

One-Stage Repair Using Five Flap Technique of Proximal Hypospadias with Penoscrotal Transposition

PENOSKROTAL TRANSPOZİSYONLU PROKSİMAL HİPOSPADİASIN BEŞ FLEP TEKNİĞİ KULLANILARAK TEK AŞAMALI ONARIMI

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Abstract

Objective: Patients with proximal hypospadias and penoscrotal transposition are frequently treated by a two-stage operation. We applied a one-stage repair modifying the Barcat technique in these patients. The aim of this study was to determine effectiveness of this technique by evaluating the results.

Material and Methods: This procedure was applied in 14 patients with proximal hypospadias and penoscrotal transposition. The penile and scrotal flaps were formed by two U-shaped incisions extending toward the dorsal face of the glans and the perineal area, respectively. The flaps were mobilized. They were then sutured in on-lay fashion, and a neo-urethra was constituted. The corpora cavernosa were dissected. The third U-flap formed by another U-shaped incision passing on either side of the urethral meatus was used to release the upper scrotal folds, and the penis was transposed anteriorly. The two curved transverse incisions were made laterally to the third U-flap. Thus, the lateral scrotal flaps were created. They were consequently sutured beneath the penis.

Results: Complications not requiring re-operation included meatal stenosis in one patient and postoperative bleeding in another. Three patients had fistulae that were subsequently repaired. The overall success rate of the initial operation was 78.6 %.

Conclusions: The advantage of this procedure is its applicability in patients who have penoscrotal transposition. This technique may be considered for repair of proximal hypospadias with penoscrotal transposition, because it provides a long and wide urethral tube and a successful penoscrotal transposition correction.

Key Words: Hypospadias, penoscrotal transposition

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Özet

Amaç: Penoskrotal transpozisyonu ve proksimal hipospadiası olan hastalar sıklıkla iki aşamalı ameliyatla tedavi edilirler. Biz bu hastalarda Barcat tekniğini modifiye ederek tek aşamalı bir onarım uyguladık. Bu çalışmanın amacı ameliyat sonuçlarını değerlendirek, bu tekniğin etkinliğini belirlemektir.

Gereç ve Yöntemler: Bu yaklaşım, penoskrotal transpozisyonu ve proksimal hipospadiası olan 14 hastada uygulandı. Penil ve skrotal flepler, sırası ile glansın dorsal yüzüne ve perineal bölgeye doğru uzanan iki adet U şeklinde insizyonlar yapılarak oluşturuldu. Flepler mobilize edilir. Tüp oluşturacak şekilde dikiş ve böylece yeni üretra oluşturuldu. Korpora kavernoza diseke edilir. Üretra meatusunun yanlarından uzanan diğer bir U şeklinde insizyon yaparak oluşturulan üçüncü U flep, üst skrotal kıvrımları serbestleştirmek için kullanılır ve penis anteriora doğru yer değiştirir. Üçüncü U flebe yanlardan iki eğri transvers insizyon yapılır. Böylece lateral skrotal flepler oluşturuldu. Bu flepler penisin altına sütüre edilir.

Bulgular: Tekrar ameliyat gerektirmeyen komplikasyonlar; bir hastada meatal stenozis ve yine bir hastada postoperatif kanamayı. Üç hastada fistül gelişti ve sonradan onarıldı. İlk ameliyatın başarı oranı % 78.6 idi.

Sonuç: Bu yöntemin avantajı penoskrotal transpozisyonu olan hastalarda uygulanabilmesidir. Bu teknik uzun ve geniş bir üretral tüp ve başarılı bir penoskrotal transpozisyon düzeltilmesini sağlaması nedeniyle penoskrotal transpozisyonlu proksimal hipospadiasın onarımı için düşünülebilir.

Anahtar Kelimeler: Hipospadias, penoskrotal transpozisyon

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Penoscrotal transposition is rarely an isolated event, but is commonly found in proximal hypospadias, and it is a severe anomaly.¹

This anomaly may be complete or incomplete. In the more common incomplete type, the penile body is embedded in the scrotum.² Correction of proximal hypospadias with penoscrotal transposition can be done as one and two-staged repairs. Reconstruction of penoscrotal transposition can be combined with chordee release and hypospadias repair. We carried out an alternative one-stage method

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using five flaps and a modification of the Barcat technique in the patients with proximal hypospadias and penoscrotal transposition.

