Original Article

Access this article online
Website: www.afrjpaedsurg.org
DOI: 10.4103/0189-6725.93294
Quick Response Code:

Feasibility of a tubularised incised-plate urethroplasty with double de-epithelised dartos flaps in a failed hypospadias repair: A preliminary report

Abdullah Yıldız, Mirko Bertozzi[1], Melih Akın, Antonino Appignani[1], Marco Prestipino[1], Ali İhsan Dokucu

ABSTRACT

Background: Reoperation for failed hypospadias has been considered to be seriously problematic. The dense fibrotic tissue causes difficulties in wound healing and increases the rate of complications. The tubularised incised-plate urethroplasty (TIPU) method has become a preferred method for all varieties of hypospadias in the past decade. However, fistulas are still one of the most common complications of this technique. The aim of this paper was to present the preliminary results of TIPU procedure with double de-epithelised dartos flaps in failed hypospadias repair. **Materials and Methods:** All patients were treated between January 2009 and August 2010 by the same procedure, utilising TIPU with double de-epithelised dartos flaps. Vascularised ventral dartos flaps harvested from each side of the penis with their vascular supply were transposed to cover the suture line by wrapping them from either side of the penis. **Results:** There were 21 boys with failed hypospadias: 20 had previously undergone TIPU, and one Koyanagi repair. Patients presented with very large fistulas in four and dehiscence in 17. Repair of the failed hypospadias using TIPU with double de-epithelised dartos flaps was quite successful, with no fistula recurrence or dehiscence observed. **Conclusion:** The preliminary results showed that TIPU with double de-epithelised dartos flaps is a useful method of successfully repairing failed hypospadias.

Key words: Dartos flap, dehiscence, hypospadias

Department of Paediatric Surgery, ŞişliEtfal Training and Research Hospital, İstanbul, Turkey, [1]S.C. Pediatric Surgical Clinic, University of Perugia, Ospedale S.Maria DellaMisericordia, Perugia, Italy

Address for correspondence:
Dr. Abdullah Yıldız,
Department of Pediatric Surgery,
ŞişliEtfal Training and Research Hospital,
25240 İstanbul, Turkey.
E-mail: nihon@superonline.com

INTRODUCTION

The tubularised incised-plate urethroplasty (TIPU) procedure, introduced in the 1990s, has gained wide acceptance in recent years. Incision and tubularisation of the urethral plate have rapidly gained popularity for correcting distal, proximal and re-operative hypospadias, because TIPU is a single-stage, feasible, simple operation with good cosmetic results and low complication rate.[1-8]

Urethrocutaneous fistulas and dehiscence are the most common complications of any hypospadias repair, even for a well-experienced surgeon. Reoperation of urethral dehiscence and major fistulas can be very difficult, due to fibrotic urethral plates and paraurethral tissues.

The fistula incidence rate is lower in TIPU repairs than in other techniques. The fistula rate has been reported as 3% and 8% for distal and proximal hypospadias in TIPU procedure, respectively.[7]

The dartos flap placement over the neourethra in a TIPU procedure reduces the incidence of postoperative urethrocutaneous fistulas even when using a single dartos flap However, the urethrocutaneous fistula rate could not quite be reduced to zero, and varying degrees of glanular torsion was often observed.[9-15] Authors previously described TIPU with double de-epithelised dartos flaps, in order to prevent fistula formation in primary cases.[13,14] We have been able to decrease high fistula rate to almost zero in primary hypospadias repairs using double dartos flaps. Glanular torsion did not occur in cases where double dartos flaps were applied.[14]

We presented the preliminary results of using TIPU with double dartos flaps for the prevention of fistula

formation in failed hypospadias repairs.

MATERIALS AND METHODS

A TIPU procedure, using double dartos flaps, was performed on in 21 consecutive boys with failed hypospadias in two different institutions, of whom 20 had undergone TIPU and one Koyonagi repair previously. All cases have been operated in different centres and referred to our institutions for correction. Complaints of patients were major fistula in four and complete dehiscence in 17 [Figure 1]. No case was excluded from the study during the study period. All patients were repaired using the standard TIPU technique that had previously been described in detail.[12] We had no information about the type of urethroplasty coverage that was done at the time of the primary repairs.

For previously circumcised patients, lateral penile skin flaps were mobilised for the harvesting of dartos tissue and penile shaft skin coverage. In patients suffering from a breakdown of a previous hypospadias repair, any skin irregularity was corrected for better evaluation of the presenting defect and proper performance of the re-operative repair.

