

A modified method of dartos flap coverage of neourethra in the repair of hypospadias and urethrocutaneous fistula

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Abstract

Background: Hypospadias is a common congenital anomaly and its repair has been characterised by constant evolution. Urethrocutaneous fistula (UCF) formation remained the most common complication of hypospadias repair the occurrence of which precludes one of the goals of hypospadias surgery.

Aim: To assess the modification of interposing layer of dartos flap coverage in hypospadias and UCF repairs in the prevention of UCF.

Materials and Methods: In this retrospective review, 11 cases of hypospadias and UCF were repaired with our modification of dartos flap interposition from January 2010 to December 2013. The medical records were retrospectively reviewed to determine the clinical presentation, the age at surgery, the position of meatus and UCF, history of previous repair and the surgical outcomes.

Results: The ages range from 1 to 25 years with a mean age of 8.36 years. Eight patients had repair of hypospadias, two patients had repair of post-circumcision UCF and a patient had repair of congenital UCF (CUCF). All the patients with hypospadias had tabularised incised plate urethroplasty except two of them who had staged repair with buccal mucosa graft reconstruction. Those with post-circumcision UCF and CUCF had incised plate plus simple closure. All the patients had our modified interposing layer of dartos flap incorporated. The outcomes were satisfactory in nine patients, one patient had glanular dehiscence and another one had complete dehiscence of the wound.

Conclusion: This modification of dartos flap interposition can be added to the various surgical armamentariums in the management of these patients.

Keywords: Hypospadias, modified dartos flap, second layer coverage, urethrocutaneous fistula

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Introduction

Hypospadias is one of the most common congenital anomalies in the male newborns and its repair has been characterised by constant evolution with varying success rate reported.¹⁻³ Urethrocutaneous fistula (UCF) formation remained the most common, and most dreaded, complication of hypospadias

repair^{4,5} the occurrence of which precludes one of the goals of hypospadias surgery.⁶

The incidence of UCF has been reported to range from 5% to 45% depending on the severity of the hypospadias, the surgical technique used for the repair, as well as the experience of the

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surgeon.⁷⁻¹⁰ In the contemporary series, however, a fistula rate of <5% has been quoted.¹¹

Several methods have been described and incorporated into the repair technique to prevent UCF formation; some of these methods are associated with other complications such as buckling on the side of the penis, penile torsion and dog-ear deformity of the flap.¹²⁻¹⁷

We described and evaluated our modification of the dartos layer interposition incorporated into the repair with emphasis on the advantage of the double-breasting of this protective layer, as well as the cosmetic disposition.

Materials and Methods

We performed a retrospective chart review of records of patients who underwent our modification of dartos flap interposition in hypospadias and UCF repair in our institution from January 2010 to December 2013. The urology unit record book was used to identify the name and the hospital number of the patients and their case record was subsequently retrieved from the institution record library for further analysis. Eleven cases of hypospadias and UCF were identified to have been repaired with our modification of dartos flap interposed between the neourethra and the skin. The records of these patients were reviewed to determine the clinical presentation, age at surgery, the position of meatus and UCF, history of the previous repair and the surgical outcomes, including complications, and were documented.

All the patients underwent routine biochemical, microbiological and haematological investigations, including haemoglobin electrophoresis among the younger patients. Microbiological cure of urinary tract infection was achieved before surgery in those patients with urinary tract infection. Informed consent was obtained prior to the procedure and post-operative care entails analgesic use, antibiotic (cephalosporin) use and wound care.

Surgical technique

Our technique involved general anaesthesia, except for the three patients that were adults and they had subarachnoid or epidural block. A routine cleansing and draping of the patient was done in the supine position. Lithotomy position was used, for better exposure, in two of the patients who had penoscrotal and scrotal hypospadias, respectively. A standard tabularised incised plate (TIP) urethroplasty was the usual intention in most cases.

