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Reflective Research of Single-Stage versus Two-Stage Urethroplasty to Better Define Best Therapy of Penile Urethral Strictures: A Comparative Longitudinal Study

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Abstract:

Aim: To determine whether single-stage is better than the two-stage urethroplasty for the therapy of penile urethral strictures

Study design: A comparative longitudinal study

Place and duration: This study conducted at Armed Forces Institute of Urology Rawalpindi, Pakistan between June 2020 to June 2021

Methodology: A reflective opinion on penile urethroplasties executed at a single center . The patients who had penile urethroplasty were included in this study. At six and 12 months, the main result was urethral patency, which was bounded as the capacity to pass the cystoscope with ease ranging from 16 to 17 Fr. The development of 90-day problems was the secondary result. Complications from both the first and second stages were covered in two-stage procedures.

Results: There was a total of 100 single-stage series of steps (48 buccal mucosal graft which is BMG and 52 penile fasciocutaneous flap [PFF]) and 52 two-stage steps conducted. The median stricture length did not differ across groups (p=0.25). Restriction on etiology, area, age, weight, past redesign, or urethroplasty technique was not shown as to link with failure in a Cox regression analysis. There was no difference in success rates comparing surgical

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procedures according to log-rank testing (91 percent [47/52] PFF vs. 83 percent [39/47] BMG vs. 87 percent [45/52] two-stage). A complication was experienced by 39% (60/154) of patients (51 percent [27/53] PFF vs. 29 percent [14/48] BMG vs. 36 percent [18/52] two-stage).The only predictor linked with the advancement of the problem was the urethroplasty technique; the odds ratio for PFF was 3.1 (p=0.009) and for two-stage was 1.4 (p=0.43) when compared to BMG.

Conclusions: The favorable result of various penile urethroplasty procedures appear to be comparable. When appropriate, the shift to a single-stage BMG seems to be based on the patient undergoing some procedures than with a two-stage repair and having a lower complexity profile than with a single-stage PFF, all without sacrificing success rates.

Keywords: urethroplasty, penile urethral strictures, penile urethroplasties

Introduction

For reconstructive urologists, the best way to treat penile urethral strictures remains a contentious topic. The discussion revolves around the following problems: Graft is less preferable over a Flap, the two-stage repair is neglected and single-stage repair is preferred. Buccal mucosa grafts (BMG) have become increasingly popular for bulbar urethroplasties in recent decades. With the best continuing result in the bulbar urethra, penile urethroplasty has undergone a paradigm change, despite a lack of data to justify this change[1]. Although the pendulous urethra is deficient in the bulbar urethra's robust vascularity, blood is donated by PFF to make up for the lack of vascularity, according to proponents of FF. Grafts, on the other hand, are considerably harvesting is made easier, according to multiple reports grafts have considerable advantages such as less indisposition of the donor site, easy to harvest and utilize. In cases of lichen sclerosis, past hypospadias repairs, and prior urethral reconstructions, two-stage repairs were traditionally employed. Patients, on the other hand, exposed to the morbidity of two procedures. As a result, to lessen the issues of a second treatment, as well as the normal six-month wait between stages, the marks for single-stage repairs for more complex restrictions, have been broadened[2].

The current study was conducted to cross analyze BMG and PFF procedures as well as comparison to staged and flap methods, we anticipated that single-stage urethroplasty using BMG delivers equivalent results with less ailment.

Methodology

A reflective opinion on penile urethroplasties executed at a single center. The patients who had penile urethroplasty were included in the study. Our institutional review board granted us ethics permission. There were 153 penile urethroplasties in total, with 100 single-stage procedures [47 BMG and 52 PFF] and 52 two-stage steps included. At six and 12 months, the main result was urethral patency, which was bounded as the capacity to pass the cystoscope with ease ranging from 16 to 17 Fr. The development of 90-day problems was the secondary

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result. Complications from both the first and second stages were covered in two-stage procedures.1-Surgical procedures and 2-PFF with a single-stage

A single stage incision is usually used to deglove the penis. Beyond the proximal range of the abnormal narrowing of a bodily passage, the urethra is located ventrally. The length of the narrowing of a body passage is calculated, and a PFF of the proper size is drawn out. The pedicle is mobilized from the dartos fascia, and the flap borders are keenly cut through the skin. An only reconstruction is undertaken after the proximal anastomosis is completed. The flap pedicle is spread and secured with a 16 Fr catheter. A plaster of occlusive gauze and mildly binding Coban wrap is placed on the penile skin. Three weeks after surgery, avoid in trial is done.

