DOI: https://doi.org/10.53350/pjmhs020231711183

ORIGINAL ARTICLE

Sexual Function after Staged Penile Urethroplasty with Oral Mucosal Graft: A Single-Center Prospective Analysis

AMIR TAIMUR KHAN[1], HAZRATULLAH[2], HAMZA KHAN SHAHBAZI[3], SYED MUHAMMAD HAIDER[4], MOATH AHMAD ABDULLAH ALMURADI[5], MUHAMMAD ANESS IQBAL[6]

[1]*Associate professor Plastic Surgery and Burns Unit Khyber Teaching Hospital Peshawar*
[2]*Assistant professor Urology Unit Khyber Teaching Hospital Peshawar*
[3]*Trainee Registrar Plastic Surgery and Burns Unit Khyber Teaching Hospital Peshawar*
[4]*Assistant Professor, Plastic Surgery and Burns Unit, Khyber Teaching Hospital, Peshawar*
[5,6]*Resident Urology unit Khyber teaching hospital Peshawar*
Correspondence to: Hazratullah, Email: hazratullah72@yahoo.com

ABSTRACT

Objective: The current study aims to assess erectile, ejaculatory and anatomical changes following staged penile urethroplasty with oral mucosal graft including outcomes re-evaluation after a set period of time in men with complex urethral strictures.

Methods: This study was a prospective cohort study of 33 men who underwent staged penile urethroplasty with oral mucosal graft in Khyber Teaching Hospital Peshawar from July 2023-August 2024. Patients completed their sexual function assessment prior to and after the surgery using the Sexual Health Inventory for men (SHIM) and the Male Sexual Health Questionnaire Ejaculatory Short Form (MSHQ-EjD). Penile curvature, length, and sensitivity were assessed subjectively using a non-validated questionnaire. Changes in scores were analyzed using linear regression and descriptive statistics were used to summarize patient-reported outcomes.

Results: The cohort had mean age 45years (SD: 11.2) and BMI 27.6kg/m^2(SD: 4.1). Stricture causes included failed hypospadias repair (52%), lichen sclerosus (27%) and previous urethroplasty (52%). Median follow up after the second stage was 6.3 months (IQR: 3.5–13.3). No clinical significance change was found in SHIM (Δ = −0.64, 95% CI: –3.00–1.72) or MSHQ-EjD score (Δ = 1.55, 95% CI: – 1.53–4.63). Subjectively 23% reported new penile curvature, 55% reported decreased length and 45% reported altered sensitivity. Satisfaction with intercourse increased in 32% (SHAM Q5) while 40% reported decreased bother by ejaculation (MSHQ-EjD Q4). Only 1 patient was on post-operative erectile dysfunction medication.

Conclusion: As assessed with validated instruments, staged penile urethroplasty with oral mucosal grafting OMG has minimal effects on erectile and ejaculatory functions. On the other hand, subjective anatomical changes (sensitivity, curvatures, length) are commonplace and necessitate proper counseling prior to surgery. These insights are relevant to the expectations of patients and offer suggestions for further research on objective measurements of anatomy of the penis.

Keywords: urethroplasty, sexual dysfunction, penile curvature, oral mucosal graft, erectile function, ejaculatory function.

INTRODUCTION

Severe penile urethral strictures remain one of the most difficult problems to reconstruct owing to their association with failed hypospadias repair, lichen sclerosus, and prior urethroplasty failures[1,2]. Such strictures are frequently associated with extensive fibrosis, long gaps, and poor local tissue, which must be surgically fixed for restoration of function[3–5]. Less aggressive procedures of urethral dilation and direct vision internal urethrotomy (DVIU) are often more desirable, but are more likely to fail and require multiple surgeries, resulting in greater morbidity in the long run.[3–5] Therefore, staged penile urethroplasty with oral mucosa graft (OMG) is commonly accepted the gold standard for more complicated cases, with success rates over 90% in two-year follow up studies[1, 2].