A stay suture of 2-0 silk, on a round body needle, is placed through the glans of the penis for traction. Penile degloving is

done using a circumcising incision circumventing the urethral plate by two parallel longitudinal incisions separating the urethral plate from the glans wings to the hypospadiac meatus and dissected proximally to the root of the penis. Orthoplasty is performed as needed by dorsal tunica albuginea plication and other methods.¹ The urethral plate is then incised and tabularised in the usual manner with 5-0 Vicryl over appropriate size Foley catheter.¹⁸

A long dartos flap is carefully mobilised to preserve its blood supply without compromising the subdermal vascular plexus that supplies the penile shaft skin from either the preputial and penile skin or the penile skin alone in those that were already circumcised. A diamond-shaped marking of 10 mm length in dimension, of the dartos, is carefully mapped out about 5 mm proximal to the position of the hypospadiac meatus [Figure 1].

The mapped-out segment is excised and approximated; the right wing of the dartos flap (AB^1) is flipped over the neourethra and anchored in at least three places to the left glanular wing and the tunica albuginea of the corpus cavernosa on the left. Similarly, the left wing of the dartos flap (A^1B^2) is transposed to the right over the already sutured right dartos wing and similarly anchored in at least three places to the right glanular wing and the external surface of the dartos flap [Figure 1]. A dorsal midline 'relaxing incision' of the dartos flap may occasionally be required. A transverse section through the repair is as depicted in Figure 2.

The meatoglanuloplasty is completed and skin covered. When completed the repair is tension-free, double-breasted and consists of symmetrically disposed dartos flap that is free of any 'dog-ear' deformity and with no torsion of the penile shaft. A protective suprapubic catheter is placed for bladder drainage, especially in those with proximal hypospadias. Parenteral cephalosporin is prescribed for the initial 48–72 h and then converted to an oral route. Anticholinergic is occasionally prescribed to prevent bladder irritation.

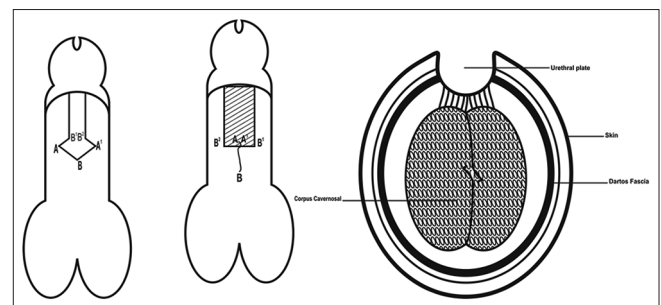


Figure 1: The mapped-out segment of the dartos fascia for excision and its approximation

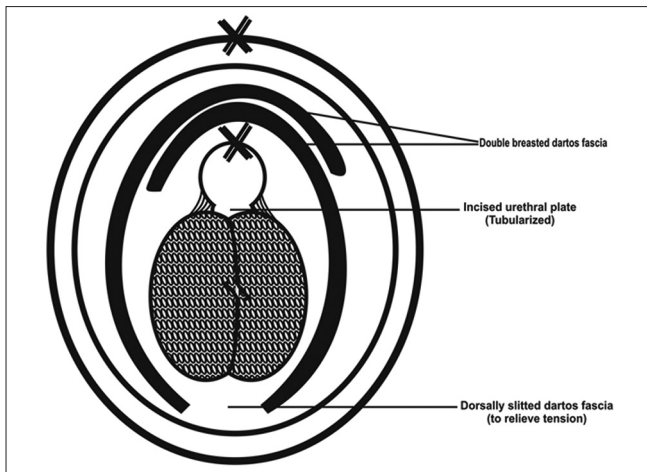


Figure 2: The cross-section of the tissue planes after completion of repair

Results

A total of 11 patients had this method of dartos flap coverage for the intermediate layer. The ages range from 1 to 25 years with a mean age of 8.36 years. Eight of the patients had repair of hypospadias, two patients had post-circumcision UCF repair and the last patient had CUCF repair.

Clinically, the hypospadias was distal penile in three patients, sub-coronal in two patients and mid-penile, penoscrotal and scrotal hypospadias in a patient each, respectively. Two of the patients had coronal post-circumcision UCF repaired, and one patient had CUCF repaired.

