
Foreskin Preservation in Penile Surgery

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Purpose: Most hypospadias repairs performed in the United States involve the removal of any foreskin that is not used in the repair, resulting in a circumcised penis. Occasionally, the wishes of the parents or the child are for the final appearance to be that of a normal uncircumcised penis. We report our collective experience from 4 institutions in the reconstruction of the foreskin during penile surgery.

Materials and Methods: A total of 58 patients underwent penile surgery with reconstruction of the foreskin during a 6-year period. Of the patients 49 underwent hypospadias repair, 8 underwent phalloplasty for chordee correction without hypospadias and 1 underwent reconstruction of the foreskin for a dorsal hood without hypospadias or chordee. Of the 49 hypospadias repairs 46 were distal, 2 mid shaft and 1 proximal shaft. The technique for foreskin reconstruction consisted of a multilayered reapproximation of the lateral margins of the dorsal hood after completion of the urethroplasty and glanuloplasty.

Results: Among 49 hypospadias repairs 2 patients had dehiscence of the reconstructed foreskin, with development of a urethral fistula in 1. Of the 58 total patients undergoing penile surgery 56 had retractable foreskin, of whom 4 required postoperative steroid application. Three patients/parents requested a secondary circumcision, 2 for an unacceptable cosmetic result and 1 based on personal preference.

Conclusions: Foreskin reconstruction in association with penile surgery can be performed safely and with a low complication rate in appropriately selected patients. Cases with a higher risk of complications include those involving more proximal hypospadias and those requiring complete degloving of the penile shaft. Of the reconstructions resulting in phimosis most can be salvaged with the application of steroids.

Key Words: penis; circumcision; urogenital abnormalities; urologic surgical procedures, male

Most penile surgery for congenital abnormalities performed in the United States includes removal of any foreskin not used in the repair, resulting in circumcision. However, some parents consider this appearance unnatural, preferring instead a normal looking uncircumcised penis as the outcome of reconstruction. Given the increased emphasis on cosmesis with hypospadias repair, it is important not only to create a normal appearing glans and meatus, but also to provide skin coverage that reflects the desires of the family. This approach represents an additional challenge to the hypospadiologist, since foreskin reconstruction has not been performed routinely in the United States and the literature from other countries where it is more commonly practiced has demonstrated inconsistent results, raising concerns that preserving the foreskin may increase complications from urethroplasty. We describe our technique for foreskin reconstruction during hypospadias repair and phalloplasty, and report the collective outcome from 4 institutions.

METHODS

A retrospective review was done of 58 patients at 4 institutions undergoing foreskin reconstruction during hypospadias repair or phalloplasty. It is interesting that 56% of the study group was Hispanic. The surgical technique was similar at each center. In contrast to penile surgeries involving circumcision in which the initial skin incision is circumferential, a V-shaped incision is made from the corners of the dorsal preputial hood to 2 mm under the meatus (fig. 1). Only the ventral aspect of the penile shaft is degloved to normal dartos attachments, although if needed to correct ventral curvature, the skin incision can be extended circumferentially and the penis completely degloved to facilitate dorsal plication. Urethroplasty proceeds as usual with the exception that there usually is no available dartos pedicle flap to interpose between the neourethral suture lines and glans closure. Following glanuloplasty preputioplasty involves a 3-layer closure consisting of the inner foreskin, middle dartos and outer foreskin all approximated with fine absorbable subepithelial sutures (fig. 2).

Postoperative dressings varied according to surgeon preference. Some patients had a semipermeable polyurethane film dressing wrapped around the entire penis and foreskin that fell off spontaneously, while others additionally had a single layer of absorbent fine mesh gauze impregnated with 3% bismuth tribromophenate placed between the glans and

