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THE MORBIDITY OF BUCCAL MUCOSAL GRAFT HARVEST FOR URETHROPLASTY AND THE EFFECT OF NONCLOSURE OF THE GRAFT HARVEST SITE ON POSTOPERATIVE PAIN

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ABSTRACT

Purpose: We assess the medium and long-term morbidity of buccal mucosal graft (BMG) harvest for urethroplasty, and evaluate the effect of nonclosure of the graft harvest site on postoperative pain.

Materials and Methods: A questionnaire was mailed to 110 men who underwent BMG urethroplasty between January 1, 1997 and August 31, 2002. Demographic data and side effects of BMG harvest, including oral pain, sensation and intake, were assessed postoperatively. A prospective study was then performed to compare 20 unselected men whose BMG donor site was closed with a group of 20 men in whom it was left open using a 5-point analog pain score that was completed twice daily for the first 5 postoperative days.

Results: A total of 49 men with a median age of 49 years (range 23 to 73) returned questionnaires relating to 57 BMG harvests. Of the graft harvests 47 (83%) were associated with postoperative pain, which was worse than expected in 24 (51%). Of the 57 patients 51 (90%) resumed oral liquid intake within 24 hours and 44 (77%) resumed normal diet within 1 week. Postoperative side effects included perioral numbness in 39 (68%) patients with 15 (26%) having residual numbness after 6 months, initial difficulty with mouth opening in 38 (67%) with 5 (9%) having persistent problems, changes in salivation in 6 (11%) and mucous retention cyst that required excision in 1 (2%). The men in the prospective donor site study had a median age of 51 years (range 24 to 70). Mean pain score for patients with donor site closure was 3.68 and was significantly higher than that for patients without donor site closure (2.26, $p < 0.01$).

Conclusions: Buccal mucosal graft harvest is not a pain-free procedure. Closure of the harvest donor site appears to worsen this pain and it may be best to leave harvest sites open. The main long-term complications are perioral numbness, persistent difficulty with mouth opening and change in salivary function.

KEY WORDS: buccal mucosa, graft adverse effects

The use of buccal mucosal graft (BMG) in urethroplasty was initially reported in 1992 for the management of multiple operated hypospadic anterior urethral strictures.[1,2] Since then it has become an increasingly popular graft tissue for urethral replacement in 1 and 2-stage, posterior and anterior, urethral stricture repairs.[3–6] Buccal mucosa is relatively easily harvested from the inner cheeks or lower lip[7,8] with reputed minimal morbidity.[9–12] Oral complications have been reported in only 0% to 8.3% of patients. However complications have only been assessed in a few reports and in small series of 13 or less buccal mucosal urethroplasties.[9–12] It is our impression that while there are no major adverse effects from buccal mucosal graft harvest, it is a more morbid procedure than previously reported. Therefore, we assessed the medium and long-term complications of buccal mucosal graft urethroplasty via a patient postal questionnaire. A prospective study was also performed to compare postoperative pain from graft harvest sites that had been sutured closed with that from graft harvest sites that had been left open.

PATIENTS AND METHODS

An ethics committee approved the questionnaire about buccal mucosal graft harvesting, which was mailed to all 110 adult patients who had undergone buccal mucosal graft urethroplasty (130 procedures) between January 1, 1997 and August 31, 2002 (see Appendix). There were no exclusion criteria. All patients with a BMG harvest were prospectively asked to complete a 5-point analog pain score twice daily for the first 5 postoperative days since September 1, 2002. The pain scores of the first 20 unselected patients whose graft harvest site was suture closed were compared with the pain scores of the first 20 unselected patients whose graft harvest site was left open. The decision to close or leave open the donor harvest site was left to individual surgeon preference.

All harvests were performed using our standard technique[11,12] under the supervision of senior surgeons (TJG and/or ARM). Following preparation the graft harvest site was infiltrated with 15 ml 0.5% xyloclane with 1 in 200,000 adrenaline. The mouth was held open using a McKesson mouth prop, the graft edges were incised with a knife and harvest was completed with scissors. Monopolar diathermy was used on bleeding points. A well-validated simple 5-point visual analog pain score, in which the score is also described in words and pictures for ease of use, was used to assess postoperative pain. Statistical analysis was performed with Student's t test for paired samples with parametric distribution and Mann-Whitney-U test for paired samples of nonparametric distribution.

