COMPARISON OF SEXUAL DYSFUNCTION BETWEEN END-TO-END ANASTOMOSIS AND BUCCAL MUCOSA GRAFT

[1]Prahara Yuri, [1]Irfan Wahyudi, [1]Arry Rodjani.

[1]Department of Urology, Faculty of Medicine/Indonesia University, Cipto Mangunkusumo Hospital, Jakarta.

ABSTRACT

Objective: *The aim of this study was to compare long term follow-up of sexual dysfunction between end-to-end anastomosis or buccal mucosa graft in short segment bulbar urethral stricture.* ***Material & Method:*** *We performed a meta analysis of cohort study. The data sources was MEDLINE from 1980 through 2011. A fixed effects model with Mantel-Haenszel method was used to calculate the pooled Risk Ratio (RRs) and 95% Confidence Interval (CIs). We assessed the heterogeneity by calculating the I2 statistic. All analyses were performed with Stata statistical software, version 10.0 (Stata Corp).* ***Results:*** *We analyzed 6 cohort studies. End-to-end anastomosis and buccal mucosa graft patients who complained about sexual dysfunction were 24.6% (45/183) and 9.1% (11/122) respectively, with overall RR 2.54 (95% CI, 0.22-0.69, p = 0.001).* ***Conclusion:*** *Buccal mucosa graft showed a superior outcome compared to end-to-end anastomosis, based on sexual dysfunction in ≤3 cm bulbar urethral stricture treatments.*

Keywords: *Sexual dysfunction, end-to-end anastomosis, buccal mucosa graft, anterior urethral stricture.*

ABSTRAK

Tujuan: *Tujuan penelitian ini adalah untuk mengetahui komplikasi jangka panjang, yaitu gangguan fungsi seksual antara end-to-end urethroplasty (EE) atau buccal mucosa graft (BMG), pada striktur uretra pars bulbosa yang pendek.* ***Bahan & Cara:*** *Kami melakukan meta analisis pada beberapa penelitian kohort. Pencarian literatur menggunakan data base MEDLINE dari tahun 1980 sampai 2011. Data dianalisa dengan menggunakan Fixed Effects Model metode Mantel-Haenszel, yang kemudian dipresentasikan dalam bentuk Risk Ratio (RRs) dan 95% Confidence Interval (CIs). Penilaian heterogeneity dilakukan dengan menggunakan statistik I2. Keseluruhan data dianalisis dengan menggunakan Stata Statistical Software, Version 10.0 (Stata Corp).* ***Hasil:*** *Didapatkan 6 publikasi yang dapat dilakukan analisa. Pasien EE dan BMG mengalami komplikasi gangguan fungsi seksual 24.6% (45/183) dan 9.1% (11/122) dengan RR gabungan 2.54 (95% CI, 0.22-0.69, p = 0.001). Simpulan: Teknik BMG lebih baik dari EE, apabila dilihat dari komplikasi gangguan fungsi seksual pada penanganan striktur uretra anterior pars bulbosa ≤3 cm.*

Kata kunci: *Gangguan fungsi seksual, end-to-end urethroplasty, buccal mucosa graft, striktur uretra anterior.*

Correspondence: Prahara Yuri, c/o: Department of Urology, Faculty of Medicine/Indonesia University, Cipto Mangunkusumo Hospital Jakarta. Jl. Diponegoro No. 71, Jakarta 10430. Office: (021) 3152892, 3923631-32; fax: (021) 3145592. Mobile phone: 085265563333. Email: prahara.yuri@yahoo.com.

