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USE OF ORAL MUCOSA GRAFT IN URETHROPLASTY

1. Dr. Ali Kareem Mohammad
M.B.Ch.B. \ MSc Urology
Iraqi Ministry of Health, Baghdad Medical Office Al-Russafa, Al-Kindey Teaching Hospital, Department of urology, Baghdad, Iraq.
dr_ali1975@yahoo.com
2. Dr. Ahmed Hameed Lafta AL-Saadi
M.B.Ch.B. \ F.I.B.M.S. \ (Urology)
Iraqi Ministry of Health, Baghdad Medical Office Al-Russafa, Al-Kindey Teaching Hospital, Department of urology, Baghdad, Iraq.
Ahmad.urosurgary@yahoo.com
3. Dr. Saad Khalid Abdulkareem
M.B.Ch.B. \ MSc Urology
Iraqi Ministry of Health, Baghdad Medical Office Al-Russafa, Al-Kindey Teaching Hospital, Department of urology, Baghdad, Iraq.
saad_doctor@yahoo.com

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Abstract:

Over the past few years, oral mucosa emerged as a reliable and popular donor tissue for urethral substitution. Our study is a prospective study to evaluate the outcome of the use of oral mucosa graft in urethroplasty, reporting its effectiveness and morbidity on the donor site. From January 2018 to January 2019, 20 patients with anterior urethral strictures and complex hypospadias repair had a urethroplasty using oral mucosa grafts. Patients' age ranged between 7 to 63 years.

Patients were divided into two groups. Group (A) which included eight patients managed by buccal muucosa graft, and group (B) which included 12 patients managed by lingual mucosa graft. All patients were followed up for three months duration. Symptoms related to the donor site were assessed within 48 hours of surgery, then at one week, one month, and three months after surgery.

Oral mucosa graft urethroplasty appears to be a successful and technically feasible option for the management of patients with urethral stricture either as a single stage in urethral strictures or staged procedure in complex cases of stricture due to complex or failed hypospadias surgery. Oral pain is not different after both grafts. In the early postoperative period, differences in oral morbidity are present between BMG and LMG

Keywords: Partial, BMG, LMG, surgery, Urology, Urethroplasty, Morbidity, Buccal.

INTRODUCTION

Reconstruction of the urethra has continued to present an enormous challenge for urologic, pediatric, and plastic surgeons as diverse opinions have been expressed on the quality and type of ideal substitution material. The unique demands of the urethra set a high standard for autogenous graft substitutes (Eppley et al., 1997).

In 1993, El-Kasaby et al. used an oral mucosal graft from the lower lip for the treatment of penile and bulbar urethral strictures in adult patients.

In 1996, Morey and McAninch reported indications, operative technique, and outcome in 13 adult patients with complex urethral strictures in which oral mucosa was used as a non-tubularized Onlay graft for bulbar urethra reconstruction. Since that time, oral mucosa has become an increasingly popular graft tissue for penile or bulbar urethral reconstruction performed in single or multiple stages (Morey and McAninch, 1996a).

Oral mucosa has received increased attention in the field of the urological reconstructive surgery as it is readily available in all patients and is easily harvested from the cheek with a concealed donor site scar with low postoperative complications and high patient satisfaction (Barbagli et al., 2010).

Moreover, oral mucosa is hairless, has thick elastin-rich epithelium, which makes it tough yet easy to handle, and has a thin and highly vascular lamina

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propria which facilitates inosculation and imbibitions (Markiewicz et al., 2007a).

Buccal Mucosa graft is harvested from the inside of the cheek and may be associated with donor site morbidity like mental nerve neuropathy and damage to Stensen's duct. Furthermore, in a few patients requiring near total urethral reconstruction, additional tissue may be required. The mucosa covering the undersurface of the tongue is identical in structure with that lining the rest of the oral cavity and has recently begun to be explored for urethral reconstruction with promising results (Simonato et al., 2006).

This paper aims to evaluate the donor site morbidity after using the oral mucosa graft in urethroplasty.

PATIENTS AND METHODS

The study has been conducted in the period between January 2018 and January 2019. The study was designed to include male patients with anterior urethral strictures of various Etiologies, including complicated hypospadias repair.

Exclusion criteria were patients with the previous history of oral surgery or oral neuropathy.

I) Patients

A total of 20 male patients were included in the study; 8 patients had a complicated hypospadias repair, 3 of them had three times failure repair, 2 of them had four times failure repair, 1 of them had five times failure repair, and 2 of them had six times failure repair. Twelve patients had urethral stricture, nine patients with no previous management of urethral stricture, one patient had one previous urethroplasty, one patient had two previous procedures, and one patient had three previous attempts of repair.