Staged penile urethroplasty generally consists of two operations, starting with urethral plate incision or excision and OMG onlay placement, followed 3–12 months later by graft tabularization[6,7]. This technique is favorably used in patients with failed hypospadias repair or lichen sclerosi, where local tissues are poor.[1,2] Even Though these procedures are shown to have anatomical success, their functional impact on sexual activity is still to be studied, leaving a gap for both patients and surgeons to consider during counseling[8–10].

One of the most important outcomes of performing urethral reconstruction is retention of sexual function, especially in the case of penile urethral strictures where the patient's sexual structures are severely affected[11–19]. Other studies correlating urethroplasty and sexual function have mainly dealt with bulbar strictures or bilateral one-stage repair[11–19], both of which do not compare to the intricacies of penile urethroplasty. For instance, Erickson et. Al.[9] and Dogra et. Al.[8] noted some degree of erectile dysfunction (ED) after anterior urethroplasty, but the patient's broader population had a mix of stricture sites and procedures, so it is difficult to relate those findings to staged penile procedures. In the same way, Sharma et. Al.[13] observed enhancements in ejaculatory function following penile urethroplasty, but her study was constrained to a very limited group of patients within the larger cohort

The dorsal side of the penis is particularly important due to the shape's anatomical intricacies, which raises worries of postoperative length, curvature, and sensitivity. The corporal bodies, neurovascular bundles, or even the tunica albuginea may be altered during penile urethroplasty, which can produce sensory and deformity outcomes[12,14]. Although Blaschko et al.[14] brought attention to the rates of new onset erectile dysfunction (ED) after anterior urethroplasty, the meta-analysis had a broad variety of techniques and causes of the stricture which makes it more difficult to understand these outcomes. Also, it has been little studied with only Erickson et al.[10] who evaluated the bother of ejaculation covering a mixed cohort of those having penile as well as bulbar stricture.

The absence of prospective information on sexual outcomes following staged penile urethroplasty with OMG is a crucial knowledge gap. The Sexual Health Inventory for Men (SHIM) and Male Sexual Health Questionnaire Ejaculatory Short Form (MSHQ-EjD) are validated instruments that have been utilized in previous studies on urethroplasty[8-10,13], but their use in staged penile procedures is lacking. Furthermore, subjective outcomes such as sensitivity and penile curvature have important bearing for patients but are seldom evaluated in the literature[15].

This study fills the gaps by assessing erectile, ejaculatory, and anatomical outcomes of a multi-institutional cohort of men with staged penile urethroplasty with OMG. Through the Trauma and Urologic Reconstruction Network of Surgeons TURNS database[16], we hypothesize that staged penile urethroplasty has minimal effects on validated sexual function scores, but may have subjective changes in anatomy. The current work gives detailed methods to understand patient-reported outcomes by combining validated instruments (SHIM, MSHQ-EjD)[17,18] with a custom-made

Received on 13-09-2023
Accepted on 29-10-2023

questionnaire that enhance preoperative counsel and postoperative expectations in this complex population.

METHODOLOGY

Study Design and Setting: This prospective cohort study used information from the database of the Trauma and Urologic Reconstruction Network of Surgeons (TURNS). The study took place from January 2010 to May 2014 during which time an institutional review board approval was obtained at all centers involved in the study.

Study Population:

Inclusion Criteria:

- Male patients aged 18 years or older who underwent staged penile urethroplasty with oral mucosal graft (OMG) and completed both stages.
- Preoperative and postoperative sexual function surveys were provided.
- Self-reported sexually active respondents during the study timeframe.

Exclusion Criteria:

- Patients who do not engage in sexual activity.
- Missing answers to postoperative surveys.

From an initial cohort of 57 patients, 19 were excluded due to missing postoperative data while 5 were excluded due to lack of sexual activity, which leads to a final analytic sample of 33 patients.