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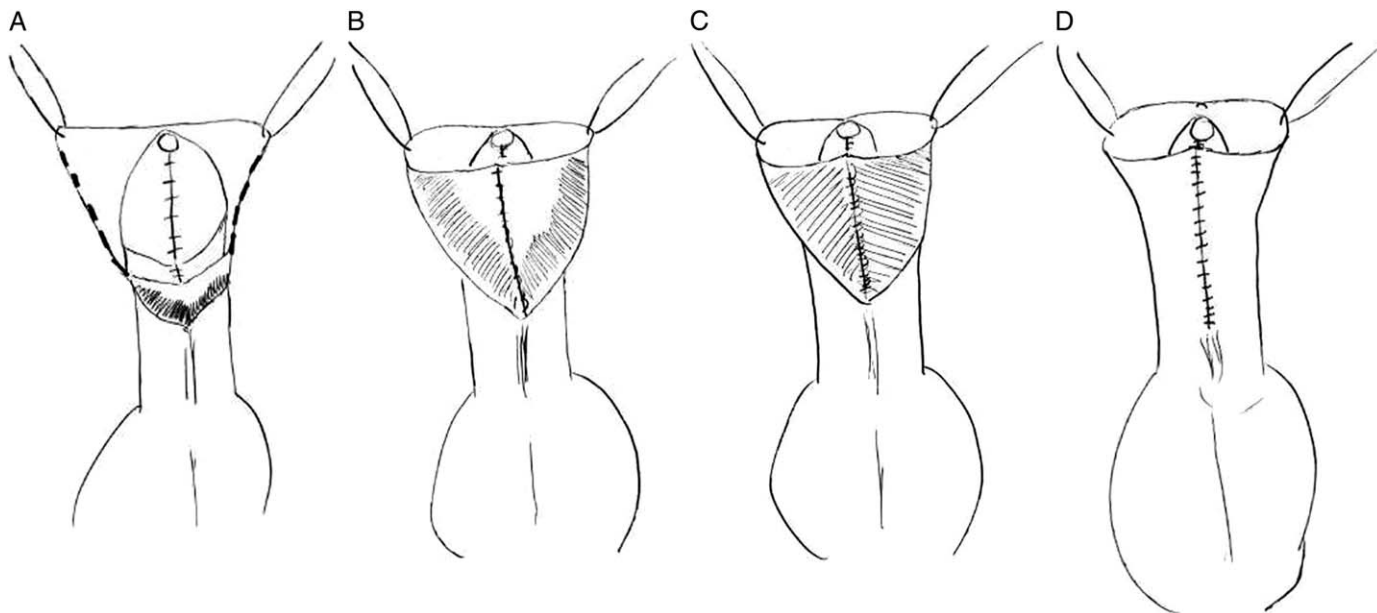


FIG. 1. Technique of foreskin reconstruction. *A*, urethroplasty is completed. Dotted lines indicate lateral edges of dorsal hood. Shaded area indicates dartos layer. *B*, inner mucosal layer of foreskin is closed. *C*, dartos layer of foreskin is closed. *D*, outer epithelial layer of foreskin is closed.

foreskin. All those undergoing urethroplasty were catheterized for 5 to 7 days. Postoperative manipulation of the foreskin by the parents was discouraged. Physicians retracted the foreskin initially at 6 to 12 weeks postoperatively when the suture lines appeared healed. Parents were then instructed to retract the foreskin in the bath daily thereafter.

RESULTS

Of the 58 patients 49 underwent hypospadias repair, with 46 distal, 2 mid shaft and 1 proximal shaft meatus. This group

represented 2% to 25% of patients at our institutions undergoing distal hypospadias surgery during the same period, excluding boys with megameatus intact prepuce variants presenting for repair after circumcision. Of these patients tubularized incised plate urethroplasty was done in 47 and Mathieu in 2. The remaining 9 patients underwent phalloplasty for minor chordee correction without hypospadias or for isolated hooded prepuce. Mean age at surgery was 14 months (range 6 months to 7 years). Postoperative followup after hypospadias repair ranged from 5 months to 6 years (mean 2 years).

