

Dorsal Onlay Technique Of Barbagli Biology Essay

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From January 2010 to May 2012 a total of 47 patients with long anterior urethral strictures were randomized into two groups. The first group included 25 patients who managed by dorsal onlay BMG urethroplasty. The second group included 22 patients who managed by dorsal inlay BMG urethroplasty. Different clinical parameters, postoperative complications and success rate were compared between both groups.

Results:

The overall success rate in dorsal onlay group was 88% while in dorsal inlay group success rate was 86.4% during the follow-up period. The mean operative time was significantly longer in the dorsal onlay urethroplasty group (205 ± 19.63 minutes) than in the dorsal inlay urethroplasty group (128 ± 4.9 minutes, p value < 0.0001). The average blood loss was significantly higher in the first group (228 ± 5.32 ml.) than in the second group (105 ± 12.05 ml, p value < 0.0001).

Conclusions:

Dorsal onlay technique of Barbagli and dorsal inlay technique of Asopa BMG urethroplasty provide similar success rate. Compared to Barbagli's technique, Asopa' technique is easy to perform and has a shorter operative time and less blood loss and associated with fewer complications for anterior urethral stricture repair.

Key words: Dorsal Onlay Urethroplasty, Dorsal Inlay Urethroplasty, Buccal Mucosal Graft, Anterior Urethral Stricture.

Introduction

There are many surgical procedures for urethral stricture repair, such as internal urethrotomy, stent, stricture excision and primary re-anastomosis, graft- augmented anastomotic procedure and patch urethroplasty. Another option is the two staged urethroplasty is indicated in patients with local adverse conditions. The choice based on the stricture length, location, depth, and density of the spongiofibrosis. Substitution urethroplasty is the mainstay of treatment for long urethral strictures, anterior strictures, and multiple urethral strictures.

In the past decade buccal mucosal graft (BMG) has become the favoured tissue for management of anterior urethral stricture. Though the first BMG urethroplasty was accomplished in 1941 by Humby, there has been a resurgence of it after 1990 (1). Since then, it has been considered as an ideal graft material for substitution urethroplasty. Buccal grafts have several advantages: it is hair less, rich in blood supply and easy to harvest. Furthermore, BMG have a thin lamina propria facilitating early inosculation, thick epithelium minimizing the chance of graft contracture (2), and natural resistance to infection and development of cutaneous diseases such as lichen sclerosis. The oral donor site heals quickly; oral complications of this procedure are minor and subsided gradually within the first year (3).

A controversial issue has been the location of the graft on the urethral surface, the ventral onlay graft technique was described by Morey and McAninch in 1996 (4). Although it is a straightforward and easy to perform technique (5), ventrally placed grafts are likely to be associated with ballooning and pseudo-diverticulum formation of the ventrally positioned unsupported graft (6). Since Barbagli and associates

(1996) (6) renewed the concept of the dorsal approach for performing urethroplasty which developed by Monseur, the dorsal onlay graft technique became the preferred approach for urethroplasty. Dorsal onlay grafting of the urethra allow better take of free graft, as the underlying corpora give better mechanical support for the graft.

Asopa et al (7) popularized dorsal inlay technique through a ventral sagittal urethrotomy approach in 2001, and postulated that the procedure is easier to perform as it does not require urethral mobilization.

The aim of our prospective study is to compare both dorsal onlay technique of Barbagli and dorsal inlay technique of Asopa for management of long anterior urethral stricture. To our knowledge there is no previous comparative study between the two techniques.

Patients and Methods

Between January 2010 and May 2012 a total of 47 male patients with long anterior urethral strictures requiring substitution urethroplasty were randomized to two groups. Both groups were managed by either dorsal onlay (25 patients) or dorsal inlay (22 patients) buccal mucosal graft urethroplasty. The method of randomization was every alternate patient with penile, bulbar or panurethral stricture being assigned to the dorsal onlay (DO) and dorsal inlay (DI) groups.