After a traction suture was placed through the glans, a skin incision was carried out around the urethral plate, and a perimeatal incision was also made on the ventrum. Two parallel incisions were made to define the urethral plate, and the glans wings were elevated [Figures 2 and 3]. The urethral plate was incised along the midline, including the mucosal and submucosal tissue from within the meatus to the tip of the urethral plate, and the plate was tubularised with 7/0 interrupted subepithelial polydioxanone suture in one layer, beginning from proximal end to the mid-glanular level, different from original definition of Snodgrass in 10 cases. In 11 cases, the plate was tubularised with 7/0 polydioxanone suture full thickness running suture. After a sufficient de-gloving of the penis and tubularisation of the plate, traction sutures were placed on the borders of the inner face of the ventral-side skin. The de-epithelialised dartos flaps were bilaterally prepared from the adjacent residual dartos fascia and completely de-epithelialised, with the dissection of the outer surface of the penile skin. Vascularised ventral dartos flaps harvested from each side of the penis were brought with their vascular supply. They were transposed to cover the suture line by wrapping them from either side of the penis. Both of the flaps were sutured to the ventral side of the penile shaft and inner glanular wing conjunctions on each counter side, using 7-0 polydioxanone sutures (Ethicon, W9100) [Figures 4 and 5]. Finally, the glanular wings were symmetrically closed over the overlapping dartos flaps with 7-0 polydioxanone sutures in two layers [Figure 6]. A stent [6-10F], corresponding to the diameter of the native urethra, was left in place for seven days for all patients.

RESULTS

Between February 2009 and August 2010, a total of 21 patients were subjected to TIPU with double de-epithelised dartos flaps for the correction of complications related to previous hypospadias surgery. The mean follow-up time was 13 months (range of 6-25 months). The mean age of the patients was 4.9 (range of 2 to 12 years).

At the time of repair, the location of the meatus was observed as coronal in six patients, sub-coronal in 11 patients, mid-penile in two patients and proximal penile in two patients. All patients had been previously circumcised. No chordee was observed in any case. Seventeen cases were admitted to our institutions with complaint of wound dehiscence all along the suture lines and four cases with major fistula (more than 0.5 cm).

One patient having an initial Koyanagi repair procedure and 20 TIPU cases were re-operated, using TIPU with double de-epithelised dartos flaps. Twenty patients had been operated once including the case operated with Koyanagi repair. One of the cases had been operated with the TIPU procedure twice before being admitted to our institution.

All patients who underwent a secondary TIPU with double de-epithelised dartos flaps procedure were successfully repaired. Devascularisation of the overlaying skin from which dartos separated was not observed. No dehiscence or urethrocutaneous fistulas occurred. We achieved satisfactory results in all secondary cases by using TIPU with double de-epithelised dartos flaps.

DISCUSSION

Complications are common after hypospadias repair, ranging from minor fistulas to complete loss of the neourethra, requiring total reconstruction. The fistula incidence rate in secondary operations in failed hypospadias repairs have been reported as higher than in primary cases.[14]

The aetiology of fistulas and wound dehiscence has



Figure 1: Preoperative view of the case



Figure 2: Dissection of urethral plate flaps

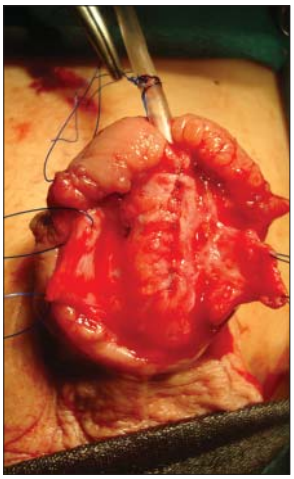


Figure 3: Preparation of flaps from the residual adjacent dartos

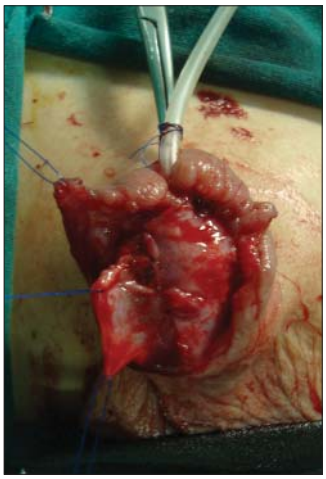


Figure 4: Rotation and suturing of the first flap

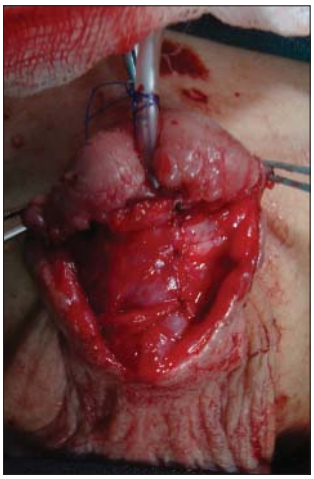


Figure 5: Final appearance of flaps after urethral covering



Figure 6: Postoperative view of the case

been a controversial issue in paediatric urology. Several factors, such as suture material, infection, previous operations, catheterisation and surgical skill may significantly affect outcomes. Various procedures have been developed to avoid the occurrence of fistula formation.

