

Modified snodgrass hypospadias repair using the lembert suturing technique

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Abstract

Background: Surgical repair of hypospadias deformity is a challenging and complex issue. However, the technique of Snodgrass and its modifications attend promising functional and cosmetic results.

Purpose: To assess the Lembert suturing technique effectiveness as a modification of the Snodgrass technique in lowering an urethrocutaneous fistula rate.

Patients and Methods: Fifty boys with mid-shaft and distal hypospadias were repaired using the modified Snodgrass technique utilizing the interrupted Lembert suturing technique in neourethroplasty. Patients with previous failed operations or severe chordee were excluded from the study.

Results: None of the patients develops UCF apart from one who developed complete wound dehiscence following severe wound infection. Mild meatal stenosis is seen in two patients, and one patient experienced a small area of superficial skin sloughing.

Keywords: Lembert suturing technique, modified snodgrass hypospadias repair, urethroplasty

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INTRODUCTION

Hypospadias occurs when the urethral fold fails to fuse completely, leaving an ectopic urethral meatus proximally with a flat urethral plate extending to the glans.^[1]

Many surgical techniques have been designed to correct this deformity. However, tabularized incised plate urethroplasty, described by Snodgrass in 1994, is one of the most commonly used procedures. It was first described for the distal type of hypospadias,^[2,3] and then later modified for the midshaft and proximal types.^[4]

The rate of potential complications after Snodgrass repair has decreased over time, and the rate of the most common complication, urethrocutaneous fistula (UCF), ranges from 2%–14%.^[5]

Many modifications to the original Snodgrass technique have been proposed to reduce the complication rate, especially UCF, concentrating on reinforcing the barrier layers^[6] or improving the suturing method.^[7,8]

In this article, the Lembert suturing technique, first described by Antoine Lembert for intestinal suturing

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purposes^[9] [Figure 1] was used to modify the original Snodgrass technique, and the effectiveness of this modified technique in minimizing UCF development was evaluated.

PATIENTS AND METHODS

From January 2017 to October 2019, a prospective study involving 50 boys with hypospadias (35 distal shaft, 10 coronal, and 5 midshaft types) was performed. Their ages ranged from 2–5 years (average 3.4 years), and none of the patients had undergone any previous surgery.

Approval was obtained from the Institutional Review Board (IRB) (IBR 7/32B).

Technique

All patients were operated under general anesthesia, and transurethral urine diversion was achieved through the insertion of an 8–12 Fr silicone catheter. A U-shaped incision was made around the ectopic urethral meatus extending distally to the glans [Figure 2a]. The width of the U incision was predetermined by approximating the urethral plate margin over the catheter. Complete degloving of the penile shaft was performed circumferentially, which automatically corrects mild cases of chordee. The midline urethral plate was incised dorsally toward the glans but never extended to the tip, and the depth of incision was down to the corporal tissue. The Lembert technique^[9] was used to perform the neourethroplasty, as follows:

1. Using a 6/0 polydioxanone suture, the needle is inserted perpendicular to the epidermis, approximately 4 mm distant from the midline of the urethral plate
2. With a fluid motion of the wrist, the needle is rotated superficially through the dermis so that the needle tip exits the skin 1 mm distant from the midline of the urethral plate on the ipsilateral side

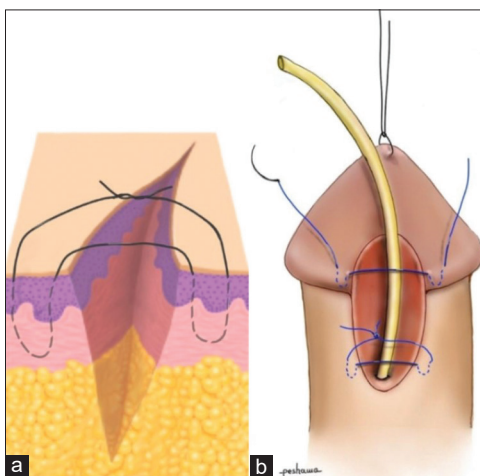


Figure 1: (a) The original Lembert suturing technique, (b) tabularizing of neourethra using lambert suture

3. The needle is then inserted perpendicular to the skin on the contralateral side, 1 mm distant from the midline of the urethral plate
4. The needle is again rotated superficially through its arc, exiting 4 mm from the midline of the urethral plate
5. The suture material is then tied gently to secure epithelial inversion, taking care to minimize tension across the epidermis and avoid overly constricting the closure edges [Figure 2b and c].

The dorsal or shaft dartos flap was used as a barrier flap to cover the new urethra, and the flap was fixed in place with a few 6/0 polydioxanone sutures [Figure 2d and e]. The glans wings were approximated at the midline with a 6/0 polydioxanone suture, and the skin flaps were mobilized for final closure using 6/0 or 5/0 polyglycolic acid sutures [Figure 2f].