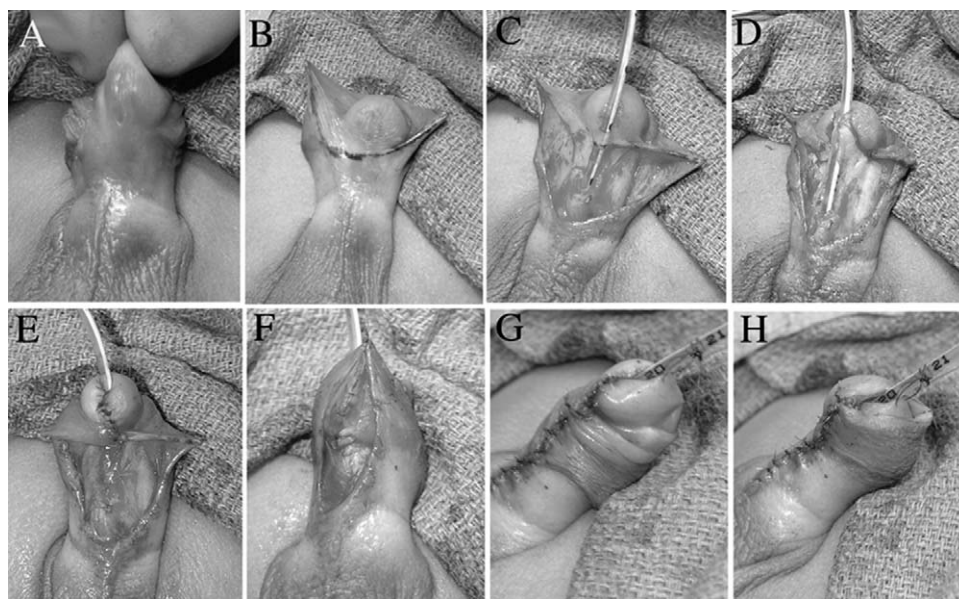


FIG. 2. Sequential reconstruction of foreskin with hypospadias repair. *A*, coronal hypospadias with dorsal hood. *B*, ventral subcoronal incision extends along lateral edges of dorsal hood. *C*, ventral penile skin degloving. *D* and *E*, urethroplasty. *F*, lateral edges of foreskin are pulled distally for foreskin reconstruction in 3 layers—inner skin, dartos and outer skin. *G*, completed reconstruction with skin pulled proximally. *H*, completed reconstruction with skin reduced over glans.

Of the 49 patients who underwent hypospadias repair 2 (4%) had development of complications, including combined foreskin dehiscence and fistula following mid shaft tubularized incised plate urethroplasty in 1 and isolated foreskin dehiscence after distal shaft Mathieu repair in 1. In both cases circumferential complete penile shaft degloving was performed to allow dorsal plication to correct ventral curvature. This result represents 2 of 11 patients who underwent complete degloving and foreskin reconstruction. All patients in whom the penile shaft skin was completely degloved underwent hypospadias repair.

Excluding the 2 boys with foreskin dehiscence, among the remaining 56 preputioplasties the foreskin was retractable in all cases. Four of these patients were prescribed topical betamethasone at 6 to 12 weeks postoperatively due to concern that secondary phimosis was developing. There were no cases of late development of phimosis in a previously retractable foreskin. Despite successful outcome, 3 patients later underwent circumcision, 2 when the parents were dissatisfied with the cosmetic appearance, citing that the skin was asymmetrical, and 1 older boy who changed his preference.

DISCUSSION

Excision of excess foreskin at the time of penile reconstruction is routine in the United States, reflecting a cultural bias toward circumcision. In fact, for some cases of minimal hypospadias the desire for circumcision to remove the hooded prepuce may be the driving force in proceeding with surgery. Nevertheless, some families, especially those of Hispanic background, prefer that the abnormal hooded prepuce, with or without hypospadias, be reconstructed to create a natural appearing penis. Since the goal of surgery is to create a functional and normal appearing penis, expectations of the patient or parents regarding handling of the foreskin should be considered. Therefore, it is important that pediatric urologists be familiar with this technique, and when planning hypospadias repair or corrective surgery for a hooded prepuce without hypospadias we now simply ask if the parents were planning on having their son circumcised at birth. Those who indicate they would not have requested circumcision are offered preputioplasty.

Foreskin reconstruction is a relatively new addition to penile surgery that has become possible as hypospadias reconstruction has evolved toward techniques that do not incorporate these tissues. The method we used is similar to that reported by others.¹⁻⁶ The lateral aspects of the skin incision are the corners of the dorsal hood at the junction of its inner and outer surfaces. Closure is done in 3 layers, including the dartos between the inner and outer skin. Although Gilpin et al² described ventral Z-plasties along the outer skin closure, we and others^{1,3-6} approximate the outer skin in the midline to mimic the normal raphe.