INTRODUCTION

Anterior urethral stricture is a fibrosing process involving the spongy erectile tissue of the corpus spongiosum (spongiofibrosis). Most urethral strictures are result of trauma (usually straddle injury). In the management of urethral strictures the etiology, site, length and density of spongiofibrosis are taken into account.[1]

For many years urethral dilatation and direct vision internal urethrotomy (DVIU) or Sache have been considered the cure for a significant number of urethral stricture diseases, mainly because they are perceived as simple procedures with little morbidity.[2] Nevertheless, 2 large studies have shown that they have low efficacy. Pansadoro and Emiliozzi prospectively in 224 anterior urethral stricture patients, followed for 5 years, reported high

recurrence rate after 1, 2, and 3 Sachse were 58%, 82%, and 100%, in 142 bulbous urethral stricture patients.[3] Heyns et al reported the recurrence rate after 1, 2, and 3 Sache were 39%, 100%, and 100%, in 210 urethral stricture patients followed for 48, 44, and 18 months.[4]

End-to-end urethroplasty (EE) which was first introduced by Hamilton Russel in 1919, showed the best result compared with Sachse.[5] This procedure is ideally suited for bulbar strictures ≤3 cm long.[6] Santucci et al, in a chart review of 168 patients (average stricture length and follow-up were 1.7 cm and 70 months) after end-to-end urethroplasty had a high success rate of 95%.[2] Barbagli et al retrospectively reviewed 260 consecutive patients who had a bulbar stricture, with mean length of 1.9 cm. After a mean follow-up of 50 months, a success rate of 98.8% was noted after end-to-end urethroplasty.[5]

In 1993, El-Kasaby et al reported for the first time that buccal mucosal graft (BMG) from the lower lip was used for treatment of penile and bulbar urethral strictures in adult patients.[7] BMG can be applied via a ventral, dorsal, or lateral approach,[8,9] that dorsal approach is known as Barbagli procedure.[7,10] BMG ideally suited for bulbar strictures > 3 cm long.[9] However, Santucci RA and Al-Qudah reported that BMG had superior success rates and fewer complications than end-to-end urethroplasty in management of short bulbar urethral stricture (average stricture length and follow-up were 1.4 cm and 36 months).[11]

Today, management of short anterior urethral stricture was controversial and there were few studies comparing long term follow-up between EE and BMG in short bulbar urethral stricture, especially meta analyses. Therefore, we will do a meta analysis to compare long term follow-up between EE and BMG in short bulbar urethral stricture.

OBJECTIVE

The aim of this study was to compare long term follow-up of sexual dysfunction between end-to-end anastomosis and buccal mucosa graft in short segment bulbar urethral stricture.

MATERIAL & METHOD

We searched the Medline database from 1980 through June 2011 using keywords "Long Term Follow-up", "Anterior Urethral Stricture", "End-to-End Urethroplasty", "Anastomotic Urethroplasty", and "Buccal Mucosa Graft". No language and research restrictions were applied. Finally, we checked references from relevant publications and review articles.

Prospective studies were included if treatment in adult male patients (> 18 years old), patient with short bulbar urethral stricture (≤3 cm) who is treated by end-to-end urethroplasty (EE) and buccal mucosa graft (BMG), follow-up sexual dysfunction (erectile dysfunction, chordee, cold glans, decreased glans sensitivity, penile length and impotence) and followed for more than 12 months. Patients with location of stricture in prostatic, membranous, and pendulous stricture or caused by pelvic fracture were excluded.

A fixed-effects model with Mantel-Haenszel method was used to calculate the pooled Risk Ratio (RRs) and 95% Confidence Interval (CIs) by comparing EE and BMG in sexual dysfunction in short bulbar urethral stricture. We assessed heterogeneity by calculating the I2 statistic low (25-50%), moderate (50-75%) and high (> 75%). All analyses were performed with Stata statistical software, version 10.0 (StataCorp).

RESULTS

The process of identifying eligible studies is summarized in Figure 1. We retrieved 234 publications from database than 208 publications are excluded based on title. Twenty eight potentially eligible publications were assessed in detail, and 6 publications met the eligibility criteria, one article had data confirmed to the author.

