

Staged buccal mucosa urethroplasty in reoperative hypospadias

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ABSTRACT

Introduction: Repeated attempts at surgical repair of serious complications involving either the partial or complete breakdown of the hypospadias repair are less likely to succeed because the penis is densely scarred, or significantly shortened, and the skin over the penis is immobile and hypovascular. Buccal mucosa (BM) has become the preferred material for reconstruction, whenever a child with skin-deficient hypospadias needs reoperation. We report the results of our surgical experience with staged reoperation using BM, in the repair of hypospadias in children with complications after multiple failed repairs.

Materials and Methods: Children needing reoperation for hypospadias underwent a staged repair using buccal mucosa. The complications were noted.

Results: Twenty-one children aged 3 – 16 years underwent this staged repair during the period May 2000 – April 2010. Two of these 21 children had a failed first stage. One child developed a urethro-cutaneous fistula following the second stage, which was corrected in an additional stage.

Conclusions: The use of the buccal mucosa graft for urethral reconstruction in a child with hypospadias, needing a reoperation, is a successful method, with a low incidence of complications.

Key words: Buccal mucosa, flap, graft, hypospadias, urethroplasty

INTRODUCTION

Complications of hypospadias repair include bleeding / hematoma, meatal stenosis, urethrocutaneous fistula, urethral stricture, urethral diverticulum, wound infection, impaired healing, and breakdown of the repair.^[1] Inspection of the available tissue to determine whether adequate local tissue exists versus the need for an extragenital tissue graft, will significantly impact and dictate the repair options. This decision-making process is critical to achieving a successful result.^[2-4]

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Whenever possible, the immediately adjacent or local pedicled, well-vascularized tissue is preferred for reoperative hypospadias surgery. In the absence of the adjacent or local tissue and in more severe reoperative cases, a free graft bladder mucosa,^[5] BM (dry or wet, onlay or tubularized),^[5-8] or a combination of the two may be used.^[9,10] BM has become the preferred material for reconstruction, whenever a child with skin-deficient hypospadias needs a reoperation.^[11] BM as a 'dry' onlay followed by tubularization, at the second stage of repair for reoperative hypospadias, is fast becoming an attractive alternative. We report our experience with the use of buccal mucosa in a two-staged reoperation of hypospadias.

MATERIALS AND METHODS

Children needing reoperation for hypospadias formed the study group. The children were examined in detail in relation to the persistence of chordee, the status of the urethral plate, scarring, healthy adjacent tissue, and the size and shape of the glans and meatus [Figure 1a]. In all children in whom there was no healthy urethral plate or it was not suitable for retubularization, and there was paucity of the vascularized adjacent genital tissue, use of the buccal mucosal graft for urethroplasty was planned. All these

children were counseled regarding this staged procedure and the need to harvest buccal mucosa for reconstruction. Buccal mucosal graft urethroplasty was performed in a staged technique as described by Bracka.^[11]

The scarred urethral plate and unhealthy ventral tissue were excised in the first stage of the procedure. The buccal mucosal graft was secured to the corporal bodies from the proximal urethral opening to the tip of the glans [Figure 1b]. The graft was quilted onto the corporal bodies and a gentle compression dressing that immobilized the graft was used. The graft take was assessed before the second stage, at least six months later. The second stage repair involved a circum graft incision with no part of the incision extending on to the surrounding skin. The graft was tubularized [Figure 1c] over a soft silicon catheter (8-12 Fr) using 5 / 0 vicryl sutures. This suture line was covered with vascularized tunica vaginalis or a subcutaneous scrotal flap as a barrier [Figure 1d].

RESULTS

Twenty-one children aged 3 – 16 years (mean age 7.4 years) presented with urethrocutaneous fistulas following hypospadias repair. Of these, 10 children had undergone primary repair at our center, which included Koyanagi's procedure in five, Snodgrass in three, and preputial onlay in two. All these 10 children had proximal penile / penoscrotal hypospadias. All the 10 children had been treated for urethrocutaneous fistula following a primary repair. The remaining 11 children presented in a similar manner, following failed hypospadias repair from other centers. Similarly all these 11 children had been reoperated for complications, including urethrocutaneous fistula.

The mean number of prior reoperations the children had undergone was 2.7 (range 2 – 5). Twenty out of 21 children were uncomfortable with their problem and were embarrassed. None of these children showed clinical signs of depression. Similarly the parents of these children were worried of the hypospadiac problem as well as the future erectile, sexual, and fertility status of these children. Three children had a tethering scar, which was excised during the first stage. Buccal mucosa of adequate length and breadth was easily harvested in all the children. Quilting of the buccal mucosa to the underlying corpora was done in all. The buccal mucosa take up was seen in 19 / 21 children. In one child (operated in the early part of the series in 2001) the buccal mucosa necrosed leaving the raw surface behind. In another child the buccal mucosal graft contracted significantly during the waiting period. Both these children underwent a repeat stage-one procedure.