RESULTS

Of the 110 men 49 with a median age of 49 years (range 23 to 73) returned completed questionnaires relating to 57 BMG

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harvest procedures for urethroplasty, for a questionnaire response rate of 45%. Median age of nonresponders was significantly younger at 36 years (range 17 to 71, $p < 0.05$). The majority (45%) of men responding had bulbar urethral strictures (table 1). The most common causes of stricture disease were idiopathic (33%), hypospadias (18%) and iatrogenic (18%). Strictures were generally long with 23 (47%) greater than 4 cm in length. A 1-stage urethroplasty was performed in 22 patients (45%) a 2-stage urethroplasty in 19 (39%) and more than 2 stages in 8 (16%). Median followup was 32 months (range 13 to 84).

The majority (72%) of graft harvest was from a single cheek (table 2). Forty-seven patients (83%) experienced postoperative pain at the site of graft harvest, of whom 24 (51%) thought this pain to be worse than expected. Of the patients experiencing worse pain than expected 13 (56%) had had single cheek harvest with suture closure of the cheek, and 7 (54%) of them thought the pain was related to the tightness of suture closure. Pain was unrelated to size of graft harvest. Regular anti-inflammatory antiseptic mouthwash use reduced postoperative pain in 34 of 50 graft harvests (68%) and aided with oral hygiene.

Of the 57 questionnaires returned 51 (90%) indicated that patients were able to consume oral fluids within 24 hours, with all reporting oral fluid consumption within 1 week, and 50 (88%) were able to eat soft solids within 2 days and 100% within 2 weeks. Resumption of normal diet was achieved by 44 men (77%) within 1 week, although return to normal diet was delayed up to 3 weeks in the remainder (fig. 1).

Perioral numbness (reduction of sensation in the oral cavity in the region of the site of graft harvest) was noted following 39 graft harvests (68%), which persisted in 15 (26%) at or beyond 6 months of followup. Four (27%) of these cases occurred after lower lip buccal mucosal harvest (table 3). Immediate postoperative difficulty with mouth opening was reported following 38 (67%) graft harvests with persistent difficulties at or after 6 months in 5 (9%). Of these patients 39 (68%) had regained normal mouth opening within 3 weeks but recovery was delayed in many of the remainder (fig. 2). Minimally troublesome persistent salivary changes after harvest were noted in 6 (11%) patients (over production in 3 and under production in 3). Of the 6 patients 4 also reported persistent perioral numbness. A postoperative mucus retention cyst developed in 1 patient with persistent perioral numbness but no subjective change in salivary function which required excision. This man had a full length anterior urethral balanitis xerotica obliterans urethral stricture and required harvest of both cheeks and lower lip for a 2-stage urethroplasty.

During the prospective study period 53 buccal mucosal graft harvests were performed as part of the urethroplasty in 51 patients. After complete explanation all patients were asked to complete the 5-point analog pain score twice daily at 11 am and 5 pm for the first 5 postoperative days. A complete data set was obtained on 40 patients. The other 12 patients either chose not to or were unable to complete the postoperative pain scores. Median age of patients having closure of the donor harvest site was 50.5 years (range 26 to 70) and median age of those having the donor site left open was also 50.5 years (range 24 to 70). Of the patients 28 required buccal mucosal graft harvest for 1-stage urethroplasty for penile urethral stricture while the remainder required graft harvest for 1-stage dorsal onlay bulbar urethroplasty or augmented roof-strip bulbar urethroplasty. There was no significant difference between the 2 groups.

Mean daily pain score for patients whose donor site was suture closed was 3.68 versus 2.26 for those whose donor site was left open. In both groups pain was maximal on postoperative day 1 and least on postoperative day 5. Mean daily pain score was always higher in the group with donor site closure, and this difference reached statistical significance on postoperative days 4 and 5 (fig. 3).

