International Surgery Journal
Sharma N et al. Int Surg J. 2018 Apr;5(4):1345-1349
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20181107

Original Research Article

Secondary hypospadias repair using Buccal mucosa graft: case series of 50 patients

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Received: 21 December 2017
Revised: 01 February 2018
Accepted: 05 February 2018

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ABSTRACT

Background: The aim of the study was to assess the various complications noticed following primary hypospadias repair and to evaluate the impact of preoperative, perioperative and postoperative study of primary hypospadias repair on patients' quality of life, independence, and complication rates. Objective of this study was to assess the success of buccal mucosa graft in secondary hypospadias repair and study the incidence and severity of complications both to the donor and recipient sites.
Methods: A total of 50 patients with previous failed hypospadias repair were included in the study who were admitted in plastic surgery unit from August 2013 to December 2016. The age of patients studied ranged from 8 to 16 years, in which about 60% cases that were presented with previous hypospadias repair were in age group 11-14 years. Patients in this study had undergone multiple previous surgeries for hypospadias repair. Ten patients had 1-2 surgeries and 40 patients had undergone 3 or more procedures for hypospadias repair.
Results: In study of 50 patients only 12 had complications following buccal mucosa graft urethroplasty.
Conclusions: Overall it showed that buccal mucosal graft urethroplasty had better results in hypospadias cripples.

Keywords: Cripples, Complications, Hypospadias, Urethroplasty

INTRODUCTION

Hypospadias is a birth defect of urethra in the male that involves an abnormally placed urethral meatus.[1] A successful repair in hypospadias is very important in the first operation. The success of repetitive operations decreases because the penis is heavily scarred, immobile, hypo vascular, or significantly shortened. The cases presented in this study have undergone the operation of hypospadias many times before. The aim of the study is to assess the various complications noticed following primary hypospadias repair and to evaluate the impact of preoperative, perioperative and postoperative study of secondary hypospadias repair on patients' quality of life and complications. Urethral reconstruction is required in congenital anomalies whether epi-or hypospadias and also in cases of urethral strictures. In the majority of cases, local penile and preputial skin is sufficient for repair. Inadequate genital tissue present has been a hindrance for urethral reconstruction. Local tissue is usually inadequate to provide skin cover as well as construct the neourethra after previous attempts at surgical repair resulted in loss of tissue and scar formation. It is also encountered, rarely, in severe hypospadias. The lack of tissue resulted in surgeons contemplating the use of free tissue grafts for neourethral reconstruction.

Initial attempts using full thickness skin grafts from non-hair bearing sites provided a reasonable success rate. The

skin grafts carried the risk of graft shrinkage, stricture formation, balanitis xerotica obliterans and scar formation at the donor site. The long-term results proved unsatisfactory. Alternatively, bladder mucosa was described for urethral replacement. While this technique became quite popular, it suffered from two major disadvantages; the need for a cumbersome separate incision procedure for harvesting besides the tendency to prolapse from the meatus, which is known as the cauliflower deformity.[2]

Humby in 1941, first suggested the use of buccal mucosa for urethral replacement.[3] Duckett in 1986 reported on using buccal mucosal graft from the cheek in the repair of epispadias or subsequently in complex hypospadias redo operations and in urethral strictures. Buccal mucosa has advantages over both skin and bladder grafts. The thick epithelial layer, abundant elastic fibres, less tendency to shrink and favourable imbibition properties make it more suitable for neourethral reconstruction.[4-6]

METHODS

The proposed study was carried out in Department of surgery, SRN Hospital associated with MLN Medical College, Allahabad and Department of Surgery, Heritage IMS, Varanasi Utter Pradesh from August 2013 to March 2017 after approval from the ethical committee and obtaining written and informed consent from the patient. All the patients were enrolled with history and clinical examination of previously operated cases of hypospadias presenting with failed repair and who undergone intervention in SRN Hospital and Heritage IMS Varanasi.

Figure 1: Pre-operative image.