We found 305 patients from 6 articles (table 1), comprised of 183 patients (EE) and 122 patients (BMG). We had 45 patients with sexual dysfunction from 183 patients post EE (average follow-up 26.6 months and complication rate 24.6%) and 11 patients from 122 patients post BMG (average follow-up 26.6 months and complication rate 9.1%).

Overall risk ratio from 6 articles on sexual dysfunction is 2.54 (95% CI, 0.22 – 0.69) and 95% Cl doesn't cross the line of no effect (line RR = 1). It shows BMG is better than EE base on sexual dysfunction in short bulbar urethral stricture (≤3 cm) management, statistically significant p = 0.001 and I2 = 0% (Figure 2).

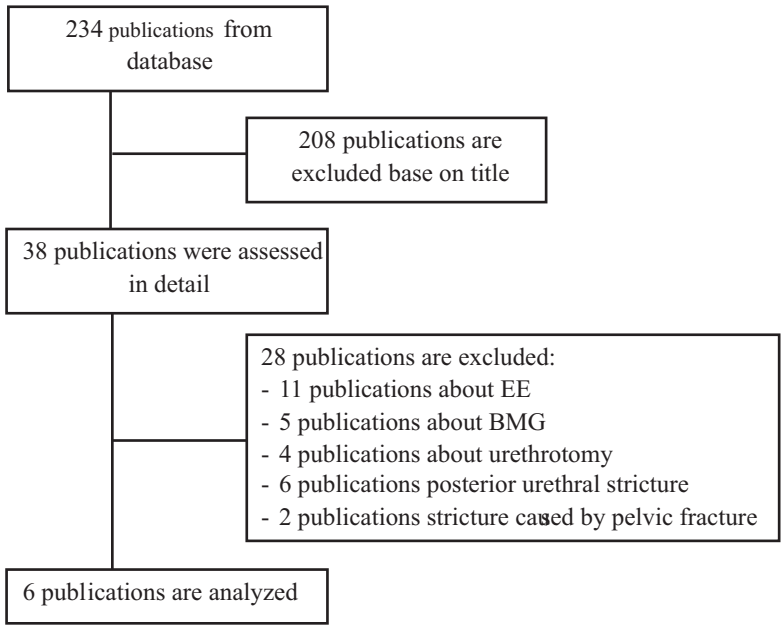

Figure 1. Literature search.

Table 1. Literature characteristic based on sexual dysfunction.

Literature	Research Method	Year	Mean of Follow-up (Month)	Follow-up Method	Mean of Stricture length (cm)	EE		BMG	
						A	B	A	B
Coursey et al[13]	Prospective cohort study	2001	36	questionnaire	1.8	56	15	26	5
Al-Qudah et al[12]	Retrospective cohort study	2006	29	questionnaire	2.8	24	5	19	0
Kessler et al[14]	Prospective cohort study	2007	18	questionnaire	2.9	20	10	23	4
MacDonald et al[15]	Retrospective cohort study	2005	24	questionnaire	2.5	23	1	14	0
Dogra et al[16]	Prospective cohort study	2011	17	questionnaire	2.95	32	9	21	2
Santucci et al[11]	Retrospective cohort study	2006	36	questionnaire	1.4	28	5	19	0

DISCUSSION

The surgical technique used in repair of bulbar urethral stricture might be selected according to stricture length and location. Generally, management for short urethral strictures is end-to-end urethroplasty and long urethral strictures is BMG.[12]

Based on this meta-analysis, BMG is shown better than EE based on sexual dysfunction in short bulbar urethral stricture ($\leq$ 3 cm) management, statistically significant p = 0.001 and overall risk ratio is 2.54 (95% CI, 0.22-0.69). Excision of a longer urethral segment risks penile shortening or chordee.[13] Chordee were reported as complication in EE and rarely in BMG.[12] We believe that neurogenic (perineal nerve), arteriogenic (bulbar artery), and psychosomatic factors play a synergistic in sexual dysfunction after end-to-end urethro-plasty.[14]

Bulbospongiosum muscle contractions are elicited by stimulation of the dorsal nerve of the penis and following stimulation of the perineal