Surgical Technique

The technique was implemented in two steps [17, 18]:

1. **Stage 1:**
   - Partial division of ventral penile skin was carried out to the level where the urethral stricture is visible.
   - Edited fibrotic urethral segments were cut out and a mucosal graft from the oral cavity (inner cheek or lip) was sutured in as a dorsal onlay over the corporal bodies.
2. **Stage 2:**
   - Took place 3 to 12 months after Stage 1, it included a tabularized graft and a catheter.
   - Fistula formation was prevented by interposing a flap of tunica dartos or tunica vaginalis.

Data Collection Instruments

1. **Validated Tools:**
   - Sexual Health Inventory for Men (SHIM) - An assessment measuring an individual's ability to have an erection through a questionnaire with 5 questions and score ranges from 1-25. [19].
2. Male Sexual Health Questionnaire Ejaculatory Short Form (MSHQ-EjD) - A tool that consists of 4 questions to evaluate ejaculatory function ranges from 1-20. [20]

Custom Post-Urethroplasty Questionnaire: Non validated questionnaire measuring satisfaction with surgery, penile curvature, length, and sensitivity (Table 2).

Variables Assessed:

- **Primary Outcomes:**
- Total SHIM and MSHQ-EjD score change preoperative versus postoperative periods.
- **Secondary Outcomes:**
  - Subjective reports of post-operative penile curvature, length loss, and sensitivity changes.
- Use of medications for erectile dysfunction.
- **Demographics:** Age, BMI, smoking history, diabetes, stricture cause (for instance, failed hypospadias repair, lichen sclerosus), and history of urethroplasty.

Statistical Analysis: The main analysis used multi-variate regression models to evaluate the difference in means of SHIM and MSHQ-EjD scores (post minus pre) with the adjustment of institution to control for potential site differences. The results were described as mean differences (Δ) with corresponding 95% confidence intervals (CIs) for uncertainty around the estimates. For secondary outcomes, self-reported changes in penile curvature, length loss, and sensitivity were summarized using descriptive statistics (i.e., percentages, frequencies) to present results. To account for bias due to multiple measures, only the last postoperative questionnaire was analyzed if a patient had completed multiple ones. All statistical analysis was done in R v.3.03 software, and two-tailed tests were used to evaluate statistical significance [21].

RESULTS

Interpretation: The sample shows not only high lichen sclerosus (27%) but also complex patients with refractory strictures (52% had previous urethroplasty) suggesting the need for staged penile urethroplasty which is characteristic of the cohort.

Interpretation: No significant change in erectile function (Δ = −0.64, 95% CI: −3.00–1.72). Subgroup analysis (Figure 2) showed 32% improved intercourse satisfaction (SHIM Q5).

Interpretation: No significant change in ejaculatory function (Δ = 1.55, 95% CI: −1.53–4.63). However, 40% reported reduced bother (MSHQ-EjD Q4).

Interpretation: Despite stable validated scores, 55% reported reduced penile length, and 45% noted altered sensitivity, underscoring the need for preoperative counseling.

Patient Demographics

Table 1: Clinical Characteristics of the Study Cohort (n=33):

Variable	Mean (SD) / n (%)
Age (years)	45 (11.2)
BMI (kg/m²)	27.6 (4.1)
Etiology	
- Failed hypospadias repair	17 (52%)
- Lichen sclerosus	9 (27%)
Prior urethroplasty	17 (52%)
Follow-Up Duration	
- Median (IQR)	6.3 months (3.5–13.3)

Subjective Sexual Outcomes

Table 2: Patient-Reported Changes Post-Urethroplasty (n=22):

Outcome	% Reporting Change
New penile curvature	23%
Reduced penile length	55%
Altered sensitivity	45%
ED medication use	3% (1 patient)
Satisfaction with surgery	68%

Erectile Function (SHIM Scores)