Typically, patients undergoing preputioplasty do not have complete degloving of the penile shaft, and Erdenetsetseg and Dewan suggested that circumcision instead be performed when complete degloving is needed for dorsal plication.⁶ While both of our patients with postoperative complications had complete degloving, 9 others also underwent circumferential incision and preputioplasty without complications. We believe the technique is best suited for cases with minimal or no ventral curvature but can be considered despite the need for dorsal plication for mild curva-

ture. Erdenetsetseg and Dewan also described a wide gap between the proximal insertions of the foreskin and the presence of "excessive" dimpling or marked dorsal asymmetry as being contraindications to preputioplasty, although they did not state how many patients were excluded on this basis.⁶

We performed foreskin reconstruction in all cases when it was requested and did not convert any to circumcision intraoperatively. Our series comprised mostly boys with distal hypospadias. Few patients with more proximal defects underwent foreskin repair, and the ventral curvature of greater than 30 degrees that often accompanies proximal hypospadias would be considered a relative contraindication. In addition, some surgeons prefer onlay urethroplasty using foreskin for proximal hypospadias. Of interest is the series by Johnson and Coleman, who successfully attempted foreskin preservation even in staged hypospadias repairs despite using the inner prepuce as a graft at the initial procedure.³

We recommended that 4 patients use topical steroids when they were suspected to have development of iatrogenic phimosis. In each patient the foreskin subsequently was retractable, and no patient later presented with phimosis. However, it may be that this treatment was unnecessary and that the postoperative reaction had not sufficiently subsided for retraction, since no other series has mentioned use of steroids, and secondary phimosis was only reported by Gray and Boston, who noted the condition in 2 of their 205 patients.⁵ Rather, the most common complication has been foreskin dehiscence, which occurred in 3% of our cases. The incidence of complete or partial dehiscence (the latter referred to as a skin fistula without involvement of the urethra) ranges from 0% to 30%.^{4,5} To reduce the likelihood of this problem, we instructed parents not to attempt foreskin retraction until the surgeon determined at 6 to 12 weeks postoperatively that the wounds were sufficiently healed.

Others similarly have first determined that the foreskin could be retracted before recommending parents continue retraction, albeit earlier, at 2 weeks postoperatively.¹ However, the greatest incidence of dehiscence was noted by Klijn et al, who instructed parents to begin retraction at 10 days postoperatively, apparently without prior physician assessment.⁴ It is possible some injuries occurred from an overzealous attempt by parents to manipulate the foreskin before postoperative reaction sufficiently subsided. Furthermore, in their series most hypospadias repairs were done with flip-flaps, in contrast to others in which urethroplasty was accomplished using techniques that did not involve a pedicled graft. Using the foreskin to create a flap potentially increases tension on the subsequent skin closure and may result in more dehiscence.

Klijn et al also discouraged preputioplasty because of increased complications from urethroplasty compared to hypospadias repair when circumcision is performed.⁴ However, isolated urethral complications occurred in only 3% of their patients, although there were combined foreskin and urethral problems in another 9%. These urethral complications included 8 fistulas and 1 dehiscence. Despite the lack of a dartos barrier flap in our series, we did not observe an increased incidence of fistulas compared to hypospadias repair with circumcision, probably because most of our cases were distal with most or all of the neourethra under the glans wings. Others similarly have not found an increased rate of fistulas with foreskin preservation.^{1-3,5,6}

We had 2 families subsequently request circumcision due to dissatisfaction with the appearance of the reconstructed foreskin. In both cases there was noticeable disproportion between the dorsal and ventral surfaces following repair. We did not categorize differences in the preoperative and postoperative appearance of the foreskin, but other parents whose boys had asymmetry did not express concerns or request additional surgery.

A weakness of our study was the lack of a systematic means to assess cosmetic outcomes, although few reports on hypospadias outcomes include such data. Furthermore, parents sometimes are unhappy with perceived excess or irregularities of skin when circumcision is done during hypospadias repair, and secondary procedures may be requested despite good functional outcomes from the urethroplasty. Gray and Boston surveyed 45 patients by questionnaire at least 10 years after distal hypospadias repair with foreskin reconstruction, comparing answers to a control group operated on for appendicitis.⁵ None of their patients had undergone circumcision after being dismissed from postoperative followup, and 95% responded that the penis looked normal or slightly different from normal, which was not significantly different from matched controls who did not undergo penile surgery.

CONCLUSIONS

The goal of hypospadias surgery is to create as normal a penis as possible. In selected proximal cases and most distal cases without significant ventral curvature foreskin reconstruction may be offered to families who would not otherwise

desire circumcision for their son. The surgical technique is straightforward, and we did not observe an increased rate of complications compared to our experience with similar repairs completed with circumcision. Postoperative retraction should be delayed until there is sufficient healing to avoid iatrogenic trauma to the repair, and is best determined by the surgeon before parents routinely manipulate the foreskin. Secondary phimosis has not been a problem with the technique. However, if secondary phimosis is suspected, it can be treated with topical steroids.

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