Material and Methods

The technique was applied in 14 patients with proximal hypospadias and penoscrotal transposition. Patient ages ranged from 4 months to 12 years. The position of the meatus was penoscrotal in 9 patients, scrotal in 4, and perineal in 1. Of the patients, 2 had previously undergone hypospadias repair. All patients were operated by a single surgeon. No dorsal plication in any patient was needed for penile straightening.

Surgical Technique: The ventral glans, urethral plate, and median scrotal raphe were infiltrated with 1:200 000 epinephrine. The first U-shaped incision with a width of 6 to 8 mm was made along the urethral plate, toward the dorsal face of the glans. The second U-shaped incision was formed in the median scrotal raphe, which extended toward the perineal area from the sides of the urethral meatus, as an extension of the former incision. The penile and scrotal flaps formed by these incisions were then mobilized and carefully freed so that they should be thick enough to preserve their vascular supply. They were equal in length and width. The urethra was mobilized for 0,5 to 1 cm.

The fibrous tissue that induces the chordee was excised using sharp dissection from just beneath the corona down to the penoscrotal junction. The corpora cavernosa were dissected to proximal from distal on the ventral face of the penis. This dissection was extended down to the anterior pubic rami. Residual chordee was then tested with an artificial erection.

The third U-flap (pubic flap) was formed by another U-shaped incision (2 to 2,5 cm x 1,5 to 2 cm) extending to the pubic area from either side of the urethral meatus. Thus, the upper scrotal folds on the dorsum of the penis were released and the penis was transposed anteriorly. The suspensory ligament should be protected while dissecting the subcutaneous and deeper tissues in the pubic area. In addition, the two curved transverse incisions

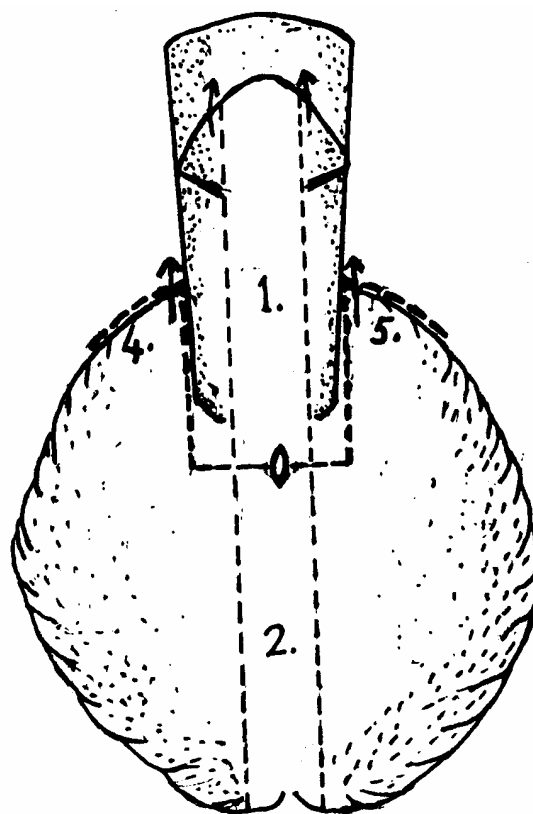


Figure 1. A. 1.Penile flap. 2.Scrotal flap. 4 and 5. Lateral scrotal flaps.