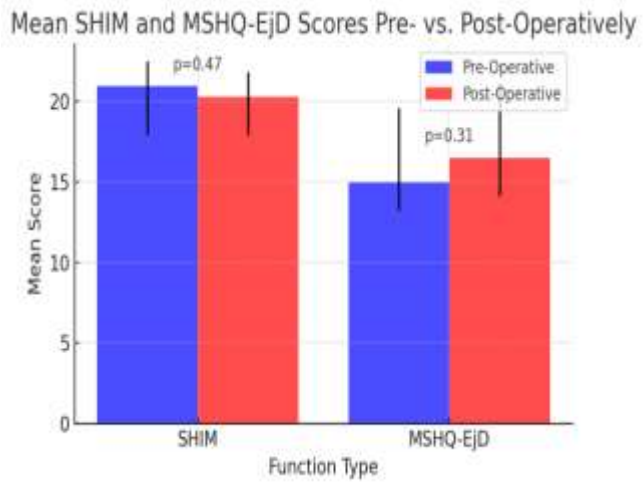

Figure 1: Mean SHIM Scores Pre- vs. Post-Operatively

Ejaculatory Function (MSHQ-EjD Scores)

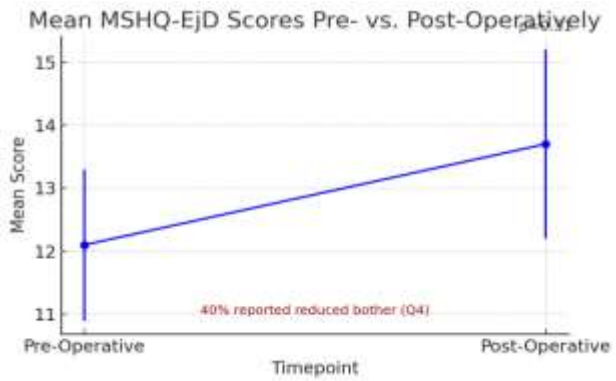

Figure 2: Mean MSHQ-EjD Scores Pre- vs. Post-Operatively:

DISCUSSION

Staged penile urethroplasty with oral mucosal graft (OMG) stands as one of the most used surgical techniques for complex penile urethral strictures because of its high anatomical and functional success rates[5,6]. The sexual impact of this surgical technique has, however, not been thoroughly studied, especially in more homogenous cohorts undergoing staged reconstruction. Our results show no meaningful change in validated scores of erectile (SHIM) and ejaculatory (MSHQ-EjD) functions postoperatively (Δ = −0.64, 95% CI: −3.00–1.72), (Δ = 1.55, 95% CI: −1.53–4.63). In spite of these stable objective measures, an alarming number of patients reported new concerns including penile curvature (23%), decrease in length (55%), and sensitivity change (45%). These findings correspond to previous studies showing that while penile urethroplasty does not significantly affect erection or ejaculatory function, the changes in anatomical and sensory functions of the penis are important for patients' well-being and needs to be addressed[9,10,13]

Dogra et al. reported a certain amount of ED in 16% of patients at 3 months that resolved by 15 months while Erickson et al. reported a recovery from ED by the 6 moth mark post operatively. Our cohort appears to support the claim that staged penile urethroplasty is less harmful to erectile function over longer periods of time. We also found that many patients did not have long declines in SHIM scores. erectile dysfunction did seem to improve for 40% of our patients who reported reduced bother on MSHQ-EjD Q4 post operatively which further leads to better satisfaction with ejaculation post surgery. Sharma et al. have noted improvements in sexual satisfaction, especially enhancement in ejaculation following urethroplasty, suggesting removal of urethral obstruction can positively impact aspects of sexual health that are currently not functioning optimally.

Outcomes, subjective or otherwise, are a worry concerning these findings. Our self-constructed survey captured penile curvature, decreased sensitivity, and even length loss, but these were absent in SHIM and MSHQ-EjD. Albeit, these measurements indicate the lack of currently available instruments to assess these subtle postoperative changes that Blaschko et al.[14] commented on when discussing the need for more precise devices. Furthermore, psychological preoperative counseling is certainly needed given the perceived length reduction rate (55%) as subjective considerations might be inflated [15].