These were mainly divided into two groups. Group (A) which included eight patients who had been managed by buccal mucosa grafts, and group (B), which included 12 patients who had been managed by lingual mucosa grafts.

Each patient received an informed consent. Patients' age ranged between 7 to 63 years.

Evaluation:

1. History taking with a special focus in the etiology of the stricture, the severity of the complaint, and previous endoscopic or open urological or surgical procedures the patient had before.
2. General and local physical examinations were done with an emphasis on the external genitalia, especially the condition of penile skin, scarring, the position of the meatus, any penile deformities, fistula or diverticula, and stricture of neourethra.
3. Laboratory investigations were done, including complete blood count, renal function tests, liver function tests, Random blood sugar, and bleeding profile.
4. Urine analysis was done to all patients, and culture and sensitivity (C & S) were done for those with infected urine and administered the proper antibiotic prior to surgery.
5. Estimating post-voiding residual urine and renal ultrasound scan was done for all patients as a routine study to assess the upper tract.
6. Retrograde and voiding cysto-urothrogram was done for all patients with urethral stricture to visualize the site and extent of the stricture and assess postoperative outcome.
7. The oral cavity of all patients planned for substitution urethroplasty was inspected during the initial evaluation.

Regarding the length of the graft, it ranged between 2 to 5 cm.

METHODS:

After completing the pre-operative assessment of the patients, they were prepared for surgery as follows:

All patients with UTI were properly treated by a full course of antibiotic, according to culture and sensitivity, prior to surgery. Patients were started on 5% povidone-iodine mouth gargles three times daily for five days after surgery. Broad-spectrum antibiotics were administered with the induction of anesthesia and for five days after surgical.

Positioning of the patients:

Patients that had pendulous strictures only and patients with complicated hypospadias repair were positioned in the supine position. Patients with bulbar or bulbo pendulous strictures were put in a lithotomy position. Patients had the perineum and penile area shaved, prepped using 5% povidine iodine solution, and draped. This was followed by passing an 18 Fr Nelaton catheter to localize the distal end of the stricture or a smaller catheter in the case of paediatric patients.

BMG Harvesting:

BMG was harvested from the inner cheek area below the Stenson's duct without injuring it. Stay sutures were placed into the corners, and the graft was harvested

The graft donor site is closed with continuous, 4-0 vicryl sutures to achieve good hemostasis. Then the graft was defatted.

Urethroplasty:

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In patients with a distal penile stricture, a circumcoronal incision is made, and the penile urethra is exposed. In patients with a bulbar urethral stricture, the stricture is approached using a midline perineal incision. We use Ventral Onlay oral mucosal graft urethroplasty or dorsal Onlay oral mucosal graft urethroplasty, and for some cases of complicated hypospadias, we used staged

Procedure. The dorsal onlay free graft urethroplasty technique followed in our study is the same as that described by Barbagli et al. (Barbagli et al., 1996), except that instead of using buccal mucosa we used lingual mucosa in group B. The graft is fixed over the corpora cavernosa in the midline with an intermittent 5-0 vicryl suture. It is then coapted to the urethral epithelium in a tension-free manner with the help of 5-0 vicryl sutures in a running continuous manner over a 16-french silicon Foley catheter.

Statistical analysis:

Data were analyzed using Statistical Program for Social Science (SPSS) version 18.0. Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

The following tests were done:

