

DISTALLY FOLDED ONLAY FLAP – A NEW TECHNIQUE FOR REPAIR OF HYPOSPADIAS

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Objective: This study was carried out to evaluate the cosmetic and functional results of this new technique for repair of hypospadias.

Patients and technique: 28 patients (2-22 years) with distal penile hypospadias were included in the study. Eleven of them had had a failed previous repair. An unhealthy urethral plate and/or thin ventral penile skin were found in 17 patients. The technique follows the steps of the island onlay preputial flap or dorsal penile fasciocutaneous flap except in that the length of the flap is, at least, 1 cm longer than the length of the urethral plate. The proximal part of the flap is used for urethral reconstruction. The distal free part of the flap is reflected back to be sutured to the edges of the glanular wings and the penile skin. The urethral stent is removed after 5 days. The patients were followed monthly up to 6 months.

Results: In 26 patients an excellent cosmetic appearance of both the penile shaft and glans was achieved with a slit-like or elliptic neo-meatus resulting in a good urine stream satisfying both the patients and their parents. Partial disruption of one side of the suture line and urethrocutaneous fistula was reported in one patient each. These two complications were corrected surgically with good results.

Conclusion: We conclude that this new technique that we named distally folded onlay flap is easy and versatile with excellent cosmetic and functional results and a low rate of complications when used for the repair of distal and mid-shaft hypospadias in either virgin or redo cases. It should also be considered as a salvage procedure when other techniques are no feasible options.

Key Words: hypospadias, onlay flap

INTRODUCTION

Onlay island flap urethroplasty is applied in a wide variety of hypospadias conditions because it is a straight forward, reliable procedure and provides excellent results. Initially, it was used only for anterior hypospadias without chordee. More recently, its application has been extended to more proximal cases in which there is a well developed urethral plate and little or no chordee after release of skin tethering¹. Excellent cosmetic and functional results with a complication rate as low as 10% were reported by Hollowell et al.¹, while other authors reported significantly high complication rates of 25% up to 52%^{2,3}. Different modifications of the onlay flap technique have been described to avoid the suspected complications. It has been suggested to use the entire inner prepuce for urethral reconstruction and as an extra soft tissue covering the suture lines

to prevent fistula formation⁴. On the other hand, the techniques of double onlay preputial island flap and the split in-situ onlay flap have been described to overcome the problem of severely deficient ventral skin and to minimize the incidence of fistula formation^{5,6}. Lastly Rui et al. presented their neo-stoma technique by everting the distal end of the onlay flap to avoid infection and orifice stenosis⁷.

In this work we describe a modification of onlay flap urethroplasty aiming at overcoming the problems of meatal stenosis, small glanular size and shortage of skin coverage and at avoiding fistula formation.

PATIENTS AND METHODS

From January 1998 to March 2003, 28 patients aged between 2 and 22 years presented

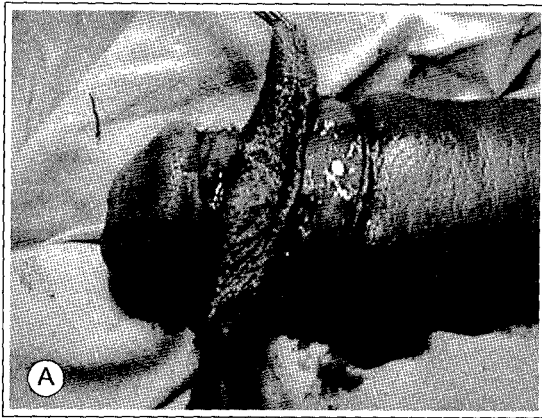


Fig. 1: **A:** A transverse fasciocutaneous flap, at least 1 cm longer than the urethral plate, is taken. **B:** The proximal part of the edge of the flap that is near to the pedicle is sutured to the urethral plate using 6/0 vicryl continuous running sutures. **C:** After the distal free part of the flap has been reflected back to cover the ventral aspect of the glans and penile shaft, the ventral penile skin is sutured to the free edges of the reflected flap.

to the urology department, Assiut University Hospital, Assiut, Egypt, for hypospadias repair and were included in this study. Distal hypospadias was recorded in 17 and mid-shaft hypospadias in 11 patients. Seven patients presented after a failed TIP repair and four after a failed Mathieu repair. Seventeen patients had an unhealthy urethral plate and/or thin ventral penile skin not suitable for either TIP or Mathieu repair. Meatal stenosis was found in 13 patients. In 22 patients, the glans was either small in size or the glanular wings were not suitable for tension-free granuloplasty.