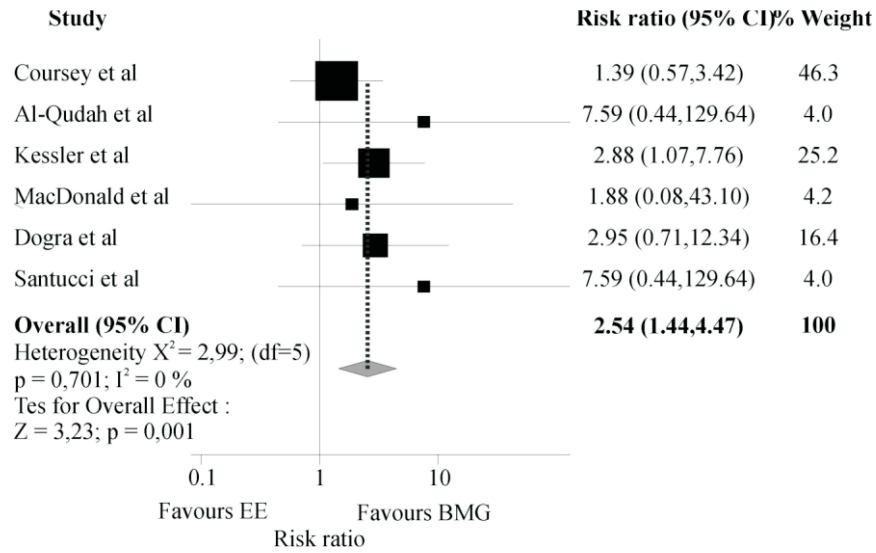

Figure 2. Forest plot comparison between EE and BMG based on sexual dysfunction.

nerve. Rhythmic contractions of the bulbospongiosum muscle expel semen and urine from the urethra, thus avoiding semen and urine sequestration in the urethral bulb. Ejaculatory disorders may result from disruption of one or more reflex pathways providing innervation of the bulbospongiosum muscle. These disorders may manifest as decreased force of semen expulsion and low semen volume caused by inefficient bulbospongiosum contractility.[15]

The blood supply to urethra are from internal pudendal artery branches into the perineal artery and posterior scrotal artery and then continues distally as the common penile artery. The common penile artery branches into the bulbar arteries and circumflex cavernosal arteries (which both supply the proximal corpus spongiosum). The common penile artery then bifurcates into the central cavernosal arteries (also known as the deep artery of the corpus cavernosum) and into the dorsal artery of the penis. The dorsal artery of the penis arborizes and penetrates into the spongy tissue of the glans penis.[16] When the urethra is mobilized and transected for anastomotic urethroplasty, adequate distal blood supply and retrograde flow is essential. Longer excision risks penile shortening, chordee or impotence and disturbs retrograde blood flow of urethra, even when lengthening maneuvers, such as extensive proximal and distal urethral mobilization, incision of the central tendon of the perineum and corporal body separation, are used.[17] If all these structures are disturbed, sexual dysfunction such as erectile dysfunction, chordee, cold glans, decreased glans sensitivity, penile length and impotence may ensue.[16]

Barbagli et al stated that interpretation of the success rate of urethroplasty according to stricture length was controversial.[13] Barbagli and Kulkarni mentioned in management of short bulbar urethral stricture, they performed EE in strictures caused by trauma and BMG caused by non-trauma.[18]

Buccal mucosa is better than other grafts, such as penile skin, scrotal skin, extragenital skin, bladder mucosa, and colonic mucosa. Advantages attributable to buccal mucosa are ease in harvesting, availability, resistance to infection and tissue characteristics (thick epithelium, high content of elastic fibers and thin lamina propria).[8,19]

In this meta analysis, we cannot analyze sexual dysfunction and voiding symptom specifically, because every literature have different parameter for sexual dysfunction, such as there is not a standard questionnaire to follow-up dysfunction and the other parameters. Therefore, we suggest to make a standard parameter to follow-up success rate of urethroplasty for sexual dysfunction.