All the patients with hypospadias had TIP urethroplasty except two who had staged repair with buccal mucosa graft reconstruction. Those with post-circumcision UCF and CUCF had incised plate plus simple closure. All the patients had our modified interposing layer of dartos flap incorporated.

The outcomes were satisfactory in nine patients, one patient had glanular dehiscence and another one had complete dehiscence of the wound.

Discussion

The management of hypospadias is quite challenging as evident by the several techniques of repair and modifications aimed to achieve better outcomes. Nevertheless, the surgery of hypospadias is still evolving. The high incidence of associated fistula has prompted the conceptualization of a number of procedures devised for the management of this aspect of the complications.

In the current study, the age at presentation, which equates with the age at surgery, ranges from 1 to 25 year with a mean

age of 8.36 ± 7.85 standard deviation years. Excluding the three patients with UCF, only 25% of our patients presented and were operated at the age considered most suitable for the operation of hypospadias which is between 6 and 18 months.¹⁹ However, our result is comparable to those obtained from similar studies in other developing countries. This late presentation is presumably due to ignorance, illiteracy and inability to afford the cost of repair.^{20,21}

The hypospadiac meatus was located in the anterior (glanular and sub-coronal), the middle (distal penile, mid-shaft and proximal penile) and the posterior (penoscrotal, scrotal and perineal) aspect in 25%, 50% and 25%, respectively, in our patients.

Various methods and technique modifications have been incorporated in the repair of hypospadias for the prevention of UCF. The most common manoeuvre is to place an intervening layer of tissue between the neourethra and the skin.^{2,22,23} The introduction of the protective intermediate layer have been described as the most important single factor in reducing the incidence of fistula and other complications of hypospadias repair.²⁴ After the first description of the use of dartos flap as a protective barrier in hypospadias repair in 1994,^{14,18} several modifications have been made such as lateral rotation of the flap, ventral transposition of the flap through a buttonhole fashion, incising the dartos flap in the midline in Byar's fashion and rotated ventrally to cover the neourethra.

In this modification, the wing of the mobilised dartos flap was advanced to the contralateral side of the penile shaft and anchored to the tunica albuginea and that of the other side to the dartos of the earlier advanced wing. The excised diamond segment prevents 'dog-ear' deformity ventrally, and relative tension created on the dorsum can be released by a dorsal longitudinal slit of the dartos. The advantage accrued from this manoeuvre was the double breasted coverage of the neourethra without tension, dog-ear deformity or penile rotation.

The idea that lateral rotation of dartos results in torsion is not in doubt, but this concept was cleverly used to correct congenital torsion of the penis in the contralateral direction to that of the torsion.²⁵ An equal and opposite advancement of the flap on both sides, in our modification, balances any rotational force that was likely to be created and the dorsal releasing incision, as deemed necessary, eliminates the tension.

Although there are two of our patients who had wound dehiscence, there was no isolated post-operation UCF in this series. The wound dehiscence may probably be from intervening post-operation wound infection complicating the procedure. This report was a retrospective evaluation of our modification

of a technique which was not randomised and compare with other technique(s); this constitute a limitation.

Conclusion

The preliminary result from our modification of the double-breasted dartos flap protective layer is encouraging. A larger number of patients and possibly a randomised control study are required to demonstrate the benefit of this modification; however, this modification can be added to the various surgical armamentariums in the management of this group of patients.

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Conflicts of interest

There are no conflicts of interest.

