



Oral quality of life after buccal mucosal graft harvest for substitution urethroplasty. More than a bite?

E. Morán¹ · M.A. Bonillo¹ · L. Fernández-Estevan² · E. Martínez-Cuenca¹ · S. Arlandis¹ · E. Broseta¹ · F. Boronat¹

Received: 10 April 2018 / Accepted: 15 June 2018 / Published online: 21 June 2018
© Springer-Verlag GmbH Germany, part of Springer Nature 2018

Abstract

Introduction The aim of our study was to analyze the oral quality of life (QoL) in patients with urethral stricture treated with BMG by using a validated questionnaire (OIDP).

Materials and methods A prospective, single-arm, observational single-centre study of a cohort of patients scheduled for BMG Urethroplasty was conducted. OIDP assesses the impact of oral conditions on daily activities including an oral QoL question (0–10). The questionnaire was self-administered before, 3 months postoperatively and at the end of the study. Means, pre- and postoperatively, were compared. Multivariate analysis was performed to analyze the risk factors for a low quality of life (<8) after surgery.

Results We included 41 patients (2013–2017). The mean preoperative oral QoL was 9.33 points (SD1.16). Preoperative mean OIDP dimensional score and global score were 0,5 (SD:0.02) and 0,8%. The most frequently preoperative altered aspect was hygiene. Mean oral QoL, 3 months after surgery, was 8,56 (SD1.89) and OIDP dimensional score and global score were 0,67 (SD0.21) and 1,1%. Mean oral QoL at the end of the study (mean 3,12 years) was 8,50 (SD1.13). OIDP dimensional score and global score were 0,7 (SD 0.16) and 1,1%. The most frequently altered aspect at the end of the study was eating. No statistical ($p = 0.07$) decrease in oral QoL was found. The increase in OIDP dimensional and global score was also not statistically significant. Neither age nor smoking, diabetes mellitus, cardiovascular morbidity, previous OIDP score, width, length of the graft, or surgery success could explain a low oral QoL after graft harvesting.

Conclusions BMG harvesting is not free of problems at the donor site. Eating seems to be the most affected aspect after surgery. Nevertheless, those sequelae do not induce a reduction in oral QoL.

Keywords Urethroplasty · Buccal mucosal graft · Oral quality of life · OIDP · Questionnaire · Donor site

Introduction

Nowadays, buccal mucosal graft (BMG) harvesting is a standardized procedure in urethral reconstructive surgery. Substitution urethroplasty is considered the gold standard for strictures longer than 2 cm located in penile or bulbar

urethra [1]. Recently tissue-engineered grafts have been developed, but they have not replaced BMG yet in clinical practice. There are numerous papers about substitution urethroplasty results, but there is limited information about donor-site morbidity. Actually, although BMG is easy to harvest, donor-site complications (sensitivity disorders, salivatory changes or pain) have been reported [2]. Moreover, all these publications are focused on pain and postoperative complications [3, 4]. However, there is no literature focusing on oral quality of life after BMG harvesting.

On this subject, odontologists understand oral quality of life as a multidimensional topic, that encompasses five consequences of oral disease (impairment, functional limitation, pain/discomfort, disability, and handicap) [5]. To evaluate these items, odontologists use some questionnaires such as OHIP-14 (Oral Health Impact Profile), or OIDP (Oral Impacts on Daily Performances).

Electronic supplementary material The online version of this article (<https://doi.org/10.1007/s00345-018-2381-9>) contains supplementary material, which is available to authorized users.

✉ E. Morán
edumoranpascual@gmail.com

¹ Department of Urology, La Fe University Hospital, Valencia, Spain

² Department of Dental Medicine, School of Medicine and Dentistry, University of Valencia, Valencia, Spain

Therefore, the aim of the present study was to analyze the oral quality of life in patients with urethral stricture disease treated with BMG using a validated questionnaire (OIDP).

Materials and methods

A prospective, single-arm, observational single centre study was performed in a cohort of patients scheduled for BMG urethroplasty from 2013 to 2017. Data were collected and entered in a prospective database by the two same surgeons performing the surgery and the follow-up. Exclusion criteria were previous harvesting of BMG or relevant concomitant oral diseases (active gingivitis and cavities).