Our technique follows the same steps as the technique using an island onlay preputial flap when the prepuce is present or a dorsal fasciocutaneous flap in circumcised patients. The first modification is that the flap taken should be as long as possible, at least one cm longer than the urethral plate (Fig 1A). The flap is rotated to the ventral surface in a longitudinal direction. The proximal part of the edge of the flap that is near to the pedicle is sutured to the urethral plate using 6/0 vicryl continuous running sutures (Fig. 1B). Before suturing the other edge of the flap, the breadth of the flap at the site of the meatus is modified to obtain a suitable meatus with regard to shape and size. Then urethral reconstruction is completed by suturing the other edge of the flap to the urethral plate using 6/0 continuous subcuticular sutures. The free edge of the pedicle is sutured to the penile shaft to cover the suture line. The distal free part of the flap is reflected back to cover the ventral aspect of the glans and penile shaft. The breadth of that part may be modified at the site of the glans to obtain a cosmetically satisfactory conical glans. The glanular wings are sutured to the edges of the reflected part of the flap. The pedicle of the reflected part is sutured to the penile shaft as a second layer covering the new urethra. The ventral penile skin is sutured to the free edges of the reflected flap (Fig. 1C). The skin coverage is completed by removing any dorsal excess skin. Dressing is done and the stent is fixed for 5 days. Follow up was done monthly for at least 6 months. A diagrammatic illustration of the operative technique is shown in Fig. 2.

RESULTS

In 26 patients we achieved an excellent cosmetic appearance of the glans and penile shaft (Fig. 3). The meatus is slit or elliptic with a good forward urine stream. No incidence of

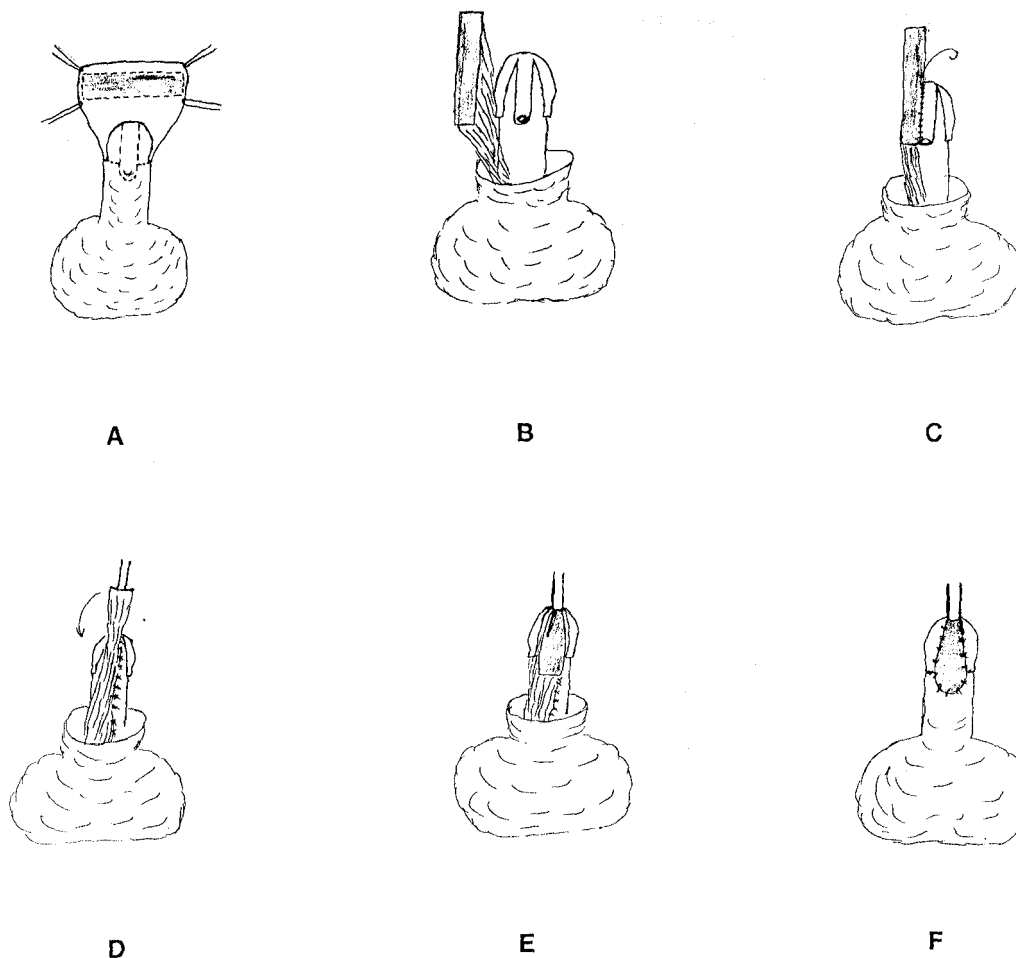


Fig. 2: Illustration of operative technique. **A, B:** A transverse fasciocutaneous flap which is at least 1 cm longer than the urethral plate is taken. **C, D:** Urethroplasty is done using the proximal part of the flap. **E:** The free distal part of the flap is reflected back. **F:** The edges of the reflected part are sutured to the edges of the glanular wings and the penile skin.

meatal stenosis was detected up to six months follow up. One partial disruption at the distal end of the suture and one urethrocutaneous fistula were recorded and corrected successfully. During the early follow-up period we found a bulky distal part of the penile shaft in 11 patients that gradually regressed to be of normal caliber at the end of six months follow up.