Author included studies providing cross sectional information of index test. That is, presence or absence of complications following hypospadias repair and their secondary correction using buccal mucosa graft by index test(s) and reference test so that it is possible to know how many patients were managed successfully by buccal mucosa graft by index test but no success on reference test (false positive or FP), how many had no success with buccal mucosa graft by index test but were found to be successful by reference test. Patients were subjected to following lines of management: a detailed history was recorded for each patient, particulars of patient were recorded: name, age, sex, ward/bed, address, history of previous repairs with date of operation, duration of stay in hospital and the complication that occurred after the primary repair was recorded. Examination of the oral cavity was done, buccal mucosa for sub mucosal fibrosis, inflammation, chronic ulcer, teeth deposits, hard (calculus), soft (plaque), carious teeth, gingivitis, periodontitis

Figure 2: Post-operative image.

Harvesting the oral mucosa, buccal mucosa may be harvested from the inner surface of the cheek or the inner surface of the upper or lower lip. For a single strip of buccal mucosa to be used as on onlay patch, the adult cheek provides up to 6cm and the lip 4cm length with 12 to 15mm width. General anaesthesia via endotracheal intubation is the preferred method of airway control to facilitate access to the oral cavity. The donor site was sutured with 3-0 absorbable suture in interrupted fashion

RESULTS

A total of 50 patients with previous failed hypospadias repair were included in the study who were admitted in Plastic Surgery Unit from August 2013 to July 2014.The age of patients studied ranged from 8 to 16 years. In present study about 60% cases that were presented with previous hypospadias repair were in age group 11-14 years (Table 1).

Table 1: Distribution of the patients in various age groups.

Age group	No. of patients	Percentage
8-11 years	10	20%
11-14 years	30	60%
>14 years	10	20%

In present study, most patients presented with urethral meatus in mid-penile region which were the result of the previous failed hypospadias repair. The position of urethral meatus was the most important factor in determining length of buccal mucosa graft and outcome of buccal mucosa urethroplasty. Some of the patients had more than one fistula with stricturous passage. In such cases the proximal opening from which the patient was passing maximum urine was considered as the meatus (Table 2).

Table 2: Distribution of patients on basis of current position of urethral meatus.

Position of urethral meatus	No. of meatus	Percentage
Midpenile	30	60%
Proximal penile	15	30%
Penoscrotal	05	10%

Type of penile tissue observed predicted the successful outcome of graft uptake. Most patients in present study had undergone various procedures and had extensively scarred soft tissue and these patients were the one who developed complications like fistula, strictures. Those with soft and supple tissue had better graft uptake and healing (Table 3).

Table 3: Type of penile tissue.

Type of tissue observed	No. of patients	Percentage
Soft and supple but deficient soft tissue	13	25%
Extensively scarred soft tissue	37	75%

Patients in this study had undergone multiple previous surgeries for hypospadias repair. Ten patients had 1-2 surgeries and 40 patients had undergone 3 or more procedures for hypospadias repair.

Number of previous surgeries correlated with the amount of soft tissue left for further reconstruction and the degree of scarring (Table 4).

Table 4: Distribution on basis of number of previous surgeries.

Number of previous surgeries done	No. of patients	Percentage
<3	10	20%
3 or >3	40	80%

Most of the patients who presented to us with previous failed hypospadias surgery had the complication of complete dehiscence of the repair with or without residual chordee, hence required substitution graft urethroplasty (Table 5).

Table 5: Complications after previous failed surgery.

Complication after previous failed surgery	No. of patients	%
Complete dehiscence of repair	25	50%
Multiple urethra-cutaneous fistulas	17	35%
Extensive stricture formation	8	15%

Maximum length of buccal mucosa graft used for urethroplasty was 8cm which used for patients with penoscrotal-hypospadias, lesser lengths needed for mid-penile hypospadias (Table 6).

Table 6: Distribution on basis of length of Buccal mucosa graft.

Length of graft	No. of patients	Percentage
3-4cm	15	30%
5-6cm	30	60%
>7cm	5	10%

This study showed that although the procedure being better for management of hypospadias cripples it was not completely free of complications (Table 7).

Table 7: Complications following buccal mucosa graft urethroplasty.

Complications	No. of patients	Percentage
Fistula	8	66%
Stricture	2	17%
Wound dehiscence	2	17%

In study of 50 patients 12 had complications following Buccal Mucosa graft urethroplasty. Of these 2 patients had wound dehiscence and had to undergo redo procedure after 4 months. Of 8 fistula patients 7 had spontaneous healing and 1 had to undergo redo procedure. Two patients with stricture were successfully managed by regular urethral dilatation.