TABLE 1. *Stricture location*

Stricture Site	No. Pts (%)
Meatal	12 (25)
Penile	10 (21)
Bulbar	21 (44)
Peno-bulbar	5 (10)

TABLE 2. *Graft harvest site*

Graft Harvest Site	No. Pts (%)
Single cheek	41 (73)
Both cheeks	3 (5)
Single cheek + lower lip	4 (7)
Both cheeks + lower lip	3 (5)
Lower lip	5 (9)

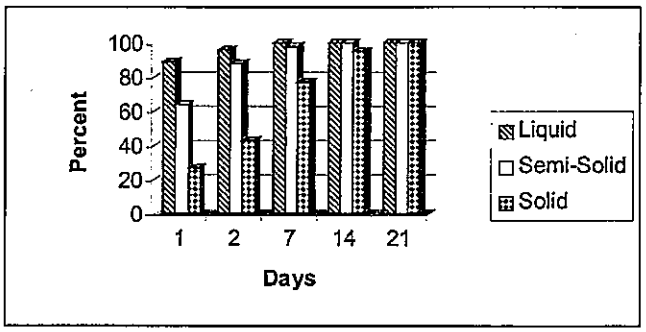

FIG. 1. Time to return to liquid, semisolid and solid diet (retrospective study).

TABLE 3. *Long-term perioral numbness and harvest site*

Graft Site	No. Numb (%)	No. Not Numb (%)
Single cheek	31 (76)	10 (24)
Both cheeks	0	3 (100)
Single cheek + lower lip	3 (75)	1 (25)
Both cheeks + lower lip	2 (67)	1 (33)
Lower lip	5 (100)	0

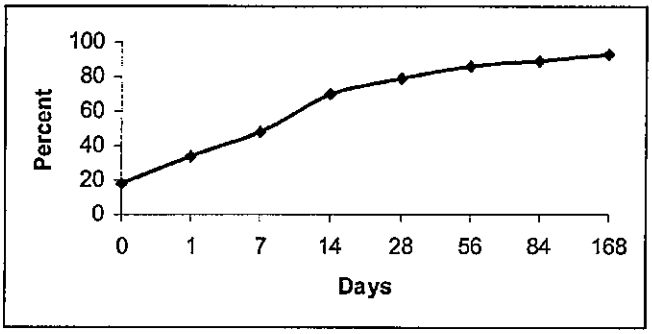

FIG. 2. Time to return to normal mouth opening (retrospective study).

DISCUSSION

Buccal mucosal graft harvest was painful for 83% of patients, 51% of whom thought the pain was worse than expected. Of the patients 100%, 97% and 77% resumed liquid, semisolid and solid diet within 1 week, respectively, and 100% achieved normal diet within 3 weeks. The main long-term complications were persistent perioral numbness (26%),

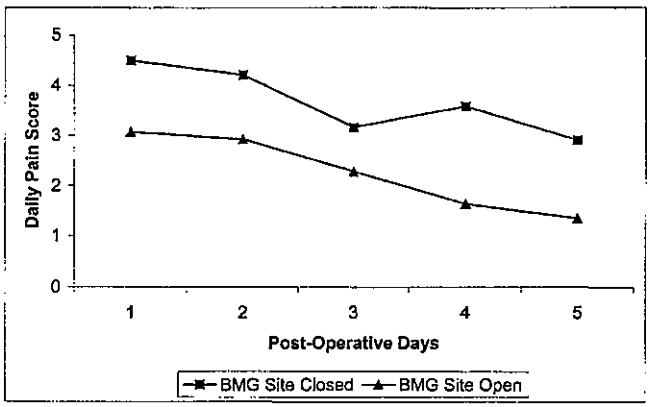

FIG. 3. Average daily pain scores for both groups (prospective study).

salivatory changes (11%) and difficulty with mouth opening (9%).

Pain was generally relieved by anti-inflammatory antiseptic mouth, which had the added benefit of helping with oral hygiene. Pain appeared to be worse and more prolonged after suture closure of the harvest site and so it may be best to leave harvest sites unsutured. Perioral numbness was related to a reduction in sensation in the region of the graft harvest and was an unavoidable consequence of excision of mucosa. No patient suffered any damage to nerves and no change in sensation along nerve territories was reported.