DISCUSSION

With increasing experience and the evolution of new techniques the goals of hypospadias repair have changed. Although the

creation of a functional urethra with a straight penis was the primary goal of the pioneers in hypospadias repair, modern approaches focus on cosmesis as well⁹. The island onlay flap achieves both these goals, yet, it is still associated with some difficulties and complications which need to be solved. The long flap used in our technique allows for urethral reconstruction as described by the original technique. The reflected distal part of the flap enables the surgeon to reconstruct a suture-free neostoma by applying only two stitches at the angles of the stoma – this is similar to the method described by Rui et al.. But while Rui et al. evert the distal end of the flap without any modification in its breadth at the point of the stoma, thus obtain-



Fig. 3: Postoperative photo showing the final cosmetic results

ing a rounded rather than an elliptic neostoma, we reduce the breadth of the flap at the point of the neo stoma to obtain an elliptic or slit-like stoma. This will ensure a satisfactory forward urine stream

The second advantage of our technique is that the distal part of the reflected flap is nearly triangular in shape and is fixed in between the glanular wings covering the glanular part of the reconstructed urethra and thus allowing reconstruction of the glans without any compression of the urethra, especially when the glans is small.

The third advantage of our technique is the soft tissue coverage of the suture line. Two layers of soft tissue are used to cover the suture line: the first layer is derived from the pedicle of the part of the flap that is used for urethral reconstruction, while the second layer is the pedicle of the reflected part. In addition to this advantage, the reflected part serves for penile skin reconstruction at the ventral aspect avoiding the need for Byars flaps and allowing the excision of any scarred or unhealthy skin.

The overall results are very satisfactory with regard to the cosmetic and functional results.

Editorial Comment:

This is a well reported article and should be published. However, personally I disagree with the technique for a couple of reasons: (1) The technique results in a less than acceptable glans approximation as there is penile skin from the folding back of the onlay which is left on the glans. The normal penile glans has no penile skin on it. (2)

Complications in the form of fistula ($n=1$) and partial disruption ($n=1$) occurred in 2 out of 28 patients (7%) only and were treated successfully. The bulky ventral aspect of the penile shaft found in 11 patients was not only due to the soft tissue of the double layers of the flap but also due to edema. It gradually resolved within six months giving a normal appearance of the penile shaft.

We conclude that this new technique that we have named distally folded onlay flap is easy and versatile with excellent cosmetic and functional results and a low rate of complications. We advocate its use for the repair of distal penile or midshaft hypospadias in either virgin or redo cases. It should also be considered as a salvage procedure when other techniques are not feasible, especially when the glans is small or when there is shortage of skin coverage.

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One of the reasons for doing this technique is to prevent fistulas. The fistulas that would be prevented with the folded segment would be glanular. Glanular fistulas are not very common. The most common location for fistulas would be at the original meatus and this folded back segment would not help that area as I understand it.

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Reply of the author:

The presence of skin at the ventral aspect of the glans will not affect the cosmetic appearance of the glans. The folded skin will solve the problem of the small-sized glans in which an approximation of the glanular wings may result in a compression of the onlay flap and thus in a narrowing of the urethra or in a high possibility of suture disruption. Regarding the prevention of fistula, the pedicle of the folded part is used as a second layer covering the complete suture line and, thus, decreases the risk of fistula formation.

RESUME

Le lambeau croisé distal selon onlay. Une nouvelle technique de cure d'hypospadias

Objectifs: Evaluer les résultats esthétiques et fonctionnels de cette nouvelle technique pour la réparation d'hypospadias. **Patients et Méthode:** Vingt-huit patients (2-22 ans) présentant un hypospadias distal ont été inclus dans cette étude. Onze patients présentaient un échec d'une réparation antérieure. Une plaque urétrale de mauvaise qualité et/ou une peau pénienne ventrale épaisse ont été décrites chez 17 patients. La technique utilisée est celle de ONLAY du lambeau préputial ou du lambeau de fascia de la peau dorsale pénienne, par contre là le lambeau est de 1 cm plus long que la plaque urétrale. Le bout proximal du lambeau est utilisé pour l'urétroplastie alors que le bout distal libre est inversé pour être suturé aux berges de la peau pénienne et au gland. Le cathéter urétral est enlevé après 5 jours. Les malades ont un suivi mensuel jusqu'à 6 mois. **Résultats:** Chez 26 patients l'esthétique de la verge et du gland est excellente, complétée par une fente ou un néo-méat elliptique qui permet un bon écoulement urinaire qui satisfait les patients et leurs parents. Des complications ont été rapportées chez deux patients: le lâchage partiel d'un côté de la ligne de suture chez un patient et fistule uréthro cutanée chez l'autre. Ces deux complications ont été corrigées avec de bons résultats chirurgicalement. **Conclusion:** Nous concluons que cette nouvelle technique est facile et flexible avec des résultats esthétiques et fonctionnels excellents et un taux bas de complications indiquée pour la réparation de l'hypospadias distal et mi-pénien. Elle devrait aussi être considérée comme une procédure de sauvetage quand les autres techniques ne sont pas réalisables.

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