Preoperative evaluation included: clinical history, physical examination, urine culture, residual urine measurement, uroflowmetry, retrograde and voiding cystourethrography.

In our study, the urethroplasty was performed by two team; one harvesting the BMG, and the other team exposing the stricture. A prophylactic broad-spectrum antibiotic (ceftriaxone) was administered before surgery and continued 5 days postoperatively. The urethroplasty was performed under general endotracheal anesthesia with transnasal intubation. In case of bulbar strictures, a midline perineal incision was made. In the case of penile strictures, a subcoronal circumferential incision was made, and the penis was degloved.

Buccal mucosa grafts were harvested from the inner cheeks (Fig.1) with care to avoid injury the Stensen's duct, opposite the upper second molar. The defect of the graft harvest site is closed with chromic catgut sutures. The harvested graft fat and submucosal layers were removed using scissors for thinning before it is applied as a patch. It is tailored to the shape of the incision. Mouth washes with povidone-iodine oral solution were started 2 days prior to graft harvesting and continued postoperatively for 3 days.

In dorsal onlay, we used the surgical technique which described by Barbagli (8). The corpus spongiosum was carefully dissected away from the corpora cavernosa and rotated. A dorsal urethrostomy was performed with extension of the incision beyond the strictured segment proximally and distally into the normal urethral lumen. The graft was spread fixed to the corpora cavernosa. After fixing the graft, several quilting sutures were added to it, and small incisions along the graft were made to prevent hematoma or edema formation. The aim of the fixation and quilting sutures is to create good contact between the graft and the corporeal bed for securing the graft taking. After introduction of a 16 F silicone catheter, the edges of the stricturotomy were then sutured to the graft as well as to the corpora cavernosa (Fig.2).

In dorsal inlay, we used the surgical technique which described by Asopa (7). Urethral dissection and rotation is not required so blood supply was not affected. A ventral urethrostomy was performed with extension of the incision beyond the strictured segment proximally and distally into the normal urethral lumen. The dorsal surface of urethra was incised in the midline. Using sharp dissection, the margins of the incised dorsal urethra were dissected from the tunica albuginea, without lifting the two edges of the bisected urethra. This dissection results in an elliptical raw area as wide as 1.5-2 cm between the bisected edges of the urethra over the tunica albuginea. The harvested BMGs were spread fixed over the raw area

to cover the defect. After fixing the graft, several quilting sutures were added to it to prevent dead space. The margins of the graft were attached to the edges of the incised urethra. The ventral urethrostomy was closed by continuous sutures over a 16 F silicone catheter and reinforced with interrupted sutures (Fig. 3).

Three weeks after surgery, a retrograde pericatheter urethrography was performed, and if no extravasation the urethral catheter is removed. Patients were followed up with uroflowmetry and urine culture every three months. Urethrography and urethroscopy were considered in presence of obstructive symptoms the uroflowmetry was less than 15 ml per second. The urethroplasty was considered a failure when postoperative intervention was needed.

Results

A total of 47 patients (mean age 36.6 years, range 16 to 59 years) with anterior urethral stricture underwent BMG urethroplasty by dorsal onlay BMG urethroplasty in 25 patients (group 1) and dorsal inlay BMG urethroplasty in 22 patients (group2). The etiology of strictures was inflammation in 61.7 %, iatrogenic in 19.1%, trauma in 12.8%, and idiopathic in 6.4%. Of the 47 patients, 34 (72.3%) had a total of 78 internal urethrotomy procedures (average 1.7 per patient). The stricture site in both groups is demonstrated in (Table 1).