BMG with a single-stage:

Depending on where the stricture is located, a dorsal inlay or dorsal onlay procedure is employed. For distal strictures, a dorsal inlay is preferable, while proximal strictures are usually treated with a dorsal only. After the glands wings have been mobilized, the reconstruction of the glans is completed, if necessary. A catheter with a diameter of 16 Fr is inserted. The wound is dressed with non-adherent gauze, ordinary gauze, and a Coban wrap. Three weeks after surgery, avoid in trial is done.

BMG in two stages:

The extent of the stricture determines how many bilateral BMGs are collected. These are attached to the urethral plate on both sides. A catheter with a diameter of 16 Fr is inserted. For the next five days, a bolster dressing made of Xero form gauze, and normal gauze is put on and attached with chromic sutures. On a postoperative day 4, a blank experiment is also performed.

The second stage can be performed even after 6 months with no difficulties in graft maturation. Under cystoscopic supervision, a catheter is inserted. The edges of the urethral plate are finely carved. Over a 26 Fr sound, the urethral plate closes. The meatus is developed and the glans flaps are advanced to the midline to complete the glanuloplasty. After a 15 Fr urethral arterial stent is inserted with a catheter, a dressing similar to the one-stage PFF is applied. Three weeks after surgery, a voiding trial is done.

Wherever appropriate, Chi-square or Mann-Whitney testing was used to compare baseline patient and stricture characteristics. Factors linked to treatment failure were investigated using Cox regression analysis. The failure was demonstrated using Kaplan-Meier regression modeling. The researchers next utilized binary logistic regression to find independent predictors of problems. Two-sided statistical tests with a p-value were used.

Results:

There were 153 penile urethroplasties in total, with 100 single-stage procedures [48 BMG and 52 PFF] and 52 two-stage steps included. Table 1 shows the demographics of the cohort. Idiopathic for PFF repairs (26 percent [13/52]) and hypospadias in the two-stage restoration (66 percent [35/52]) were frequent etiologies for BMG repairs (56 percent [18/47]). At 5.0

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cm (interquartile range [IQR] 3.4–9) for PFF, 5.0 cm (2.9–8.8) for BMG, and 5.4 cm (4.1–6.9) for two-stage (p=0.25), there was no variance in median point of disease length across groups (Table 1). Table 2 shows the outcomes and complications of penile urethroplasty. Overall, the three groups had similar success rates, with 91 percent (47/52) for PFF, 83 percent (39/47), and 87 percent (45/52) for BMG and two-stage methods, respectively. The obstacle we were obstacle 50 percent of the PFF group (26/52), 29 percent of the BMG group (13/47), and 36 percent of the two-stage group (18/52). There was 17 Clavien grade I–II problems in the PFF group, including seven lesion infections treated with antibacterial and ten incidences of frontal epidermolysis, treated conventionally. One case of epidermolysis debrided under local anesthesiaia, seven urethra cutaneous fistulas (UCF) surgically repaired, one ventral glans crack necessitating glanuloplasty, and two cases of flap necrosis debrided under general aesthetic were among the ten cases that required re-intervention. Antibiotics were used to treat a urinary tract infection (UTI), pneumonia, hematoma, and lesion infection, two incidences of UCF, and seven episodes of epidermolysis treated conservatively were among the 13 Clavien I–II complications in the BMG group. Stricture etiology (p=0.75), length (0.27), age (p=0.23), obesity (p=0.06), prior to reconstruction (p=0.34), or urethroplasty technique (p=0.36) were not shown to linked with failure in a Cox regression analysis (Table 3). The success rates of surgical treatments were not different (91 percent [48/53] PFF vs. 83 percent [39/47] BMG vs. 87 percent [45/52] two-stage) according to Kaplan-Meier plots and log-rank tests. The only element linked with the growth of problems (p=0.03) was the urethroplasty procedure (binary logistic regression analysis). PFF had an odds ratio of 3.1 (95 percent trust interval [CI] 1.32–6.30; p=0.008), while two-stage urethroplasty had an odds ratio of 1.4 (95 percent confidence interval [CI] 0.59–3.4; p=0.43) (Table 4).