BMG harvesting

All the grafts were harvested from the inner cheek by the same two surgeons. Landmarks were delineated (Stenon conduit, tonsillar fossa). Ovoid shaped graft was designed. The buccal mucosa was then infiltrated with 10 mL 2% lidocaine with adrenaline. The width of the BMG was consistently 20 mm. Length of the graft was adjusted to the length of the stricture. Bleeding control was achieved using monopolar electrocautery. Donor-site wound was closed with 5–0 mono-filament running suture in all patients. Chlorhexidine-impregnated gauze was placed on the harvest site. An external ice pack was applied for swelling control.

Oral postoperative management

Chlorhexidine rinses were recommended every 8 h for 7 days. Liquid diet was administered during the first 2 days after procedure (cold soups or broths). Pain-killers (Paracetamol) and non-steroidal anti-inflammatory drugs were administered to every patient. Antibiotics were prescribed (mostly amoxicillin once a day) until urethral catheter removal 21 days after procedure.

OIDP questionnaire

The standardized and validated OIDP questionnaire assesses the impact of oral conditions on the abilities of individuals to perform eight daily activities. Each dimension (eating, speaking, hygiene, occupational activities, social relations, sleeping-relaxing, smiling, and emotional state) is evaluated as a dichotomic answer (zero no affected/one affected). If positive, the duration and severity of each impact are recorded on a Likert scale(0–5) [6]. It can be calculated as dimensional score [The questionnaire analyses if there is (one point) or not (zero points) difficulty in nine areas, so the dimensional score is from 0 to 9]. The other score that can be relevant is the global score. The impact on each dimension

is calculated as the result of multiply severity and duration. The global score would reflect the total quantity of impacts perceived expressed as a percentage. It is calculated by adding together the scores of the nine dimensions divided by the maxim score ($9 \times 5 \times 5 = 225$) multiplied by 100.

The OIDP Spanish version also includes a general oral quality of life question (0–10).

Questionnaire was self-administered before, 3 months after surgery and at the end of the study.

Statistical analysis

Our primary endpoint was to analyze if BMG harvesting deteriorates oral quality of life. For this purpose, we compared means of pre and postoperative OIDP scores with Student's *t* test for paired samples. Percentages were compared with the Chi-square test. Multivariate analysis (logistic regression) was performed to analyze risk factors for a low quality of life (<8) related to the surgery. Explicative variables were age, smoking history, diabetes mellitus, cardiovascular morbidity, width and length of the graft, success of the urethroplasty, and preoperative IODP score. All analyses were performed with SPSS 20.

Results

Initially we include 44 patients scheduled for BMG urethroplasty who fulfilled OIDP questionnaire before surgery but we exclude for the analysis three patients, two in whom a simple end-to-end primary anastomosis was finally performed and a patient with a BMG urethroplasty who was referred from other hospital and he did not come to the follow-up. Then, we analyzed 41 consecutive patients who underwent substitution urethroplasty with BMG from 2103 to 2017. Mean age was 52.67 years (S.D. 19.31). Demographic variables are shown in Table 1. In brief, most of the strictures (58.8%) were idiopathic. Surgical techniques are depicted in Fig. 1. Mean stricture length was 4.89 cm (S.D. 2.21). After a mean follow-up of 3.12 years we found stricture recurrence in eight patients (20.2%).

Regarding to BMG, mean length and width were 5.16 cm(S.D. 2.47) and 2.18 cm(S.D. 0.48), respectively. None of the patients required reintervention for oral bleeding.

Mean preoperative oral quality of life as described in OIDP questionnaire was 9.33 points (S.D. 1.16). Among patients, 21 described some kind of oral alterations. Preoperative mean OIDP dimensional score was 0.5 (S.D. 0.02). Mean preoperative global OIDP score was 0.8%. The most frequently altered aspect before surgery was hygiene, which was somehow affected in 47.6% of the patients. No immediate postoperative complications were reported.

Table 1 Demographic variables

| Variable | Mean |
|------------------------|---------------------|
| Age (years) | 52.67 (S.D. 19.31). |
| Smoking habit (%) | 29.2% |
| Cardiopathy (%) | 6.8% |
| Diabetes (%) | 8.5% |
| Stricture length (cm) | 4.89 (S.D. 2.21) |
| Graft length (cm) | 5.16 (S.D. 2.47) |
| Graft width (cm) | 2.18 (S.D. 0.48) |
| Stricture location (%) | |
| Penile | 14.4 |
| Penile–Bulbar | 28 |
| Bulbar | 57.6 |