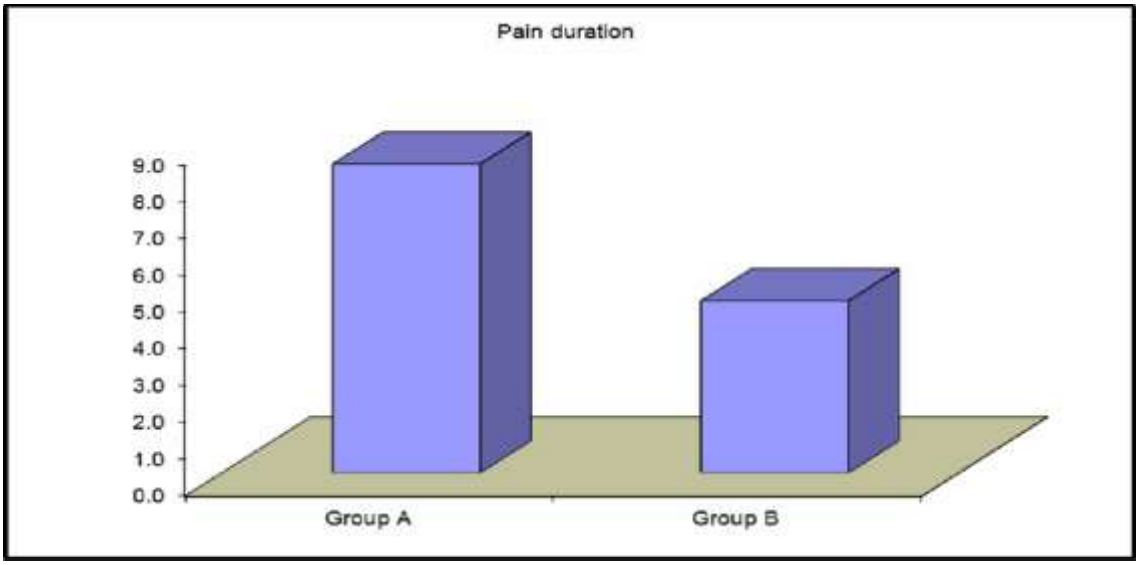
- Paired sample t-test of significance was used when comparing between related samples.
- Chi-square (X2) test of significance was used in order to compare proportions between two qualitative parameters.
- Probability (P-value)
  - P-value <0.05 was considered significant.
  - P-value <0.001 was considered as highly significant.
  - P-value >0.05 was considered insignificant.

RESULTS

Table (1): Comparison between group A and group B regarding pain and its duration

		Group A	Group B	Chi-square test	
		No. = 8	No. = 12	X^2	P-value
Pain	Negative Positive	0 (0.0%) 8 (100.0%)	0 (0.0%) 12 (100.0%)	NA	NA
Duration (Days)	Mean ± SD Range	8.38 ± 3.82 3 – 15	4.67 ± 2.57 2 – 10	2.609	0.018 **(S)**

Fig. (1): Pain duration of both groups.



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Slurring of speech was not seen in group A, while it was seen in 7 (58.3%) of patients of group B **(table 2, Fig. 2).** Slurring of speech correlated with pain at the donor site. The slurring improved as the pain subsided. The majority of patients had normal speech by postoperative days 6 or 7, except of 1 patient in group B, in whom it persisted for 15 days of follow-up.

Table (2): Comparison between group A and group B regarding slurring of speech and its duration

		Group A	Group B	Chi-square test	
		No. = 8	No. = 12	X^2	P-value
Slurring of speech	Negative Positive	8 (100.0%) 0 (0.0%)	5 (41.7%) 7 (58.3%)	7.179	0.007 **(HS)**
Duration (Days)	Mean ± SD Range	– –	6.29 ± 4.42 1 – 15	NA	NA

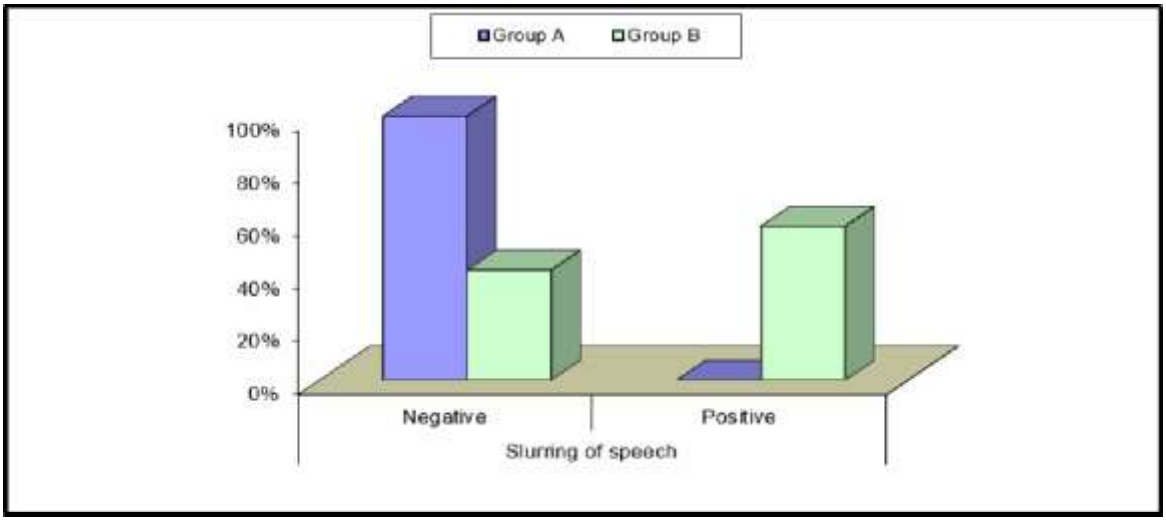

Fig. (2): slurring of speech distribution between the two groups.