Table 1. Medical aspects at the start

Medical aspects	**One-stage PFF, n (%, IQR)**	**One-stage BMG, n (%, IQR)**	**One-stage overall, n (%, IQR)**	**Two-stage, n (%, IQR)**	**p**
N	52	47	100	52	—
The average age of urethroplasty patients (years)	47	49	48	34	0.0001
Length of the median stricture (cm)	5.0 (3.5–10)	6.0 (3.6–9.8)	5.0 (3.5–10.0)	5.5 (4.0–7.0)	0.25
Causes of suffocation					
Idiopathic	14 (26.4)	8 (16.7)	22 (21.8)	1 (1.9)	0.001*
Traumatic	7 (13.2)	4 (8.3)	11 (10.9)	1 (1.9)	0.048*
Lichen sclerosis	1 (1.9)	19 (39.6)	20 (19.8)	14 (26.4)	0.35
Radiation	1 (1.9)	1 (2.1)	2 (2.0)	0 (0)	0.30
Hypospadias	13 (24.5)	7 (14.6)	20 (19.8)	36 (67.9)	0.0001*
Iatrogenic	16 (30.2)	9 (18.8)	25 (24.8)	1 (1.9)	0.0003*
Infectious/inflammatory	1 (1.9)	0 (0)	1 (0.99)	0 (0)	0.47
Prior urethral reconstruction	8 (15.1)	9 (18.8)	17 (16.8)	35 (66.0)	0.0001*

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The median length of follow-up (months)	93 (60–113)	32 (18–50)	56 (28–103)	87 (45–121)

*p<0.05 denotes statistical significance. BMG: buccal mucosal graft; IQR: interquartile range; PFF: penile fasciocutaneous flap.

Table 2. Complications and results of urethroplasty

Results	**One-stage PFF, n (%)**	**One-stage BMG, n (%)**	**One-stage overall, n (%)**	**Two-stage, (%)**	**n p**
Successful urethroplasty	48 (90.6)	40 (83.3)	88 (87.1)	46 (86.8)	0.95
Complication experienced	27 (50.9)	14 (29.2)	41 (40.5)	19 (35.8)	0.57
Clavien grade					
I	9 (17.8)	8 (17.7)	19 (18.9)	7 (13.2)	0.38
II	7 (13.2)	4 (8.3)	11 (10.9)	5 (9.4)	0.79
IIIa	1 (1.9)	0 (0)	1 (1.0)	0 (0)	0.47
IIIb	9 (17.0)	1 (2.1)	10 (9.9)	6 (11.3)	0.93
Iva	0 (0)	0 (0)	0 (0)	0 (0)	—
IVb	0 (0)	0 (0)	0 (0)	0 (0)	—
V	0 (0)	0 (0)	0 (0)	0 (0)	—
Re-operation for complication	10 (18.9)	1 (2.1)	11 (10.9)	6 (11.3)	0.94

BMG: buccal mucosal graft; PFF: penile fasciocutaneous flap.

Table 3. Variables linked to treatment failure analysis using the Cox regression method.

Medical variable	**Disaster ratio**	**95% CI**	**P**
Age	0.98	0.96–1.01	0.23
Weight(BMI□ 35kg/ m^2)	1.9	0.95–7.09	0.06
Stricture length (cm)	1.2	0.92–1.21	0.27
Previous urethroplasty	0.63	0.22–1.69	0.37
Technique			0.35
1-stage BMG	significance	—	—
1-stage PFF	0.45	0.14–1.40	0.14
2-stage	0.63	0.23–1.80	0.38

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Suffocation causes			0.99
Idiopathic	significance	—	—
Traumatic	1.5	0.22–11.0	0.65
Lichen sclerosis	1.8	0.39–9.60	0.41
Radiation	1.1	0.9–1.01	0.98
Hypospadias	1.4	0.26–6.10	0.75
Iatrogenic	1.2	0.19–6.80	0.88
	1.1	0.99–1.01	0.98
Inflammatory/infectious			

Table 4. Binary logistic regression was used to look at characteristics that were independently linked to postoperative problems.

Clinical variable	Odds ratio	95% CI	P
Age	0.99	0.97–1.00	0.07
Stricture length	1.01	0.90–1.10	0.93
Etiology	0.94	0.78–1.16	0.63
Weight(BMI□ 35kg/m^2)	0.59	0.22–1.72	0.34
Previous urethroplasty	0.68	0.36–1.41	0.30
Technique			0.02*
One-stage BMG	significance	—	—
One-stage PFF	3.2	1.32–6.30	0.009*
Two-stage	1.4	0.59–3.40	0.43

Discussion:

This is the largest reflective cohort study of three different penile urethroplasty methods ever conducted. In our current research, progressive rates were similar among strategies, ranging from 83 percent for BMG to 91 percent for PFF [4, 5, 6, 7].