The second stage was done at least six months after the first stage. The tubularization of the buccal mucosa into the urethra was easily achieved in all the children. The



Figure 1: (a) Hypospadias cripple showing penoscrotal external meatus and scarred ventral penile skin, (b) Buccal mucosa graft laid on the ventral surface of the penis extending from the external urethral meatus to the tip of the glans, (c) Tubularization of the Buccal mucosal graft, (d) Vascularized tunica vaginalis flap used as a barrier

tunica vaginalis vascularized graft was used as a barrier in 18 of the children. In the remaining three, subcutaneous scrotal flaps were used as barriers. Twenty out of 21 children had a satisfactory outcome, with no residual chordee, a good caliber anterior urethra, and a wide caliber external meatus, situated on the glans. A single urethrocutaneous fistula was noted in the remaining child, which needed an

additional procedure. The mean follow-up was 28 months (range 6 – 37).

DISCUSSION

Hypospadias is a congenital abnormality occurring in one out of 300 live births and recent studies suggest an increase of the incidence, with considerable variation in different countries.^[12,13] The current standard of care is to repair the hypospadias with a one-stage procedure in the first year of life and on an outpatient basis.^[12,14] Operative failures result from wound infection, urine extravasation, hematoma, ischemia, and necrosis of flap and graft or from errors in design, technique, and postoperative care during the primary repair.^[15,16] Repeated attempts at surgical repair in these complicated cases are then less likely to succeed because the penis is densely scarred, immobile, hypovascular, or significantly shortened.^[16] Horton and Devine^[17] used the term *hypospadias cripple* to describe the patient who had undergone multiple, unsuccessful hypospadias repair attempts, with significant resultant penile deformity. These patients represent perhaps the most perplexing of hypospadias repair complications, in that, they require extensive repair amid scarred and devitalized tissue.

The use of the immediately adjacent or local pedicled, well-vascularized tissue is preferred for reoperative hypospadias surgery. In 1992, Burger *et al.* reported the use of BM for the repair of complications, following childhood hypospadias surgery.^[18] The buccal grafts were used either as a tube or patch in a one-stage operation, with three postoperative fistulas requiring a new surgical approach and one meatal stenosis managed by simple dilation, with a satisfactory final outcome in all patients.^[18] After the Burger article, numerous reports appeared on the use of the BM grafts in the repair of complications after failed hypospadias surgery. Unfortunately, the majority of these studies mixed both children and adults or patients with epispadias or urethral stricture without hypospadias; therefore, it was not possible to extrapolate from the overall complication rates, the results that the authors obtained, particularly in adults with failed hypospadias repair.^[6,19-22]

In 1995, Bracka presented a two-stage penile skin graft technique for repairing complications after failed hypospadias, in 121 adults.^[23,24] This method did not claim substantial originality, but rather, represented a further refinement and evolution of the existing surgical techniques suggested for hypospadias surgery. The author concluded that a two-stage repair by splitting the glans and lining it with penile skin or BM grafts (to allow a subsequent terminalization of the meatus), was extremely adaptable and produced sophisticated results in any degree of deformity, in a skin-deficient 'hypospadias cripple'.^[23,24] Nevertheless, about 10% of the patients required a revision of the first stage

of their repair or underwent further cosmetic adjustment after a completion of their repairs.^[23,24]

Sripathi *et al.*^[27] retrospectively reviewed their experience in the management of hypospadias cripples and treatment of urethral strictures following hypospadias repair in 20 children, over a 41-month period and concluded that in salvage procedures performed on hypospadias cripples, a staged repair with buccal mucosa as an inlay in the first stage followed by tubularization four to six months later provided good results. Similarly Gill and Hameed^[25] showed this technique in 100 patients with hypospadias cripples, who had previously undergone multiple (3 – 16) procedures. In the first stage, a full-thickness graft of skin or buccal mucosa was used for the urethral plate reconstruction after release of the chordee. Stage II was carried out at least six months after the first procedure. The meatal opening at the tip of the glans was achieved in 94 patients, straightening of the penis in 96, and proper urinary stream in 92 patients. Fistula formation occurred in nine patients. In their opinion, the two-staged Bracka technique was a useful strategy to deal with the myriad abnormalities encountered in crippled hypospadias. This technique not only created a neourethra successfully, but also gave the penis a near-normal shape and appearance. Our study also revealed that all the children with multiple failed repairs, needing a reoperation, could undergo staged buccal mucosa urethroplasty. We had 2 / 21 (9.52 %) failures after the first stage and 1 / 21 (4.76 %) failures after the second stage.

Bracka^[26] opined that the Bracka two-stage graft repair remains an ideal and versatile solution when a full circumference urethroplasty is required. It is particularly appropriate for severe primary hypospadias associated with a poor plate and marked chordee and also to replace a scarred, hairy or balanitis xerotica obliterans diseased urethra, in reoperative salvage hypospadias. A staged approach may give a better cosmetic result to the patient.^[23] When a hypospadias repair fails, the glans wings often contract and there is not enough width or mobility to achieve an orthotopic meatus after the second procedure. Glanular scarring can be excised and the graft can be interposed between the corporal bodies to give a deep groove for subsequent glansplasty and distal urethroplasty. A barrier is required and this can be obtained from the tunica vaginalis or a subcutaneous scrotal flap, as both of them have excellent blood supply and can be mobilized to give a barrier layer. Buccal graft urethroplasty using a staged technique described by Bracka^[23] has improved outcomes when compared with single stage buccal repairs.