Swollen of the donor site was seen in all patients of group A (100.0%) and subsided completely in all patients within 5-6 days and in 11 patients (91.7%) of group B and subsided within seven days after the operation **(table 3).**

Table (3): Comparison between group A and group B regarding swelling of the donor site and its duration

		Group A	Group B	Chi-square test	
		No. = 8	No. 12	X^2	P-value
Swelling of the donor site	Negative Positive	0 (0.0%) 8 (100.0%)	1 (8.3%) 11 (91.7%)	0.702	0.402 **(NS)**
Duration (Days)	Mean ± SD Range	5.50 ± 2.20 3 – 10	3.64 ± 1.75 2 – 7	2.058	0.055 **(NS)**

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Limitation of the oral opening was present in all patients of group A (100.0%) and completely subsided within 6-7 postoperative days, while in group B, no patient had a Limitation of oral opening.
Perioral numbness occurred in 7 patients (87.5%) of group A and subsided within seven postoperative days, except two patients continued with perioral numbness for 30 days after the operation, while only one patient (8.3%) of group B had perioral numbness and completely subsided in two days after the operation (**table 4, fig. 3**).

Table (4): Comparison between groups A and B regarding perioral numbness and its duration

		Group A	**Group B**	**Chi-square test**	
		No. = 8	**No. = 12**	**X²**	**P-value**
Parasthesia	Negative Positive	1 (12.5%) 7 (87.5%)	11 (91.7%) 1 (8.3%)	12.535	0.000 **(HS)**
Duration (Days)	Mean ± SD Range	15.43 ± 11.04 6 – 30	2.00 ± 0.00 2 – 2	1.137	0.299 **(NS)**

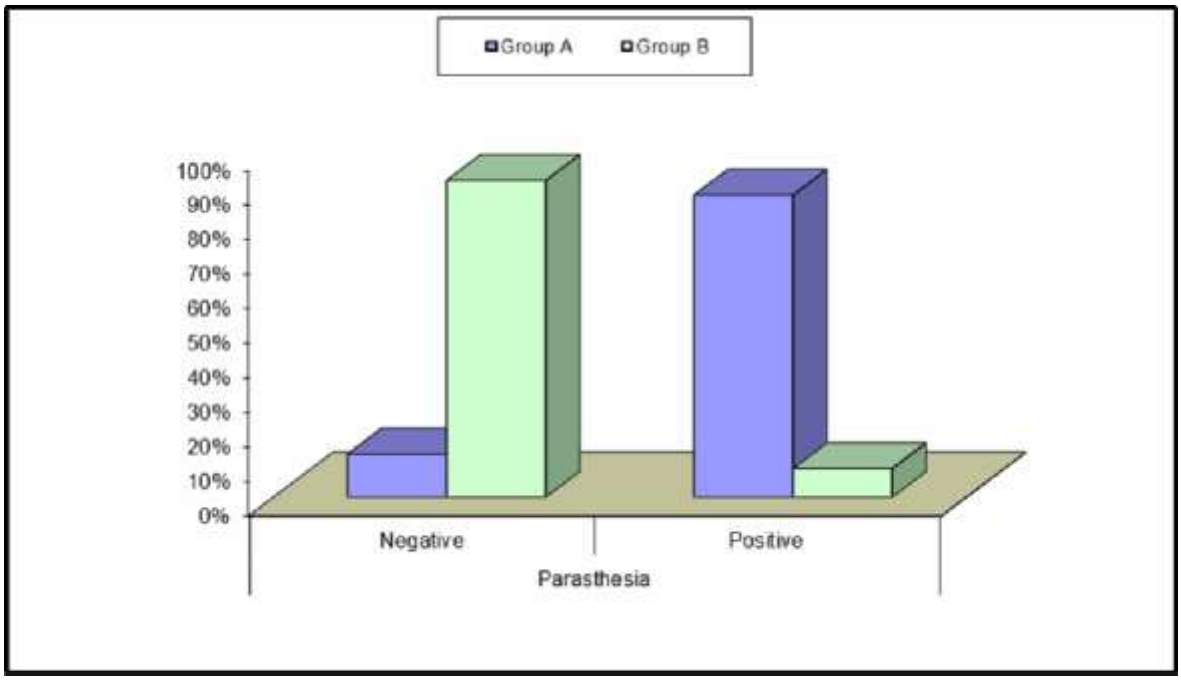

Fig. (4): Perioral numbness distribution of both groups.