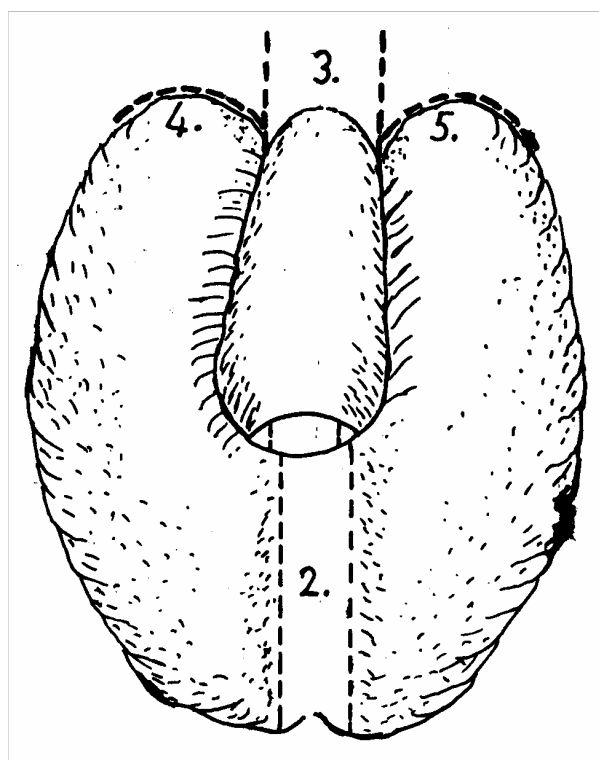


Figure 1. B. 3.Pubic flap



Figure 2. The penile flap incisions are extended along the urethral plate toward the dorsal face of the glans. The scrotal flap is formed in the median scrotal raphe.

with a length of 2 to 2,5 cm just above the upper scrotal folds to form the lateral scrotal flaps are made laterally to the third U flap.

The penile and scrotal flaps were sutured in on-lay fashion to form a neo-urethra using 6-0 polydioxanone interrupted sutures over a 10 to 12 Fr silicone Foley catheter passed into the bladder. The glans was deeply incised in the midline. A triangle spongy tissue from the precise tip of the glans was excised to prevent meatal stenosis. The dorsal neo-urethral lip was sutured to the tip of the glans. The glans wings were closed over the neo-urethra in two layers with subepithelial and epithelial sutures of 6-0 polydioxanone. The divergent edges of the corpus spongiosum and Buck's fascia were sutured in the midline over the neo-urethra. The ventral skin defect was then repaired. The two

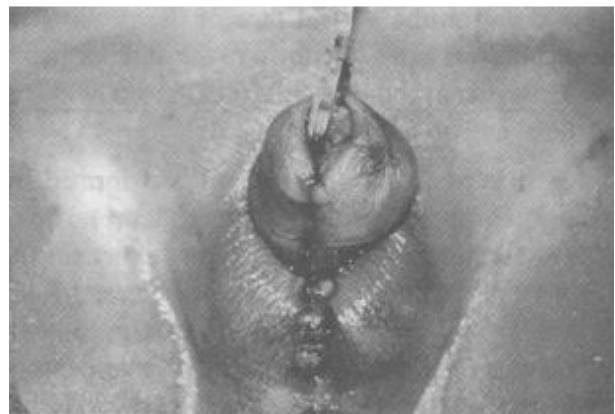
halves of the scrotum were widely mobilized. The lateral scrotal flaps were rotated beneath the anteriorly-transposed penis. The incisions were closed in two layers with interrupted sutures of 5-0 polydioxanone. The silicone Foley catheter was kept in place for 12 to 14 days.

Results

The mean follow-up period (ranging from 8 months to 6 years) was 42 months. A fistula requiring re-operation occurred in 3 patients (21.4 %), one of whom developed a wound infection. In all cases the fistula developed at the penoscrotal junction or proximal penis. Complications not requiring re-operation included mild meatal stenosis in one patient and postoperative bleeding in another. Mild edema was common, but did not compromise wound healing. No patient required a second procedure to correct chordee and penoscrotal transposition. The success rate of the initial operation was 78.6 % (11 of 14). The cosmetic appearance of the penis and scrotum satisfied both the surgeons and parents.

Discussion

The main principles for repair of proximal hypospadias with penoscrotal transposition are correction of the chordee, extension of the penis, creation of a sufficiently long neo-urethra, and transposition of the penis anteriorly and of the scrotum posteriorly. The first question to be addressed in



fulfilling these principles is which type of operation is most appropriate for this anomaly. The

Figure 3. Appearance of the penis and scrotum after hypospadias and penoscrotal transposition repair.

technique proposed most during the last 20 years to repair proximal hypospadias has been the tubularized island flap procedure (Duckett technique) (3). However, Kaplan reported that using a free graft for constructing the neo-urethra allows more flexibility than a pedicle flap and provides an adequate neo-urethral length even in cases of scrotal or perineal hypospadias (4). Moreover, the original Barcat technique fulfills important principles of penile reconstruction. This technique does not depend on the shape of the glans, depth of the urethral groove or even whether or not a prior operation was performed. It allows optimal positioning of the neo-meatus and deepening of the glans groove without lateral dissection within the glans (5). Although the procedure is usually used for repair of distal hypospadias, it can be applied to more proximal deformities when a longer neo-urethra can be constructed (6). In this study, unlike the original Barcat technique for penile reconstruction, we formed the flaps by extending toward the dorsal face of the glans and the perineal area, dissected the corpora cavernosa down to the anterior pubic rami, and excised the triangular spongy tissue at the tip of the glans. Thus, an effective chordee correction, a longer penile body, and a neo-urethra were provided; and a disproportion between the penile body and neo-urethra was prevented.