The average stricture length, according to retrograde and voiding cystourethrography, in the dorsal onlay urethroplasty group was 4.9 cm (range 4 to 15) and in the dorsal inlay urethroplasty group 4.4 cm (range 4 to 12). The mean operative time was significantly longer in the dorsal onlay urethroplasty group (205 ± 19.63 minutes) than in the dorsal inlay urethroplasty group (128 ± 4.9 minutes, p value < 0.0001). The mean follow up in both groups was 22.6 and 24.2 months, respectively. The average blood loss was significantly higher in the first group (228 ± 5.32 ml.) than in the second group (105 ± 12.05 ml, p value < 0.0001). Only one patient in the dorsal onlay urethroplasty group required postoperative blood transfusion. Hospitalization in the first and second groups averaged 4.3 days (range 4 to 6 days) and 3.2 days (range 2 to 6), respectively. Three patients in first group and four patients in second group had postoperative wound infection, all are managed successfully with change in antibiotics according to culture sensitivity test using wound swab. One patient in the dorsal inlay urethroplasty group showed extravasation of contrast medium on pericatheter urethrogram after 3 weeks of operation, he was managed successfully by two weeks of additional catheterization. In the dorsal onlay group, 2 patients developed significant chordee after surgery, which was managed by dorsal plication. Four patients in first group suffered from bothersome post-void dribbling, while only one patient in second group developed bothersome post-void dribbling.

Three patients (12.8%) in each group developed stricture at 3, 6, 12, and 18 month follow-up. Patients with recurrent stricture presented with weak urinary stream, diminished urinary flow (peak urinary flow < 15 ml/s), dysuria, and recurrent UTI. Four of the failure cases who developed a distal anastomotic stricture, and one who had two stenotic rings at the distal and proximal site of anastomosis, all of them respond well to internal urethrotomy. Another patient (group2) developed long segment stricture and required open surgery. Five of the patients with recurrent stricture had undergone multiple endoscopic procedures with resultant periurethral fibrosis and marked spongiofibrosis. The six strictures, which recurred in our study according to the preoperative site of the stricture, were one penile, two bulbar, and three panurethral. It is well known that panurethral stricture repair is difficult problem to solve and the success rate is lower when compared to simple penile or bulbar stricture repair.

Peak urinary flow rates improved in the first group from an average of 8.2 ml/sec preoperatively to 23.4 ml/sec postoperatively. In the second group the maximum urinary flow increased from an average of 9.1 ml/sec preoperatively to 24.5 ml/sec postoperatively. AUA symptom score decreased from a mean of 22.4 preoperatively to 4.8 postoperatively in the first group. Also AUA symptom score decreased from a mean of

23.5 preoperatively to 5.1 postoperatively in the second group.

The donor sites were all fully epithelialised by 6 weeks. No long-term complications as regard the donor site. Four patients suffered from difficulty opening the mouth, and a salivary flow problem up to 3 months after surgery but later they overcame the disability.

BMG urethroplasty was considered successful if no intervention in the form of dilatation or OU was needed, and the maximum flow rate was ≥ 15 ml/s during the follow-up period. The overall success rate in dorsal onlay group was 88% while in dorsal inlay group success rate was 86.4% during the follow-up period.

Discussion

Urethral reconstruction with stricture excision and end-to-end anastomosis remains the gold standard technique for dealing with short urethral strictures of ≤ 2 cm, with good long term outcomes. Patients with longer or complex strictures, require substitution urethroplasty (9). The ideal tissue for substitution urethroplasty remains controversial. Candidate tissues that have been used for urethral reconstruction are split and full-thickness skin grafts, bladder mucosa, and oral mucosal (2).

Several studies reported that substitution urethroplasty using Full-thickness skin grafts or bladder mucosa, are associated with high complication rate, especially during long-term follow-up. These data have led to the current enthusiasm for buccal mucosa grafting in reconstructive surgery of both hypospadias and stricture repair (10).

Buccal mucosal grafts (BMGs) are considered as the best material for urethroplasty due to different factors including: rich in blood supply, easy accessibility, resistance to infection, in addition to a thick epithelium and a thin lamina propria facilitating early inosculation (1, 3).