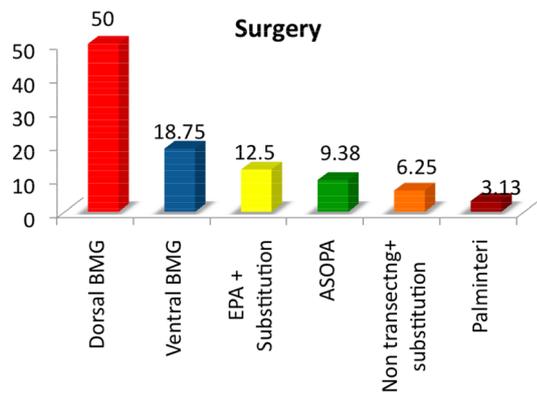


Fig. 1 Surgical techniques. EPA Excision and Primary Anastomosis

Mean oral quality of life, 3 months after surgery, was 8.56 (S.D. 1.89). Postoperatively mean OIDP dimensional score was 0.67 (S.D. 0.21). Mean postoperative global OIDP score was 1.1%. Only two patients (4.8%) described two dimensions affected. The most frequently altered aspect after surgery was eating which was somehow affected in 48.1% of the patients. Results are shown in Table 2.

At the end of the study, we found that up to 38% of the patients had some oral transitory procedure such as

endodony or dental extraction. Regarding OIDP related to the surgery, OIDP quality of life remained stable (8.50 (S.D. 1.13)). OIDP dimensional score increased from 0.5 at baseline to 0.7 but without any statistical significance. OIDP global score remained at 1%. This means that after a mean follow-up of 3.12 years, BMG only impacts in 1% to the patient’s oral health. Eating was the most altered area of oral health even after this long follow-up.

No differences were found in the Chi-square test between pre and postoperative at 3 months and at the end of the study percentages regarding hygiene or eating domains (Fig. 2).

We found when comparing oral quality of life, a non-statistical ($p = 0.07$) decrease in oral quality of life from 9.33 to 8.56 points in the Student’s t test as shown in Fig. 3. The increase in OIDP dimensional score and global score (0.5–0.67 and 0.8%–1.1%, respectively) were also not statistically significant. Among all patients, only 6 (14.6%) described scores lesser than eight. Binary logistic regression was performed to determine risk factors of low quality of life (< 8) related to surgery. Neither age, nor smoking habit, diabetes mellitus, cardiovascular morbidity, previous OIDP score, width, length of the graft or urethroplasty success could explain a low oral quality of life alter graft harvesting.

Discussion

There is plenty of literature regarding success rates of urethroplasty including uroflowmetry results and PROMS questionnaires. On the contrary, there are limited papers about oral health after BMG harvesting. Recently, there is an increasing interest about quality of life complications in urology.

In our study we collaborated with the Department of Dental Medicine to find the better questionnaire to evaluate how BMG harvesting can affect to oral quality of life. Thus, OIDP questionnaire was selected. Because quality of life must be considered as multidimensional, so oral quality of life [7]. OIDP includes functional (speaking, hygiene, occupational), psychosocial (social relationships, smiling) and pain discomfort items (eating, sleeping, relaxing, emotional

Table 2 Pre and postoperatively OIDP results

| | Preop. OIDP mean (S.D.) | 3 Months OIDP mean (S.D.) | Long term OIDP mean (S.D.) | p |
|------------------------|-------------------------|---------------------------|----------------------------|------|
| OIDP dimensional score | 0.5 (0.02) | 0.67 (0.21) | 0.7 (0.16) | 0.06 |
| OIDP global score (%) | 0.8 | 1.1 | 1 | 0.12 |
| OIDP QoL | 9.33 (1.16) | 8.56 (1.89) | 8.50 (1.13) | 0.07 |
| Oral hygiene (%) | 47.6 | 37 | 40 | 0.11 |
| Eating (%) | 33.3 | 48.1 | 47 | 0.06 |