Inadequate sample size (n=33), the average follow-up duration (6.3 months), and scrupulous reliance upon self-reporting were a few of the countless limitations of this study. This also shifts the memory distortion burden towards the participants. Moreover, the lower survey response rate (22/33 patients) also leads to the inability to provide accurate patient outcome data, particularly in younger populations suffering from these sensitive conditions[22]. Further, however, this study did attempt to address the deficiency within the existing literature investigating sexual outcomes after staged penile urethroplasty.

CONCLUSION

A patient that underwent staged penile urethroplasty with OMG due to complex penile stricture disease is at a low risk of experience changes in erectile and ejaculatory function post-surgery. A considerable number of patients, however, may report subjective changes in penile curvature, length, and sensitivity. These findings justify thorough preoperative counseling while pointing towards new potential research directions aimed at improving measurement of understated sexual outcomes results. Further research with subjective and objective evaluation of sexual function outcomes will help appreciate the impact of staged penile urethroplasty on sexual functioning and satisfaction.

REFERENCES

1. Greenwell, T. J., Castle, C., Andrich, D. E., MacDonald, J. T., Nicol, D. L., & Mundy, A. R. (2004). Repeat urethrotomy and dilation for the treatment of urethral stricture are neither clinically effective nor cost-effective. The Journal of Urology, 172 (1), 275–277. https://doi.org/10.1097/01.ju.0000130479.68250.9f
2. Rourke, K. F., & Jordan, G. H. (2005). Primary urethral reconstruction: The cost minimized approach to the bulbous urethral stricture. The Journal of Urology, 173 (4), 1206–1210. https://doi.org/10.1097/01.ju.0000154657.76503.7d
3. Wright, J. L., Wessells, H., Nathens, A. B., & Hollingworth, W. (2006). What is the most cost-effective treatment for 1- to 2-cm bulbar urethral strictures? A societal approach using decision analysis. Urology, 67 (5), 889–893. https://doi.org/10.1016/j.urology.2005.11.035
4. Heyns, C. F., Steenkamp, J. W., De Kock, M. L., & Whitaker, P. (1998). Treatment of male urethral strictures: Is repeated dilation or internal urethrotomy useful? The Journal of Urology, 160 (2), 356–358. https://doi.org/10.1016/S0022-5347(01)62764-6
5. Chapple, C., Andrich, D., Atala, A., Barbagli, G., Cavalcanti, A., Kulkarni, S., … Mundy, A. R. (2014). SIU/ICUD Consultation on Urethral Strictures: The management of anterior urethral stricture disease using substitution urethroplasty. Urology, 83 (3S), S31–S47. https://doi.org/10.1016/j.urology.2013.09.014
6. Mangera, A., Patterson, J. M., & Chapple, C. R. (2011). A systematic review of graft augmentation urethroplasty techniques for the treatment of anterior urethral strictures. European Urology, 59 (5), 797–814. https://doi.org/10.1016/j.eururo.2011.01.033
7. Mundy, A. R. (1993). Results and complications of urethroplasty and its future. British Journal of Urology, 71 (3), 322–325. https://doi.org/10.1111/j.1464-410X.1993.tb15983.x
8. Coursey, J. W., Morey, A. F., McAninch, J. W., Summerton, D. J., Secrest, C., & White, P. (2001). Erectile function after anterior urethroplasty. The Journal of Urology, 166 (6), 2273–2276. https://doi.org/10.1016/S0022-5347(05)65560-0
9. Dogra, P. N., Saini, A. K., & Seth, A. (2011). Erectile dysfunction after anterior urethroplasty: A prospective analysis of incidence and probability of recovery—Single-center experience. Urology, 78 (1), 78–81. https://doi.org/10.1016/j.urology.2011.02.022
10. Erickson, B. A., Granieri, M. A., Meeks, J. J., Cashy, J. P., & Gonzalez, C. M. (2010). Prospective analysis of erectile dysfunction after anterior urethroplasty: Incidence and recovery of function. The Journal of Urology, 183 (2), 657–661. https://doi.org/10.1016/j.juro.2009.09.079
11. Erickson, B. A., Granieri, M. A., Meeks, J. J., McVary, K. T., & Gonzalez, C. M. (2010). Prospective analysis of ejaculatory function after anterior urethral reconstruction. The Journal of Urology, 184 (1), 238–242. https://doi.org/10.1016/j.juro.2010.02.263
12. Erickson, B. A., Wysock, J. S., McVary, K. T., & Gonzalez, C. M. (2007). Erectile function, sexual drive, and ejaculatory function after reconstructive surgery for anterior urethral stricture disease. BJU International, 99 (3), 607–611. https://doi.org/10.1111/j.1464-410X.2006.06603.x
13. Sharma, V., Kumar, S., Mandal, A. K., & Singh, S. K. (2011). A study on sexual function of men with anterior urethral stricture before and after treatment. Urologia Internationalis, 87 (3), 341–345. https://doi.org/10.1159/000329489
14. Blaschko, S. D., Sanford, M. T., Cinman, N. M., McAninch, J. W., & Breyer, B. N. (2013). De novo erectile dysfunction after anterior urethroplasty: A systematic review and meta-analysis. BJU International, 112 (5), 655–663. https://doi.org/10.1111/bju.12134