The use of BMG for urethroplasty was initially popularized by pediatric urologists for use in multiple operated hypospadias repairs.[13] Advantages of buccal mucosal as a free graft are that it is hairless, and has a thick elastin rich epithelium making it tough and easy to handle, with a thin and highly vascular lamina propria that facilitates inosculation and imbibition.[13] It adapts to wet and exposure to air, it is easily harvested with a concealed donor site scar and readily available in all patients.[3]

Many studies have reported the short and medium-term results of buccal mucosal graft urethroplasty but only a few involving small numbers of patients (less than 13) have commented on the short-term morbidity of the graft harvest itself and most reported no donor site complications.[3,4,14–17] In only 1 previous report was pain associated with the buccal mucosal graft alluded to and then only in the context of the first operative day when it is reported to be more severe than that due to the perineal or penile urethroplasty wound.[6]

Measurement of postoperative pain is not an exact science as each patient has different pain thresholds and perceptions. The patients were unselected but were well matched for age, urethroplasty type and grafts. It is difficult to comment as to whether the statistically significant reduction in pain after nonsuture of the harvest site was clinically significant, although the retrospective patients thought donor site suture and consequent tightness were major causes of postoperative pain. It took slightly longer to prepare the harvest site to leave open than closed, as more exact hemostasis was required. There were no returns to the operating room or significant bleeding complications in either group, although 1 open donor site case required a cheek pack overnight for hemostasis. There was no difference in ease of re-harvest from patients whose donor site was left open compared with those whose donor site was sutured closed. For both sites an area of fibrosis of approximately 1 cm surrounds the scar and it is necessary to harvest above or below this level.

CONCLUSIONS

The morbidity of buccal mucosal graft harvest is relatively minor and occurs in less than 30% of cases. The main long-term complications are numbness of the oral cavity, persistent difficulty with mouth opening and change in salivatory function. Patients need to be advised that it is not a pain-free procedure. Pain appears to be worse after cheek suture and it may be best to leave harvest sites unsutured.

APPENDIX: MORBIDITY ASSESSMENT OF GRAFT HARVEST SITE FOR URETHROPLASTY QUESTIONNAIRE

1. What type of graft tissue was used for your urethroplasty? (Please tick more than 1 if appropriate).
   a) Buccal mucosa—one cheek ☐
   b) Buccal mucosa—both cheeks ☐
   c) Buccal mucosa—lower lip ☐
   d) Buccal mucosa—both cheeks and lip ☐
   e) Post-auricular—behind 1 ear ☐
   f) Post-auricular—behind both ears ☐
   g) Foreskin ☐
   h) Other penile skin ☐
   i) Scrotal skin ☐
   j) Other (please specify)—☐ ☐
2. What type of urethroplasty did you have?
   a) One stage ☐
   b) Two stage ☐
   c) More than two stages ☐
3. How successful was your urethroplasty?
   a) Excellent ☐
   b) Satisfactory ☐
   c) Unsatisfactory ☐
   d) Disaster ☐
4. How would you rate the quality of information given to you before the operation?
   a. Excellent ☐
   b. Satisfactory ☐
   c. Unsatisfactory ☐
   d. Awful ☐
5. Were you warned of any problems that might occur at the site from which the graft tissue was taken for your urethroplasty? If so please specify.

6. What additional information would you have liked to have received?

Buccal Mucosa (Cheek and/or Lip Lining)

1. What was the date of your operation(s)? ☐ ☐
2. Was the your mouth painful? ☐
3. Was this pain worse than you had expected? ☐
4. Did you use regular mouthwash? ☐
5. Did the mouthwash reduce the pain? ☐
6. Did the mouth wash help in any other way? (Please specify). ☐
7. How long after the operation was it before you were able to drink? ☐
8. How long after the operation were you able to eat soft foods? ☐
9. How long after the operation were you able to eat normal foods? ☐
10. Did you have difficulty opening your mouth after the operation? ☐
11. Can you open your mouth normally now? ☐
12. How long did it take until you could open your mouth normally? ☐
13. Did you have any numbness in your mouth after the operation? ☐
14. Do you still have any numbness in your mouth? ☐
    Where is this numbness? (Please specify) ☐
15. Have you had any changes in your saliva (spit) production? ☐
16. Have you required any further operations on your mouth since your urethroplasty? ☐
17. Is there anything else we should know about your mouth after the operation? ☐
18. How long after the urethroplasty did you restart sexual activity?

Many thanks for taking the time to fill in this questionnaire.

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