QoL Quality of life, OIDP Oral impacts on Daily Performances

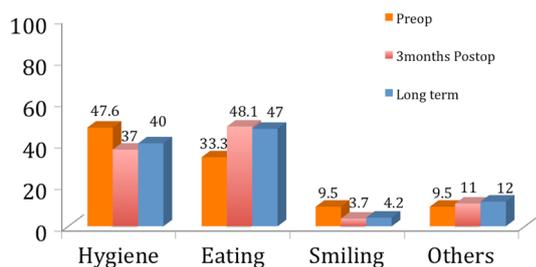


Fig. 2 Pre and postoperatively OI DP results

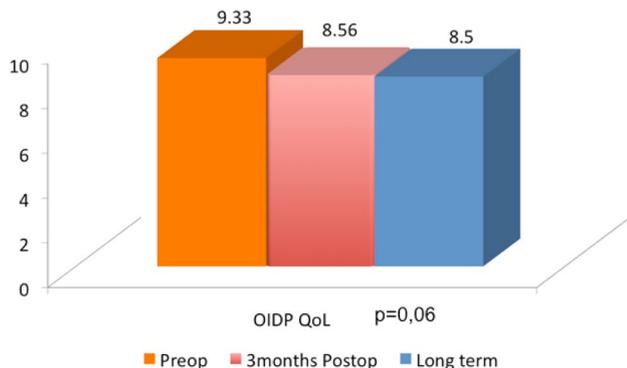


Fig. 3 Oral quality of life OI DP. QoL Quality of life, OI DP Oral Impacts on Daily Performances

state), therefore, it can be considered a valid tool for the purpose of our study [8].

In our study, regarding factors that could affect wound healing; we found a 29.2% of smoking status, 6.8% of cardiovascular morbidity and 8.5% of diabetes mellitus. Comparing to other series [9], smoking habit and diabetes mellitus were slightly higher but cardiovascular morbidity was comparable.

Questionnaires are not commonly used in urethroplasty so it is difficult to establish comparisons. In any case, what it is usually evaluated is pain after graft harvesting during eating, sleeping or relaxing. In our study, eating dimension was affected in 33% of patients before surgery and it was the most affected item in the postoperative evaluation in roughly one out of two patients, specifically eating. Sleeping, relaxing or emotional status were rarely affected. Soave et al. [10] evaluated this using the multidimensional Short-Form McGill Pain Questionnaire (SF-MPQ), consisting of a sensory and an affective pain subscale with 11 and four items, respectively [11]. This questionnaire only evaluates pain related issues. This included mouth opening, perception of taste, salivation, oral sensation, diet, oral bleeding, use of analgesics, smiling, whistling, oral swelling, speech, and burden in daily life due to oral

morbidity. This was a comparative study between closure and non-closure mouth wound. Since all our patients had their donor-site closed, we can only compare our results with that cohort of patients in the Soave study. Forty-two patients fulfilled the questionnaire at 3 months postoperatively and they found a 9% of alteration in eating dimension. These wide differences could be explained by several reasons. First, baseline smoking status in that cohort of patients was only of 8% compared to 29.2% of our study. Moreover, the width of the graft harvested by Soave et al. was 1.5 cm compared to our 2 cm harvested grafts. Closure technique was different as we used a 5/0 mono-filament running suture compared to the interrupted 4–0 mono-filament sutures. Nevertheless, in our opinion the latter is not crucial to explain the differences in our results rather than width and smoking status. In fact, that dimension was not affected compared to non-closure group ($p=0.4$).

The group of Hamburg published an excellent paper on oral morbidity and functional outcomes after redo-BMG [12]. Unfortunately, a non-validated questionnaire was used. It is remarkable that using a 38% lower lip grafts problems such as salivation or mouth opening were not significant. In this study, near a 26.4% had little or moderate oral complications which eventually implied changes in diet. Those results are comparable to our series although slightly higher. It should be taken into account that this is a redo-BMG cohort so this 26.4% could be added to a baseline alteration, which is not reported in that study.

One strength of our study is that we have evaluated oral health-related quality of life using a validated questionnaire. When comparing oral quality of life we found a non-statistical ($p=0.07$) decrease in oral quality of life from 9.33 to 8.56 points. This means a decrease in less than one point and a resulting score over eight, namely a very good quality of life. Among all patients, only 6 (14.6%) scores was described lesser than eight. We tried to evaluate risk factors for a low quality of life by including variables that could alter healing or the perception of pain. Thus, we analyzed age, smoking habit, diabetes mellitus, cardiovascular morbidity, previous OI DP score, width or length of the graft or urethroplasty success. It is remarkable that frequent alteration on parameters like eating, hygiene or smiling has not a translation in quality of life scores. This is the first study evaluating oral health quality of life using a validated questionnaire so unfortunately we cannot compare our results with previous literature. Nevertheless, in our opinion, even though there is not a significant decrease in oral quality of life related to BMG harvesting, innovation and investigation regarding other donor-sites [13, 14] or techniques like tissue engineering [15, 16] must be continued.