Both penile and bulbar urethral strictures are included in anterior urethral strictures, the two prospective trials randomly assignients to single-stage BMG or PFF. These studies found no difference in success: 92% BMG vs. 84 percent PFF in Claassen et al, and 83 percent BMG vs. 90 percent PFF [8, 9 10]. The results of both trials are impeded by small sample sizes and group heterogeneity. Once bulbar urethral strictures were removed from the equation, the first trial's group sizes were 18 for PFF and 21 for BMG, while the second case group sizes were 11 for PFF and 13 for BMG.

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Our series did not report PVD or penile hypoesthesia, but the rate of focal flap necrosis was 4% and the rate of epidermolysis was near 20%. In the Claassentrial, the most common BMG side effects were oral (26%) and included increased salivation and perioral numbness. Oral difficulties were seen in 32% of the Soliman patients. There were no oral issues reported in this trial, yet a complication like perioral numbness could occur depending on how patients were instructor about the donor site and the length of follow-up.

If it was resolved within 90 days, we didn't consider it a complication. This series, as well as our data, show the benefits of BMG and the drawbacks of PFF. The PFF is a complicated vag with lengthy suture lines that can lead to UCF (12%) and epidermolysis (32%), as well as dehiscence (3%) and necrosis (5%). Overall, single-stage BMG approaches appear to have some progressive rates to PFF procedures, but with less dejection.

Tawakol, et al., presented research with 102 two-stage repairs (n=91 when pure bulbar strictures were omitted) and 138 single-stage repairs in the biggest steps analyzing single-stage and two-stage procedures [11, 12, 13, 14]. When earlier hypospadias surgery has failed or when the urethral lumen has been obliterated, a two-stage technique was used to treat lichen sclerosis. The annual incidence with single-stage was 3% at six months, compared to 4% with two-stage. Despite the fact the even thought was similar (18%), the most common research in our series were UCF repairs and focal flap necrosis, considering in the comparative trial, all PFF revisions were for hematomas [15, 16, 17]. Our two-stage repair revision rate, on the other hand, was only 11%. Urethrostomy stenosis (17%) and growth of the glans cleft (16%) were the most normal reasons for revision in the research (13 percent). We usually keep patients on diazepam 6 mg two times a day for 48 hours after surgery, then switch them to 6 mg nightly for three weeks. Though it's unlikely that this explains the entire discrepancy, it could result in a lower revision rate. There are two key reasons for our shift away from strict two-stage fixes. To begin with, all patients have at least two treatments, with some being left with a cosmetically unappealing penis for six months while waiting for the second stage. Second, due to difficulties that necessitate revisions, roughly 11–50 percent of patients will require three or more procedures [18, 19, 20]. Similar findings appear to have validated the transition away from two-stage urethroplasties while reducing the overall surgeries necessary.

The use of analysis by the Cox regression method to uncover aspects related to the failure of treatment is a strength of our study. In general, studies of penile strictures include a somewhat diverse population in terms of stricture duration, etiology, and past procedures. Despite the heterogeneity of these characteristics, we were able to show that none of them were linked to treatment malfunction. Similarly, binary logistic regression revealed that the urethroplasty technique, specifically PFF, is the sole component that predicts problems. The study's long-term follow-up is another plus.

Study limitations:

Even though single-Even thoughts thought over PFFs and two-stage repairs, there still lies the problem with selection. For patients with poorly formed glans, failed single-stage restorations, and an obliterated urethral plate, we nevertheless recommend a two-stage repair.

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There was some diversity in the etiology of strictures at the start. Nevertheless, structure etiology was not linked to failure in our regression analysis. Due to the rarity of this condition, small numbers necessitate a prospective, randomized trial comparing these three procedures will very definitely never be achievable due to a mix of various restricted etiologies and built-in biases of surgeons.

Conclusions:

It is concluded that there is a small margin in working efficiency between single-stage BMG, PFF, and two-stage urethroplasties for penile urethroplasty. Single-stage PFF had a higher rate of complications. When appropriate, the shift to a single-stage BMG seems to be based on the patient undergoing some procedures than with a two-stage repair and having a lower complexity profile than with a single-stage PFF, all without accommodating success rates.

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Conflict of interest

None

Permission

Permission was taken from the ethical review committee of the institute

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