One of the most effective factors in reducing fistula

formation in hypospadias surgery is the introduction of a protective intermediate layer between the neourethra and the skin.[12-14] A well-vascularised adjacent tissue, such as a dartos flap, significantly decreases fistula formation.[2,3,6,8-14]

Several operative procedures have been reported in literature to decrease the incidence of the complications.[9-19] Authors have reported the use of dorsal subcutaneous preputial flaps, ventral subcutaneous flaps, dartos flaps, external spermatic fascia flaps, spongioplasty, tunica vaginalis and scrotal dartos flaps.[9-18]

Although Telfer *et al*. and Borer *et al*. reported that using a protective intermediate layer reduced the fistula rate from 63% to 4.5%,[19] some researchers reported high fistula rates despite the use of a single dartos flap as a barrier layer.[3,7,10] Recently, in a study done by Yigiter *et al*., the authors compared the complication rates of the flapless, single flap, double flaps and procedures in TIPU, and reported a 29.4%, 26% and 0.1% incidence of fistulas, respectively.[20] In our previous studies, we concluded that TIPU with double dartos flaps seems far more effective in completely covering the neourethra than the methods including a single flap.[13,14]

The reason for fistula development is not well known in single dartos flaps covering the neourethra. The fistula tract can find its way through a small perforation due to injury during dissection, a focal ischemic injury, infection of the edges of the flap. When double dartos flaps are used, a perforation in one flap that may cause an urethrocutaneous fistula would be protected by the second-layer dartos flap. Two flaps rotated from both lateral sides in our technique can also protect the flaps' edges.[8,14]

TIPU with double de-epithelised dartos flaps for hypospadias reoperation in a previously circumcised patient with a failed hypospadias does not show a significant difference from the techniques described for primary repair.

The blood to the urethral plate is supplied by both urethral and deep dorsal arteries. Although the urethral plate is incised in the midline as part of the Snodgrass technique, this does not interrupt or significantly alter the dual blood supply to the two newly-mobile and easily-tubularised strips. For these reasons, TIPU seems to be the most suitable re-operative method for cases with failed hypospadias.

If a preputial dartos flap is not available, as in all of our cases where the patient had been previously circumcised, an approximation of adjacent tissues alongside the neourethra can be used as an adequate substitute in a double dartos flaps fashion. In contrast to Kamal's study, we faced no difficulty in using adjacent tissues to cover the suture line.[8] We also found the harvesting of the flaps easier, due to the release of the chordee in the previous operations. It was not necessary to de-glove the penis completely as in primary cases in our previous studies. Limited dissection of the dartos flaps from the adjacent tissues was found adequate to cover the whole suture line. This limited dissection can also preserve the circulation of the ventral penile skin.

As we know, disrupted vascular circulation in secondary cases can increase wound-healing time and complication rates. Additional blood flow and a nutritious layer of neourethra due to vascular reinforcement flaps were estimated to be extremely important factors in a condition with limited blood flow, such as re-operation areas. The low rates of complications in our reoperation hypospadias cases can be related to the fact that the dartos flap is strong enough and has abundant vascular structure.

Despite this advantage, it can be estimated that the risk of glandular wound dehiscence is suspected to be higher in patients who have double dartos flaps than in those patients who have only one-layer covering.[20] Glans closure was comfortably achieved and wound dehiscence was not seen in any of the cases. According to our experience, the important point in this technique is to deeply dissect the glans wings to obtain good mobility for later closure.

In conclusion, TIPU with double dartos flaps is very efficacious in preventing fistula formation, even in reoperation in failed hypospadias cases. Vascular reinforcement flaps supply additional blood flow, supporting the wound's healing, and avoids fistulas and dehiscence in poor vascularity areas, such as in secondary cases.

REFERENCES

1. Samuel M, Wilcox DT. Tubularized incised-plate urethroplasty for distal and proximal hypospadias. BJU Int 2003;92:783-5.
2. Snodgrass WT, Nguyen MT. Current technique of tubularized incised plate hypospadias repair. Urology 2002;60:157-62.
3. Sozubir S, Snodgrass WT. A new algorithm for primary hypospadias repair based on TIP urethroplasty. J Pediatr Surg 2003;38:1157-61.
4. El-Sherbiny MT, Hafez AT, Dawaba MS, Shorrab AA, Bazeed MA. Comprehensive analysis of tubularized incised-plate urethroplasty in primary and re-operative hypospadias. BJU Int 2004;93:1057-61.
5. Al-Hunayan AA, Kehinde EO, Elsalam MA, Al-Mukhtar RS. Tubularized incised plate urethroplasty: Modification and outcome.