No donor site infection was reported by both groups. None of the patients in both groups had salivatory disturbances, hemorrhage, or scarring of the cheeks or tongue after the operation. All patients received antibiotics for five days duration. All the patients of both groups were able to resume oral fluids within 24 hours, ate soft solids after 48-72 hours, and return to a normal diet within 5-7 days of surgery. The hospital stay ranged between 5-8 days.

DISCUSSION

In 1941 Humby first reported using of BMG for hypospadias repair **(Humby, 1941).**

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In 1993 El-Kasaby et al. reported the first good results of the application of a free BMG for hypospadias and urethral strictures **(El-Kasaby et al., 1993).**
In 2006, Simonato et al. first described the use of mucosa harvested from the tongue for anterior urethroplasty (**Simonato et al., 2006).**
The use of lower lip mucosa is not recommended as it is associated with more sensitivity disorders and a risk of unaesthetic inversion of the lower lip **(Markiewicz et al., 2008)**.
Urethroplasty with oral mucosal grafts has become a popular technique over the last decade due to its excellent long-term results, favored by the characteristics of this easily obtained tissue **(Hosseini et al., 2011)**.
Buccal mucosa transplants retain their histo-pathological characteristics and are not overgrown with urothelium after urethral engraftment in humans. Durable preservation of histological characteristics in the urethral environment distinguishes buccal mucosa from other
materials tested for substitution urethroplasty. This is probably a crucial factor determining the superior success rate of buccal mucosa for the treatment of urethral stricture (Soave et al., 2014).
A prospective comparative study of Sharma et al. reported that lingual mucosa graft (LMG) urethroplasty provides outcomes equivalent to those of BM graft urethroplasty. However, postoperative morbidity and long-term changes in speech make it a second choice for strictures >7 cm, only for cases where a BM graft is unavailable (Sharma et al., 2013).
The object of our study is to evaluate the donor site morbidity after using the oral mucosa graft in urethroplasty.
Pain in the oral cavity is a predominant complaint in the early postoperative period, as shown by all patients of both groups reporting moderate to severe pain during the first postoperative day and subsided gradually within seven days. At three months, all of the patients were free of pain. There was no difference in pain intensity between group A (BMG) and group B (LMG). Our results are similar of a prospective study by Sharma et al. (Sharma et al., 2013).
While in the prospective study of Kumar et al., pain at the donor site was (92.1%) of BMG and (95%.1) of LMG in the 1st post-operative day, then subsided within seven days after
surgery except in one patient (2.6%) of BMG pain prolonged for three months (Kumar et al., 2010).
In the early postoperative period, 7 of the patients (58.3%) of group B (LMG) in our study were associated with slurring of speech, and none of group A (BMG). It is less than the comparative study of Maarouf et al. (Maarouf et al., 2013) and (Sharma et al., 2013). These symptoms gradually subside with time, and there were no longer significant differences after three months.
Limitation of the oral opening was seen in the early postoperative period in group A (BMG) and not seen in group B (LMG); this is in line with the studies of (Maarouf et al., 2013) and (Sharma et al., 2013).
After three months, oral morbidity was comparable between both groups.
Perioral numbness occurred in (87.5%) of patients of group A (BMG) and occuerd in (8.3%) of patients of group B (LMG); this is in line with the study of (Maarouf et al., 2013) and more than the rate of study of Sharma et al. which had BMG (60%) and less than the rate of LMG (40%) in the same study (Sharma et al., 2013).
Swelling of the donor site was seen in all patients of group A and in (91.7%) of patients of group B and subsided completely in all patients within seven days after the operation.
In our study, no donor site infection was reported by both group. None of the patients in both groups had salivatory disturbances, hemorrhage, or scarring of the cheeks or tongue after the operation.
Long-term complications like persistent pain at the donor site, salivatory disturbances, perioral numbness, and tightness of the mouth were seen in BMG only according to studies of (Kumar et al., 2010), while in our study, there were no long-term complications.
The limitations of our study were a small number of samples of just 20 patients and a short period of follow-up, and the length of the graft harvested was (2-5 cm).

CONCLUSION

Early postoperative pain is frequent and not different between both grafts. In the early postoperative period, problems with eating and drinking and speech impairment are more frequent with LMG, whereas oral tightness is more frequent with BMG. LMG harvesting is easy to carry out and is not associated with long-term complications at the donor site. Also, it is a good substitute for BMG in patients whose buccal mucosa is diseased or had already been used.

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