References

- Subramaniam R, Spinoit AF, Hoebeke P. Hypospadias repair: An overview of the actual techniques. *Semin Plast Surg* 2011;25:206-12.
- Baskin LS, Ebberts MB. Hypospadias: Anatomy, etiology, and technique. *J Pediatr Surg* 2006;41:463-72.
- Kamal BA. Double dartos flaps in tubularized incised plate hypospadias repair. *Urology* 2005;66:1095-8.
- Latifoglu O, Yavuzer R, Unal S, Cavusoglu T, Atabay K. Surgical treatment of urethral fistulas following hypospadias repair. *Ann Plast Surg* 2000;44:381-6.
- Horton CE, Devine CJ, Graham JK. Fistulas of the penile urethra. *Plast Reconstr Surg* 1980;66:407-18.
- Dubois R, Pelizzo G, Nasser H, Valmalle AF, Dodat H. Urethral fistulas after surgical treatment of hypospadias. Apropos of a series of 74 cases. *Prog Urol* 1998;8:1029-34.
- Horton CE, Devine CJ. Urethral fistulas. In: Horton CE, editor. *Plastic and Reconstructive Surgery of the Genital Area*. Boston: Little, Brown and Co., 1973; 397-403.
- Shapiro SR. Complications of hypospadias repair. *J Urol* 1984;131:518-22.
- Smith ED. The history of hypospadias *Pediatr Surg Int* 1997;12:81-5.
- Smith ED. Durham smith repair of hypospadias. *Urol Clin North Am* 1981;8:451-5.
- Agrawal K, Misra A. Unfavourable results in hypospadias. *Indian J Plast Surg* 2013;46:419-27.
- Ross JH, Kay R. Use of a de-epithelialized local skin flap in hypospadias repairs accomplished by tubularization of the incised urethral plate. *Urology* 1997;50:110-2.
- Snow BW. Use of tunica vaginalis to prevent fistulas in hypospadias surgery. *J Urol* 1986;136:861-3.
- Retik AB, Mandell J, Bauer SB, Atala A. Meatal based hypospadias repair with the use of a dorsal subcutaneous flap to prevent urethrocutaneous fistula. *J Urol* 1994;152:1229-31.
- Motiwala HG. Dartos flap: An aid to urethral reconstruction. *Br J Urol* 1993;72:260-1.
- Yamataka A, Ando K, Lane GJ, Miyano T. Pedicled external spermatic fascia flap for urethroplasty in hypospadias and closure of urethrocutaneous fistula. *J Pediatr Surg* 1998;33:1788-9.
- Churchill BM, van Savage JG, Khoury AE, McLorie GA. The dartos flap as an adjunct in preventing urethrocutaneous fistulas in repeat hypospadias surgery. *J Urol* 1996;156:2047-9.
- Snodgrass W. Tubularized, incised plate urethroplasty for distal hypospadias. *J Urol* 1994;151:464-5.
- Snodgrass WT, Shukla AR, Canning DA. Hypospadias. In: Docimo SG, Canning DA, Khoury AE, editors. *The Kelalis-King-Belman Textbook of Clinical Pediatric Urology*. 5th ed. London: Informa Healthcare Ltd., 2007; 1205-38.
- Khan M, Majeed A, Hayat W, Ullah H, Naz S, Shah SA, *et al*. Hypospadias repair: A single centre experience. *Plast Surg Int* 2014;2014:453039.
- Bhat A. Extended urethral mobilization in incised plate urethroplasty for severe hypospadias: A variation in technique to improve chordee correction. *J Urol* 2007;178(3 Pt 1):1031-5.
- Djordjevic ML, Perovic SV, Vukadinovic VM. Dorsal dartos flap for preventing fistula in the snodgrass hypospadias repair. *BJU Int* 2005;95:1303-9.
- Ozturk H. Dartos flap coverage of the neourethra following repair for primary hypospadias, reoperative hypospadias and urethrocutaneous fistulas. It is a safe approach. *Acta Cir Bras* 2010;25:190-3.
- Shehata S, Hashish M. Management of post hypospadias urethral fistula. In: Donkov I, editor. *Current Concepts of Urethroplasty*. Shanghai, China: InTech, 2011; 47-60. Available from: <http://www.intechopen.com/books/current-concepts-of-urethroplasty/management-of-post-hypospadias-urethral-fistula>. [Last accessed on 2016 Jul 07].
- Fisher PC, Park Jm. Penile torsion repair using dorsal dartos flap rotation. *J Urol* 2004;171:1903-4.