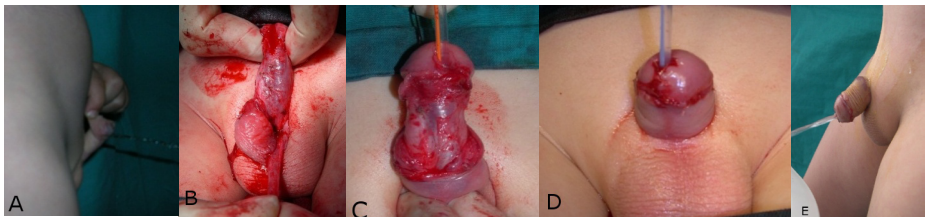

Figure 1. Distal hypospadias, reconstruction of urethra with urethral advancement technique. Urination, preoperative view (A), intraoperative view (B,C), early postoperative view (D) and postoperative urination view (E).

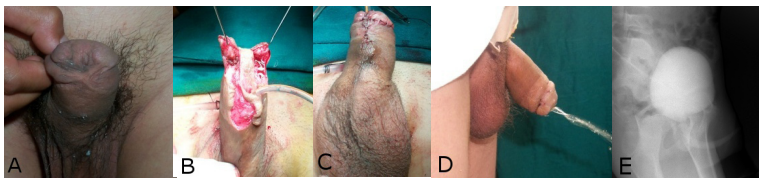

Figure 2. Distal hypospadias, reconstruction of urethra with Mathieu technique. Preoperative view (A), intraoperative view (B,C), postoperative urination view (D), voiding cystouretrogram view postoperative 5 month (E).

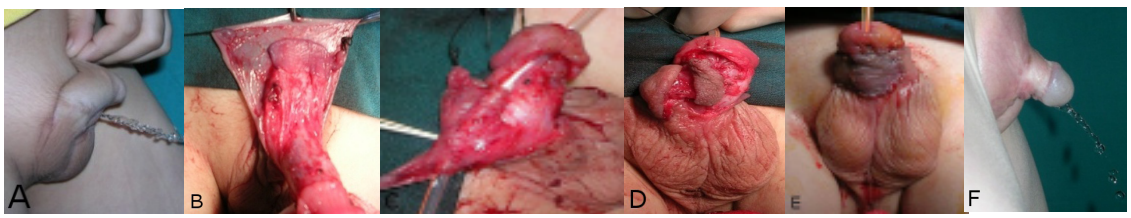

Figure 3. Proximal hypospadias, reconstruction of urethra with Asopa technique. Urination, preoperative view (A), intraoperative view (B, C, D), early postoperative view (E) and postoperative urination view (F).

meatal stenoses were observed more frequently with the TIP technique (TIP: 3.0%, Mathieu: 0.6%). In their study where they compared the Mathieu and TIP techniques, Oswald et al.[20] have found that in patients with distal hypospadias, the rate of complications was lower, the duration of the surgery was shorter and the appearance was better with the TIP technique. Seyhan and Sahin[24] have applied the TIP technique in patients with distal hypospadias and reported better results in those without chordee and where the urethral groove was distinguishable. They also reported the rate of complications as 19% during their mean follow-up period of 18 months. However, Baran et al.[25] have suggested that although the chordee tissue may be soft to a certain extent during the first months, it will never become an erectile and elastic tissue and thus the urethra formed will always be shorter than the rapidly growing penis. They therefore claim that it will not be appropriate to declare the TIP technique as a successful method without observing the results for 10 years after the operation.

In our study, the repairs in the patients with distal hypospadias were primarily carried out using the Mathieu and urethral advancement techniques, which are methods that have long been in use with success.[17,19] In the patients who were treated using the Mathieu technique, no instances of meatal stenosis and only one case (5.8%) of fistula were observed. Harrison et al.[26] have reported a 1.7% fistula and a 6.4% meatal stenosis rate after urethral advancement and glanuloplasty. Sensoz et al.[5] used distal de-epithelialisation and advancement flap techniques and reported an urethrocutaneous fistula rate of 1.7% and a meatal stenosis rate of 3.3%. Among our patients who have undergone urethral advancements, no case of fistula was observed, although meatal stenosis developed in one patient (3.7%).

The selection of the surgical technique for the patients with proximal hypospadias remains a challenge due to the high rate of complications.[27,28] The most appropriate treatment method depends on the quality of the urethral plate and the surgeon's preference. TIP urethroplasty using preputial island flaps and skin grafts is often the preferred method. In the presence of a sufficient prepuce, the onlay preputial island flap urethroplasty and the Asopa technique for mid-shaft and proximal hypospadias can provide a well-formed urethra with little torsion of the penis. In patients with a narrow plate or severe chordee, the first choice is the Asopa technique. Unless the urethral plate is excised, the onlay preputial island flap technique is applied. The excision of the urethral plate is performed for the correction of severe chordee. Different studies indicate the complication rates for the onlay preputial island flap urethroplasty[28-31] as 15–45% and for the Asopa technique[27,32-34] as 9%–69%. In our patients, the complication rates were comparable with the literature for the onlay preputial island flap urethroplasty (25%) and the Asopa techniques (26.3%).

The preputial skin graft, bladder mucosal graft, oral mucosal graft and extra-genital skin graft urethroplasty methods are among the techniques which can be applied in cases of proximal hypospadias.[2,27] In our study, patients with penoscrotal and scrotal hypospadias were treated through urethroplasty using skin grafts prepared from inner prepuce. Baran et al.[2] reported a complication rate of 62% in cases of hypospadias which have been repaired through skin graft urethroplasty. The number of the patients who underwent skin graft urethroplasty in our study was 4 and the complication rate was 50%.

The comparison of the complication rates in hypospadias surgery is complex and difficult. The success rate of the hypospadias repair is affected by many variables such as anatomical variations, tissue quality, surgical technique and the surgeon's competence. This situation renders an objective comparison of the various techniques difficult. Postoperative success indicates that the applied technique is appropriately selected according to the anatomical location of the hypospadias, and the skill and experience of the surgeon.

Various methods have been described for the repair of hypospadias. Instead of trying a different method in every patient, selecting a limited number of methods according to the location of the hypospadias and gaining experience in these methods will significantly improve the success rates. At this point, we are of the opinion that the urethral advancement technique is a good choice in circumcised patients with glanular hypospadias and without distal chordee. In patients with coronally or more proximally located hypospadias, we prefer the Mathieu or urethral advancement techniques due to their low complication rates. In patients with mid-penile or proximal hypospadias, we prefer the Asopa technique subsequent to a chordee excision in case of a narrow urethral plate and fibrotic chordee that causes severe curvature. In case of a wide urethral plate, we perform the repair with an onlay preputial island flap. In cases of penoscrotal and scrotal hypospadias, we prefer urethroplasty using free skin grafts. The high rates of complication independently from the technique chosen still render the treatment of the patients with midpenile or proximal hypospadias complicated.

Although obtained from a limited number of patients, our results point out the most effective techniques as urethroplasty using the onlay preputial island flap in cases of proximal hypospadias and the urethral advancement technique in the cases with distal hypospadias.

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