In all patients who underwent Buccal mucosa graft urethroplasty graft was taken from lower lip. All donor sites were primarily closed with interrupted absorbable suture.

Table 8: Donor site morbidity.

Post op day	Complication noticed
Day 1	Pain, bleeding, swelling
Day 2	Pain, swelling
Day 3	Pain, swelling
Day 4	Swelling
Day 5-8	Swelling subsided

Swelling, bleeding and pain were the commonly encountered complications of donor site. Pain was adequately managed by analgesics and ice fomentation.

Swelling usually was transient and on an average, it usually subsided by the 5th postop day. No infection or wound dehiscence was noticed after primary closure of the donor site and the donor site healed completely by 8th post-operative day (Table 8).

DISCUSSION

Secondary repair for hypospadias cripples is a difficult task as anatomical, functional and aesthetic aspects has to be taken into account while performing urethroplasty. Penile shape, appropriate meatal position and normal functional capacity has to be achieved; normal urinary outflow rates, stream and erection are to be considered. Aesthetics outcome are to be kept in mind and the donor site impairment has to be avoided.

The goal of secondary repair of hypospadias cripples are creation of straight penis, meatus placed vertically on glans penis and to provide a functional urethra devoid of fistula, stricture or diverticula. The surgeon has to balance this procedure to achieve the best cosmetic appearance with reliable functions. In order to achieve it one must restore urethral continuity up to tip of glans, straight penis without torsion.

Though there are many procedures for secondary repair of hypospadias including full thickness skin grafts, bladder mucosa, glue etc., and the best suited option for a particular patient is critical for normal penile anatomy and function.[4]

A total of 50 patients were included in present study. Among these 25 patients presented with complete dehiscence of repair, 17 patients presented with multiple urethra-cutaneous fistulas, 08 patients presented with extensive stricture formation. The same surgeon performed the procedure of dorsal onlay buccal mucosa graft urethroplasty to reduce the bias.[7,8]

Multiple procedures were described for correction of hypospadias with evolving techniques either single staged or two staged, but the outcomes varied on the basis of the surgical technique, the procedure used, patient selection, preoperative parameters and most importantly the position of the meatus.

Many complications occurred after primary repair of hypospadias and led to various studies for the management of hypospadias cripples.

Buccal mucosa graft urethroplasty can be done by using various techniques:

- Ventral onlay urethroplasty
- Dorsal onlay urethroplasty
- Bracka's 2 stage urethroplasty

Author in this study performed dorsal onlay urethroplasty and had satisfactory results and stable neourethra and was easier technique to perform and minimal risk of graft necrosis.[9]

Most common age group who presented with failed primary hypospadias repair were in 11-14 years group that is the delay between primary and secondary repair was 8 or more years.

Of all the patients most of them were operated primarily by tabularized incised plate urethroplasty (tip) procedure. This caused a deficient prepucial skin available for secondary repair, hence perfect candidates for secondary repair with buccal mucosa graft.

Buccal mucosa graft is an excellent graft material for substitution free graft urethroplasty in cases with prior failed primary repair of hypospadias in whom the preputial skin was lacking or insufficient and a longer urethral tube needed to be constructed.[10]

The technique used was dorsal onlay method and had various advantages as compared to ventral onlay method. Success rate of dorsal onlay substitution free buccal mucosal graft is affected by length of urethral tube to be reconstructed.[11]

Patients who were previously operated multiple times for the repair of hypospadias and had various complications were enrolled in the study and were operated by buccal mucosa graft urethroplasty in this study 17 patients presented with multiple urethra-cutaneous fistula and repair with buccal mucosa graft in these patients was successful in 16 of these patients and only 1 patient had to undergo redo procedure.[12]

Although excellent procedure it is not free of complications both at donor site and graft site. The most common complication related to donor site are transient pain and swelling. Those related to graft site are stricture and fistulas which can be successfully managed by gradual urethral dilatations. The usual follow up period was 6 weeks to mark the procedure as successful or failure.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Sharma N, Mishra M. Secondary hypospadias repair using Buccal mucosa graft: case series of 50 patients. Int Surg J 2018;5:1345-9.