Conclusions

Buccal mucosal graft harvesting is not free of problems at donor-site. Eating seems to be the most affected area after surgery. Nevertheless, those sequels do not induce a reduction in oral health-related quality of life. Therefore, BMG appears to be a safe and thus advisable procedure for substitution of urethroplasty, but patients must be awarded of such oral bothersome symptoms.

Author contributions EM: project development, data collection, data analysis, manuscript writing, manuscript writing/editing. MAB: project development, data analysis, data collection, manuscript writing/editing. LF-E: project development, data analysis, manuscript writing, manuscript writing/editing. EM-C: project development, data collection or management. SA: project development, data collection or management. EB: project development, data collection or management, manuscript writing/editing. FB: project development, data analysis, manuscript writing/editing

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Research involving human participants and/or animals Not applicable.

Informed consent Yes.

References

- Chapple C, Andrich D, Atala A et al (2014) SIU/ICUD consultation on urethral strictures: the management of anterior urethral stricture disease using substitution urethroplasty. *Urology* 83(3 Suppl):S31–S47
- Dublin N, Stewart LH (2004) Oral complications after buccal mucosal graft harvest for urethroplasty. *BJU Int* 94(6):867 (2004)
- Markiewicz MR, DeSantis JL, Margarone JE, Pogrel MA, Chuang SK (2008) Morbidity associated with oral mucosa harvest for urological re-construction: an overview. *J Oral Maxillofac Surg* 66:739–744
- Barbagli G, Vallasciani S, Romano G, Fabbri F, Guazzoni G, Lazzeri M (2010) Morbidity of oral mucosa graft harvesting from a single cheek. *Eur Urol* 58:33–41
- Locker D (1988) Measuring oral health: a conceptual framework. *Community Dent Health* 5:3–18
- Montero J, Bravo M, Vicente MP, Galindo MP, Lopez JF, Albaladejo A (2010) Dimensional structure of the oral health-related quality of life in healthy spanish workers. *Health Qual Life Outcomes* 9:24
- John MT (2007) Exploring dimensions of oral health-related quality of life using expert's opinion. *Qual Life Res* 16:697–704
- Astrom AN, Mtaya M (2009) Factorial structure and cross-cultural invariance of the oral impact on daily performance. *Eur J Oral Sci* 117:293–299
- Lumen N, Vierstraete-Verlinde S, Oosterlinck W, Hoebeke P, Palminteri E, Goes C et al (2016) Buccal versus lingual mucosa graft in anterior urethroplasty: a prospective comparison of surgical outcome and donor-site morbidity. *J Urol* 195(1):112–117
- Soave A, Dahlem R, Pinnschmidt HO, Rink M, Langetepe J, Engel O et al (2018) Substitution urethroplasty with closure versus non-closure of the buccal mucosa graft harvest site: a randomized controlled trial with a detailed analysis of oral pain and morbidity. *Eur Urol* 73(6):910–922. <https://doi.org/10.1016/j.eururo.2017.11.014>
- Hawker GA, Mian S, Kendzerska T, French M (2011) Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). *Arthr Care Res* 63(Suppl 11):S240–S252
- Rosenbaum CM, Schimid M, Judwig TA, Kluth LA, Dahlem R, Fisch M et al (2016) Redo BMG urethroplasty: success rate, oral morbidity and functional outcomes. *BJU Int* 118(5):797–803
- Akhtar A, Khattar N, Goel H, Rao S, Tanwar R, Sood R (2017) Looking beyond oral mucosa: initial results of everted saphenous vein graft urethroplasty (eSVGU) in long anterior urethral strictures. *Arab J Urol* 15(3):228–235 (9)
- Xu Y, Shen Z, Liu G, Liu B, Hua X, Xiang Y et al (2017) Urethral reconstruction using everted saphenous vein graft in a rabbit model: one year outcomes. *Urol Int* 99(1):110–117
- Atala A, Danilevskiy M, Lyundup A, Glybochko P, Butnaru D, Vinarov A et al (2017) The potential role of tissue-engineered urethral substitution: clinical and preclinical studies. *J Tissue Eng Regen Med* 11(1):3–19
- Levy AC, Vanni AJ (2018) Refractory urethral stricture management: indications for alternative grafts and flaps. *Curr Urol Rep* 19(3):20