CONCLUSION

Buccal mucosa graft showed a superior outcome compare to end-to-end anastomosis base on sexual dysfunction in ≤3 cm bulbar urethral stricture treatment.

REFERENCES

1. Jordan GH, McCammon KA. Surgery of the penis and urethra. In: Campbell-Walsh Urology. 10th ed. Philadelphia: Elsevier Saunders; 2012. p. 956-1000.
2. Santucci RA, Mario LA, McAninch JW. Anastomotic urethroplasty for bulbar urethral stricture: Analysis of 168 patients. J Urol. 2002; 167: 1715.
3. Pansadoro V, Emiliozzi P. Internal urethrotomy in the management of anterior urethral strictures: Long-term follow-up. J Urol. 1996; 156: 73.
4. Heyns CF, Steenkamp JW, De Kock ML. Treatment of male urethral strictures: Is repeated dilation or internal urethrotomy useful? J Urol. 1998; 160: 356.
5. William MB, Schlossberg SM. Anterior urethral reconstruction: Excision with primary anastomosis. In: Textbook of Reconstructive Urologic Surgery. United Kingdom: Informa; 2008. p. 453–8.
6. Gomez RG. Stricture excision and primary anastomosis for anterior urethral stricture. In: Urethral Reconstructive Surgery. United States: Humana Press; 2008. p. 107–18.
7. Barbagli G. Buccal mucosal graft urethroplasty. In: Urethral Reconstructive Surgery. United States: Humana Press; 2008. p. 119–35.
8. Mangera A, Patterson JM, Chapple CR. A systematic review of graft augmentation urethroplasty techniques for the treatment of anterior urethral stricture. European Urol. 2011; 59: 797.
9. Angermeier KW. Anterior urethral reconstruction: Ventral Grafts. In: Textbook of reconstructive urologic surgery. United Kingdom: Informa; 2008. p. 459–65.
10. Barbagli G, Lazzeri M. Anterior urethral reconstruction: Dorsal grafts. In: Textbook of Reconstructive Urologic Surgery. United Kingdom: Informa; 2008. p. 466–73.
11. Santucci RA, Al-Qudah HS. Buccal mucosal on lay urethroplasty or anastomotic urethroplasty for short and medium length urethral strictures: Which is better? J Urol. 2006; 68 suppl. 5A: MP-17.03.
12. MacDonald MF, Santucci RA. Review and treatment algorithm of open surgical techniques for management of urethral stricture. J Urol. 2005; 65: 9–15.
13. Barbagli G, De Angelis M, Romano G, Lazzeri M. Long-term follow-up of bulbar end-to-end anastomosis: Retrospective Analysis of 153 Patients in a Single Center Experience. J Urol. 2007; 178: 2470.
14. Dogra PN, Saini AK, Seth A. Erectile dysfunction after anterior urethroplasty: A Prospective Analysis of Incidence and Probability of Recovery – Single Center Experience. J Urol; 2011. p. 78.
15. Yang CC, Bradley WE. Reflex innervation of the bulbocavernosus muscle. BJU Int. 2000; 85: 857.
16. Brandes SB. Vascular anatomy of genital skin and the urethra: Implications for Urethral Stricture. In: Urethral Reconstructive Surgery. United States: Humana Press; 2008. p. 9–18.
17. Guralnick ML, Webster GD. The augmented anastomotic urethroplasty: Indications and outcome in 29 Patients. J Urol. 2001; 165: 1496.
18. Barbagli G, Kulkarni SB. Controversies in urethral stricture. Annual Meeting American Urological Association [CD-ROM]. Washington; 2011.
19. Bullock TL, Brandes SB. Adult anteroir urethral stricture: A National Practice Patterns Surveys of Board Certified Urologists in the United States. J Urol. 2007; 177: 685.