15. DeLong, J., & Buckley, J. (2013). Patient-reported outcomes combined with objective data to evaluate outcomes after urethral reconstruction. Urology, 81 (2), 432–436. https://doi.org/10.1016/j.urology.2012.10.035
16. Erickson, B. A., Voelzke, B. B., Myers, J. B., Brant, W. O., Broghammer, J. A., Smith, T. G., & Buckley, J. C. (2012). Practice patterns of recently fellowship-trained reconstructive urologists. Urology, 80 (4), 934–937. https://doi.org/10.1016/j.urology.2012.06.045
17. Riechardt, S., & Fisch, M. (2012). Two-stage urethroplasty with buccal mucosa. BJU International, 109 (1), 150–162. https://doi.org/10.1111/j.1464-410X.2011.10341.x
18. Patterson, J. M., & Chapple, C. R. (2008). Surgical techniques in substitution urethroplasty using buccal mucosa for the treatment of anterior urethral strictures. European Urology, 53 (6), 1162–1171. https://doi.org/10.1016/j.eururo.2008.01.019
19. Rosen, R. C., Catania, J. A., Althof, S. E., Pollack, L. M., O'Leary, M., & Seftel, A. D. (2007). Development and validation of a four-item version of the Male Sexual Health Questionnaire to assess ejaculatory dysfunction. Urology, 69 (5), 805–809. https://doi.org/10.1016/j.urology.2007.01.039
20. Rosen, R. C., Cappelleri, J. C., Smith, M. D., Lipsky, J., & Pena, B. M. (1999). Development and evaluation of an abridged, 5-item version of the International Index of Erectile Function (IIEF-5) as a diagnostic tool for erectile dysfunction. International Journal of Impotence Research, 11 (6), 319–326. https://doi.org/10.1038/sj.ijir.3900472
21. R Core Team. (2014). R: A language and environment for statistical computing . Vienna, Austria: R Foundation for Statistical Computing. Retrieved from https://www.R-project.org/
22. Erickson, B. A., Elliott, S. P., Voelzke, B. B., Myers, J. B., Broghammer, J. A., Smith, T. G., & Buckley, J. C. (2014). Multi-institutional 1-year bulbar urethroplasty outcomes using a standardized prospective cystoscopic follow-up protocol. Urology, 84 (1), 213–216. https://doi.org/10.1016/j.urology.2014.03.039

This article may be cited as: Khan AT, Hazratullah, Shahbazi HK, Haider SM, Almuradi MAA, Iqbal MA: Sexual Function after Staged Penile Urethroplasty with Oral Mucosal Graft: A Single-Center Prospective Analysis. Pak J Med Health Sci, 2023;18(11): 183-186.