Follow-up

During the hospital stay (1–3 days), all patients received antibiotics through the parenteral route for 1 day and then were switched to the oral route for another 5 days. The catheter was removed after 7–10 days. All patients were scheduled for a regular follow-up visit every week for the 1st month then every month thereafter. At each visit, the patient was clinically examined to assess the healing process, and their parents were asked to calibrate the new urethra three times a week for 2–3 months using an 8–10 Fr urethral sound.

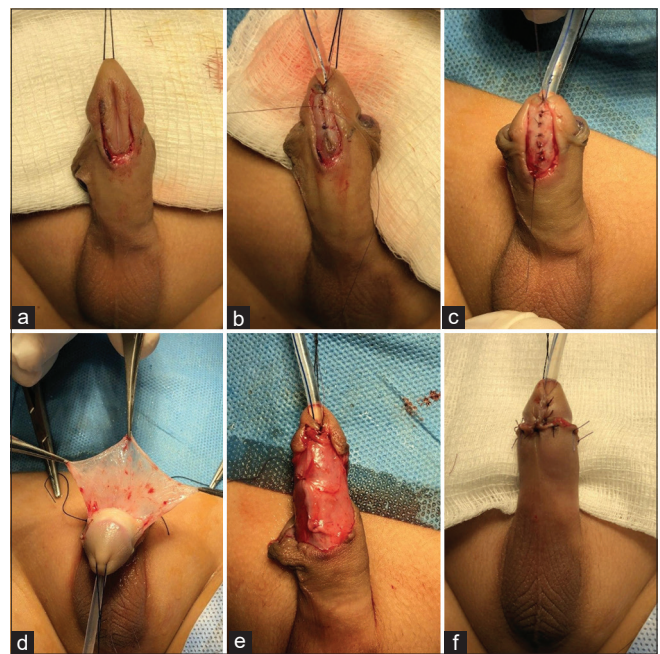


Figure 2: (a) U-shaped incision around urethral plate (b and c) tabularization of neourethra using lembert suture (d) dartos flap elevation (e) Rotation of dartos flap to cover the suture line (f) closure of neourethra

RESULTS

The series included 50 boys with hypospadias, comprising 35 patients with distal shaft, 10 with coronal, and five with midshaft types. Their ages ranged from 2–5 years (average 3.4 years). The majority of patients had no chordee, and the five cases with very mild chordee were corrected intraoperatively by degloving. In these patients, no recurrence of ventral curvature was noticed during follow-up.

The mean follow-up was 6 (range 1–36) months, and complications were observed in four (8%) patients

Following the removal of the silicone catheter, a straight voiding stream and cosmetically acceptable slit-like meatus were achieved in the majority of cases. No UCF was observed during the follow-up period; however, one patient developed complete wound dehiscence due to local infection. Two patients developed meatal stenosis to < 8 F, which was successfully managed by frequent urethral dilatation using lidocaine gel and (8–10 Fr) urethral sounding three times a week for 2–3 months. Only one patient experienced a small area of the skin sloughing on the ventral penile skin surface which healed successfully with conservative treatment.

DISCUSSION

The formation of a UCF may occur early in the process of healing from hypospadias repair, beginning with the migration of skin epithelium into the suture tract.^[7] Al-Adl *et al.* postulated that the development of UCF may occur due to outward migration of new urethral mucosa or inward migration of dermal epithelium.^[10] Hence, it can be stated that epithelial creeping is a significant issue in fistula formation. Snodgrass first described his hypospadias repair technique in 1994,^[11] and since then, it has gained widespread acceptance due to its versatility and low complication rate. Many techniques have been adopted to prevent UCF formation,^[2-8,10-13] most of which are directed toward adding a well-vascularized reinforcing layer between the neourethra and external skin. Studies have reported the use of a dorsal or ventral dartos barrier flap^[2,3] or a de-epithelized dermal flap^[6,7] as a reinforcing layer to prevent fistula formation. However, some have postulated that there is no difference in the fistula rate between patients with and without barrier flaps.^[3] The suturing method is another issue that needs to be addressed to minimize the fistula rate. Yamataka *et al.* modified the Snodgrass technique by stripping the most superficial layer of the skin from both sides of the U-shaped incision, aiming to expose more subcutaneous

tissue, and trim the epithelium along the suture line. A double-layer of closure of the tabularized neourethra has been adopted by others. The first layer is closed by running subcuticular sutures and the second layer is closed by interrupted sutures to secure (turning in) any epithelium that may protrude between the sutures of the first layer.^[8,12]

All of the modifications mentioned above have achieved promising results. In our study, we adopted the Lembert suturing technique, originally developed for intestinal suturing,^[9] to secure epithelial inversion, thereby minimizing its migration along the suture tract and consequently decreasing the fistula rate. In addition, no suture material traverses the incised urethral plate, reducing the risk that foreign material will impair effective wound healing. This may explain our promising results, which are consistent with the results of Sameek Bhattacharya, who modified the Snodgrass technique by avoiding the use of a dartos interposition flap.^[13]

The Lembert suturing technique does not contribute to epidermal-edge apposition, which is considered the main drawback of this technique along with the greater amount of time and meticulous approach required for urethral closure.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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