CONCLUSIONS

For the skin-deficient hypospadias requiring reoperation, buccal mucosa has become the preferred material for reconstruction. Multiple previous failures of hypospadias

repair in a patient may be best treated with a two-stage technique that incorporates buccal mucosa, with a low complication rate.

REFERENCES

- Keating MA, Duckett JW. Failed hypospadias repair. In: Cohen MS, Resnick MI, editors. Reoperative Urology. Boston: Little, Brown and Company; 1995. p. 187-204.
- Borer JG, Retik AB. Hypospadias. In: Wein AJ, Kavoussi LR, Novick AC, Partin AW, Peters CA, editors. Campbell-Walsh Urology. 9th ed. Philadelphia: W B Saunders; 2007. p. 3703.
- Bhat A, Mandal AK. Acute postoperative complications of hypospadias repair. Indian J Urol 2008;24:241-8.
- Bhat A. General considerations in hypospadias surgery. Indian J Urol 2008;24:188-94.
- Baskin LS, Duckett JW. Mucosal grafts in hypospadias and stricture management. AUA Update Series 1994;13:270-5.
- Duckett JW, Coplen D, Ewalt D, Baskin LS. Buccal mucosal urethral replacement. J Urol 1995;153:1660-3.
- Ahmed S, Gough DC. Buccal mucosal graft for secondary hypospadias repair and urethral replacement. Br J Urol 1997;80:328-30.
- Caldamone AA, Edstrom LE, Koyle MA, Rabinowitz R, Hulbert WC. Buccal mucosal grafts for urethral reconstruction. Urology 1998;51:15-9.
- Ransley PG, Duffy PG, Oesch IL, Hoover D. Autologous bladder mucosa graft for urethral substitution. Br J Urol 1987;59:331-3.
- Retik AB. Proximal hypospadias. In: Marshall FF, editor. Textbook of operative urology. Philadelphia: W. B. Saunders Company; 1996. p. 977-984.
- Bracka A. Two-stage urethroplasty revisited. In: Snodgrass W, editor. Dialogues in pediatric urology. vol. 25. Pearl River, NJ: William J. Miller Associates, Inc.; 2002. p. 7-8.
- Baskin LS. Hypospadias and urethral development. J Urol 2000;163:951-6.
- Thomas DF. Hypospadiology: Science and surgery. BJU Int 2004;93:470-3.
- Manzoni G, Bracka A, Palminteri E, Marrocco G. Hypospadias surgery: when, what and by whom? BJU Int 2004;94:1188-95.
- Devine CJ Jr, Franz JP, Horton CE. Evaluation and treatment of patients with failed hypospadias repair. J Urol 1978;119:223-6.
- Stecker JF Jr, Horton CE, Devine CJ Jr, McCraw JB. Hypospadias cripples. Urol Clin North Am 1981;8:539-44.
- Horton CE, Devine CJ Jr. A one-stage repair for hypospadias cripples. Plast Reconstr Surg 1970;45:425-30.
- Bürger RA, Müller SC, el-Damanhoury H, Tschakaloff A, Riedmiller H, Hohenfellner R. The buccal mucosal graft for urethral reconstruction: A preliminary report. J Urol 1992;147:662-4.
- Yerkes EB, Adams MC, Miller DA, Brock JW 3rd. Coronal cuff: A problem site for buccal mucosal grafts. J Urol 1999;162:1442-4.
- Metro MJ, Wu HY, Snyder HM 3rd, Zderic SA, Canning DA. Buccal mucosal grafts: Lessons learned from an 8-year experience. J Urol 2001;166:1459-61.
- Hensle TW, Kearney MC, Bingham JB. Buccal mucosa grafts for hypospadias surgery: Long-term results. J Urol 2002;168:1734-7.
- Fichtner J, Filipas D, Fisch M, Hohenfellner R, Thüroff JW. Long-term followup of buccal mucosa onlay graft for hypospadias repair: Analysis of complications. J Urol 2004;172:1970-2.
- Bracka A. A versatile two-stage hypospadias repair. Br J Plast Surg 1995;48:345-52.
- Bracka A. Hypospadias repair: The two-stage alternative. Br J Urol 1995;76:31-41.
- Gill NA, Hameed A. Management of hypospadias cripples with two-staged Bracka's technique. J Plast Reconstr Aesthet Surg 2011;64:91-6.
- Bracka A. The role of two-stage repair in modern hypospadiology. Indian J Urol 2008;24:210-8.
- Sripathi V, Satheesh M, Shubha K. Salvage hypospadias repairs. J Indian Assoc Pediatr Surg 2008;13:132-6.

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