Not only the type of graft tissue but also the site for graft placing is crucial, as the blood supply of the recipient area and the graft support are both essential in graft uptake (7,11,12,13). The trend of dorsal onlay over ventral graft patch placement was popularized by Barbagli et al in 1998 (14). It was established that dorsally placed BMG graft technique has better mechanical support and an abundant blood supply. Furthermore, dorsally placed BMG graft avoids pseudodiverticulum formation and sacculation of the graft sometimes observed following ventral onlay, because it is supported by corporal bodies (6). The Barbagli dorsal onlay technique involves dissection of the urethra from the corpora cavernosa and its rotation of 180 degree. In case of previous repeated dilations or internal urethrotomies, the urethral detachment from the corpora is difficult due to the fibrotic adhesions; furthermore, this approach may damage erectile function and the bulbar arteries when very proximal dissection from the corpora is required (15, 16).

Asopa popularized (2001) the dorsal inlay technique (7) by ventral sagittal urethrotomy approach. In the Asopa procedure the urethra is not mobilized or dissected, which not only preserves the urethral blood supply coming through circumflex and perforating vessels but also simplifies the procedure.

The aim of this prospective study is to compare the results of dorsal onlay (Barbagli) technique and dorsal inlay (Asopa) technique in management of long anterior urethral stricture. To our knowledge before our work there were no previous studies comparing the two techniques. A randomized study on urethroplasty techniques is difficult as different factors like stricture length, site, previous intervention and degree of spongiofibrosis affect procedure results. The patients with different variables were well balanced in both groups. The only uncontrolled variable was the degree of spongiofibrosis. Urethral sonography is unreliable in predicting the depth of spongiofibrosis when compared with histopathological correlation (17).

In this study BMG dorsal onlay urethroplasty and BMG dorsal Inlay urethroplasty provided comparable

outcomes for anterior urethral strictures repair. We reported success rate in dorsal onlay group 88% while in dorsal inlay group success rate was 86.4%. The overall success rate of both groups is comparable with those in other series of BMG urethroplasty (Table 2) using Barbagli technique or Asopa technique for anterior urethral stricture repair

Using Asopa' technique no mobilization of the urethra is required, which not only preserves the urethral blood supply coming through circumflex and perforating vessels but also simplifies the procedure, as no urethral dissection is required to place the graft dorsally. In our study the mean operative time with Asopa' technique was significantly shorter (128 ± 4.89 minutes) than the mean operative time in Barbagli's technique (205 ± 19.63 minutes, p value < 0.0001). The other distinct advantage of Asopa' technique is that the stricture site is directly seen, and the BMG can be tailored to the dorsal urethrotomy defect; in Barbagli's technique, visualization is rendered difficult by the rotation necessary for urethral incision dorsally. Asopa' technique may also be more suitable when the urethra is adherent to underlying corpora cavernosa as a consequence of repeated OUs and in obese patients where a dorsal approach may be particularly difficult (18). In this study, the average blood loss in the first group was significantly more than in the second group (228 ± 5.32 Vs. 105 ± 12.05 , p value < 0.0001) which could be attributed to urethral dissection and rotation in Barbagli's technique. However in Asopa' technique, The bleeding from the edges of the spongy urethra at the ventral urethrotomy site is more than in the dorsal onlay technique but can usually be controlled effectively with diathermy or sutures.

In this study, there are minor complications. There was no postoperative diverticulum formation, urinary incontinence or de novo erectile dysfunction, but wound infection was present in three patients in first group and four patients in second group, and could be managed conservatively by antibiotics. Four patients in first group and only one patient in second group suffered from bothersome post-voiding dribbling, while only one patient in second group developed bothersome post-voiding dribbling, and could be managed conservatively by manual urethral compression. . In the dorsal onlay group, two patients developed significant chordee after surgery, which was managed by dorsal plication. The re-stricture rate was low three patients in each group; all of them were managed by internal urethrotomy. Only one patient required open surgery. No long-term morbidity was observed as regard the donor site.

Conclusions:

Dorsal onlay technique of Barbagli and dorsal inlay technique of Asopa BMG urethroplasty provide similar success rate. Compared to Barbagli's technique, Asopa' technique is easy to perform and has a shorter operative time and less blood loss and associated with fewer complications for anterior urethral stricture repair.