Int Urol Nephrol 2003;35:47-52.
6. Snodgrass W. Hypospadias repair: The flap-less future. Presented at the first world congress on hypospadias and intersex disorder, November 17-19, 2005.
7. Snodgrass W, Lorenzo A. Tubularized incised-plate urethroplasty for hypospadias reoperation. BJU Int 2002;89:98-100.
8. Kamal BA. Double dartos flaps in tubularized incised plate hypospadias repair. Urology 2005;66:1095-8.
9. Djordjevic ML, Perovic SV, Vukadınovıc VM. Dorsal dartos flap for preventing fistula in the Snodgrass hypospadias repair. BJU Int 2005;95:1303-9.
10. Chatterjee US, Mandal MK, Basu S, Das R, Majhi T. Comparative study of dartos fascia and tunica vaginalis pedicle wrap for the tubularized incised plate in primary hypospadias repair. BJU Int 2004;94:1102-4.
11. Cheng EY, Vemulapalli SN, Kropp BP, Pope JC 4th, Furness PD 3rd, Kaplan WE, *et al*. Snodgrass hypospadias repair with vascularized dartos flap: The perfect repair for virgin cases of hypospadias? J Urol 2002;168:1723-6; discussion 1726.
12. Bakan V, Yıldız A. Dorsal double-layer dartos flap for preventing fistulae formation in the Snodgrass technique. Urol Int 2007;78:241-4.
13. Appignani A, Prestipino M, Bertozzi M, Nardi N, Falcone F. Double-cross flap protection: New technique for coverage the neourethra in hypospadias repair. J Urol 2009;182:1521-7.
14. Yıldız A, Bakan V. Comparison of perimeatal-based flap and tubularized incised plate urethroplasty combined with single or double layer dartos flap in distal hypospadias. Urol Int 2010;84:265-8.
15. Barbagli G, Perovic S, Djinovic R, Sansalone S, Lazzeri M. Retrospective descriptive analysis of 1,176 patients with failed hypospadias repair. J Urol 2010;183:207-11.
16. Dodat H, Landry JL, Szwarc C, Culem S, Murat FJ, Dubois R. Spongioplasty and separation of the corpora cavernosa for hypospadias repair. BJU Int 2003;91:528-31.
17. Yerkes EB, Adams MC, Miller DA, Pope JC 4th, Rink RC, Brock JW 3rd. Y-to-I wrap: Use of the distal spongiosum for hypospadias repair. J Urol 2000;163:1536-8; discussion 1538-9.
18. Hayashi Y, Kojima Y, Kurokawa S, Mizuno K, Nakane A, Kohri K. Scrotal dartos flap for the prevention of the urethrocutaneous fistula on hypospadias urethroplasty. Int J Urol 2005;12:280-3.
19. Borer JG, Bauer SB, Peters CA, Diamond DA, Atala A, Cilento BG Jr, *et al*. Tubularized incised plate urethroplasty: Expanded use in primary and repeat surgery for hypospadias. J Urol 2001;165:581-5.
20. Yiğiter M, Yildiz A, Oral A, Salman AB. A comparative study to evaluate the effect of double dartos flaps in primary hypospadias repair: No fistula anymore. Int Urol Nephrol 2010;42:985-90.

Cite this article as: Yildiz A, Bertozzi M, Akin M, Appignani A, Prestipino M, Dokucu AI. Feasibility of a tubularised incised-plate urethroplasty with double de-epithelised dartos flaps in a failed hypospadias repair: A preliminary report. Afr J Paediatr Surg 2012;9:8-12.

Source of Support: Nil. **Conflict of Interest:** None declared.

Announcement

"Quick Response Code" link for full text articles

The journal issue has a unique new feature for reaching to the journal's website without typing a single letter. Each article on its first page has a "Quick Response Code". Using any mobile or other hand-held device with camera and GPRS/other internet source, one can reach to the full text of that particular article on the journal's website. Start a QR-code reading software (see list of free applications from http://tinyurl.com/yzlh2tc) and point the camera to the QR-code printed in the journal. It will automatically take you to the HTML full text of that article. One can also use a desktop or laptop with web camera for similar functionality. See http://tinyurl.com/2bw7fn3 or http://tinyurl.com/3ysr3me for the free applications.