The second question is whether it is appropriate to correct this anomaly in a one-stage procedure as opposed to a two-stage repair. The proximal hypospadias with penoscrotal transposition is frequently treated with a two-stage operation (7). A simultaneous urethroplasty is not recommended since the circular incision made at the base of the penis for correction of penoscrotal transposition compromises lymphatic drainage, which may interfere with healing of the neo-urethra (2). Greenfield *et. al* also advocate the two-stage operation to correct chordee effectively and achieve a nearly normal penile cosmetic appearance with a low rate of complication (8). According to Mori and Ikoma, the penoscrotal transposition should be corrected after urethroplasty (9). But there are reports of one-stage repairs as well (10-12). The present procedure is also applied as one-stage. Perovic and Vu-

kadinovic also successfully realized one-stage surgical repair using vascularized penile skin flaps (11). The only disadvantage of this technique is the limited length of the urethra and the spiral skin flap if used. A neo-urethra of adequate length is essential in forming a neo-meatus to be located at the precise tip of the glans in the proximal hypospadias repair. We created a longer neo-urethra by using scrotal flap, which extends toward the perineal area. It may be remembered that the neo-urethra is likely to become hairy because the scrotal flap is formed from the median scrotal skin. However, in an investigation of 12 healthy males between the ages of 20 to 30, we determined that the median scrotal skin with a width of approximately 8 to 10 mm remained hairless.

In recent years, some authors have recommended the Koyanagi procedure for repair of severe hypospadias with penoscrotal transposition (13-15). They reported that the rates of complications requiring further surgery were between 20 and 50 %. For the patients in which the Duckett procedure was used, the overall complication rates were noted as 33 to 38 % (16,17). Complications are fistula, mega-urethra, and proximal anastomotic strictures. The present procedure is technically easier than Duckett repair, and complications requiring re-operation have been 3 fistulas (21.4 %). Barthold *et al* reported that the fistula rate was 18 % in patients with distal or mid-penile hypospadias for whom the modified Barcat technique was used (5). Fistula formation can be decreased by closure of the divergent corpus spongiosum and Buck's fascia over the neo-urethra, although this remains the most common complication in our series. The viability of the distal ends of the long peri-meatal flaps used to form the neo-urethra may be questioned, but their viability is verified by the fact that the neo-urethra did not break down in any of our patients. However, Redman suggested that no deliberate attempt need be made to preserve the vascularity of the flaps regardless of length, because, for all practical purposes, these may function as free skin grafts (18).

In penoscrotal transposition, the origin of the penis, corporal fixation, and inferior pubic rami are

abnormal, and the penis is fixed much further back (19). Therefore, we dissected the corpora cavernosa down to the anterior pubic rami and released the upper scrotal folds through a third U incision. Thus, the penis was transposed anteriorly. Furthermore, the lateral scrotal flaps created by the two curved transverse incisions made laterally to the third U-flap have a key role in correcting penoscrotal transposition. Ehrlich and Scardino suggested leaving a skin bridge between the medial aspects of the lateral scrotal flaps to avoid compromising blood supply to the penile skin (10). We agree.

We have used the present procedure for repair of proximal hypospadias with and without penoscrotal transposition since 1990. The advantages of this repair are particularly its applicability in patients who have encountered complications following previous hypospadias repair and penoscrotal transposition. We achieved excellent cosmetic and functional results with a one-stage operation in 78,6 % of the patients. As a result, the five-flap technique may be considered for repair of proximal hypospadias with penoscrotal transposition as it provides sufficient penile length, a long and a wide-enough urethral tube, a successful chordee, and penoscrotal transposition correction with a low complication rate.

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