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Substitution Urethroplasty with Closure Versus Nonclosure of the Buccal Mucosa Graft Harvest Site: A Randomized Controlled Trial with a Detailed Analysis of Oral Pain and Morbidity

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Abstract

Background: Optimal surgical management of the buccal mucosa harvest site in patients with urethral stricture disease during buccal mucosa graft urethroplasty (BMGU) remains controversial.
Objective: To analyze in detail intensity and quality of pain as well as oral morbidity following closure (C) versus nonclosure (NC) of the donor site.
Design, setting, and participants: Randomized controlled trial on 135 patients treated with BMGU between October 15, 2014 and December 18, 2015.
Intervention: Following computer-based randomization, 63 and 72 patients, respectively, received C and NC of the donor site at the inner cheek. Preoperatively, on days 1, 5, and 21 as well as at 3 and 6 mo postoperatively, patients completed standardized questionnaires, including validated questions on intensity and quality of pain as well as oral morbidity.
Outcome measurements and statistical analysis: The coprimary end points were intensity and quality of oral pain. Secondary end points included oral morbidity and intensity of pain of the perineogenital region. Generalized linear mixed models evaluated the effect of various covariates on intensity and quality of oral pain, oral morbidity, as well as intensity of pain of the perineogenital region.
Results and limitations: There was noninferiority for NC versus C in intensity and affective quality of oral pain at every time point following BMGU. Oral morbidity and complications included pain, bleeding, swelling, numbness, alteration of salivation and taste, as well as impairment of mouth opening, smiling, whistling, diet, and speech. Time from BMGU had significant effects on intensity ($p < 0.001$) and quality of oral pain (sensory pain: $p < 0.001$, affective pain: $p < 0.001$, total pain: $p < 0.001$). Length of buccal mucosa graft had significant effects on intensity ($p = 0.001$) and quality of oral pain (sensory pain: $p = 0.020$, total pain: $p = 0.042$).
Conclusions: NC is noninferior to C of the donor site in intensity and quality of oral pain, and offers a treatment alternative. Time from BMGU and length of the buccal mucosa graft have effects on oral morbidity and complications.

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Patient summary: We investigated pain, morbidity, and complications following closure (C) versus nonclosure (NC) of the buccal mucosa harvest site in patients undergoing buccal mucosa graft urethroplasty (BMGU). We found that NC is not worse than C regarding oral pain. In addition, time from BMGU and length of the buccal mucosa graft have effects on oral morbidity and complications.

1. Introduction

Substitution urethroplasty is the gold standard treatment for long primary and recurrent urethral strictures [1]. Currently, autologous buccal mucosa represents the most frequently used transplant for substitution urethroplasty [1,2], due to its favorable availability, simple processing, and durable integration in the urethra [3]. Although tissue-engineered grafts have been introduced, none has succeeded in routine clinical use for urethral reconstructive surgery [4]. Buccal mucosa graft urethroplasty (BMGU) offers excellent functional treatment outcomes [5,6]. However, donor site complications following BMGU may cause relevant pain and morbidity, including difficulties with mouth opening and perioral numbness [7–9].

Still, optimal surgical management of the buccal mucosa harvest site during BMGU remains a matter of controversial debates [8,10–13]. Previous findings suggest that closure (C) or nonclosure (NC) of the donor site may be advantageous, particularly in the early postoperative phase [10–13]. However, previous studies focused on intensity of oral pain, and morbidity mainly considered effects on mouth opening, salivation, diet, or perioral numbness [10–13], whereas quality of oral pain, swelling, impairments of speech, taste perception, or smiling has not been evaluated in detail. In addition, data on perioperative analgesic medication and pain in the perineogenital region have not been presented [10–13].

Therefore, the aim of the present randomized controlled prospective trial was to analyze in detail the intensity and quality of oral pain as well as morbidity in patients with urethral stricture disease treated with BMGU with C versus NC of the donor site.

2. Patients and methods

2.1. Patient cohort

The local ethics committee approved this randomized controlled, two-treatment-arm study (No. PV4827). Male patients ≥18 yr of age with urethral stricture disease were eligible. Exclusion criteria were any previous treatment with BMGU, known or suspected concomitant oral diseases (gingivitis and caries), psychiatric disorders or cognitive impairment, chronic pain, bilateral buccal mucosa graft harvest, and non–German-speaking patients. Power analysis indicated that 50 patients per group were required to achieve 96% power at a significance level of 0.05 to show noninferiority of NC versus C, assuming a noninferiority margin of a one point difference in pain intensity on an 11-point numeric rating scale (NRS). A noninferiority approach was used, since NC represents a less invasive procedure for a patient with fewer sutures compared with C of the donor site. A narrow noninferiority margin of a one point difference was chosen based on the findings of other authors, who reported that a reduction of 1.5 or 2 points on an 11-point NRS is clinically significant and that the change that defines a clinical significant difference decreases over time [14–16]. Based on previous withdrawal rates in questionnaire-based outcome studies of our institution [17,18], 163 patients were enrolled between October 15, 2014 and December 18, 2015 after written informed consent.

2.2. Surgical procedure and randomization

BMGU has previously been described in detail [19]. In brief, dorsal inlay or ventral onlay single-stage BMGU was performed depending on the location of the urethral stricture [20–23]. Buccal mucosa graft harvest at the inner check has extensively been described earlier [11,19]. In brief, the mouth was covered in a sterile manner in all patients. For exposure of the buccal mucosa at the inner cheek, two 3-0 monofil sutures were placed at the inferior and superior lip. The buccal mucosa was infiltrated with 2% lidocaine with adrenaline and harvested in an ovoid shape from the inner cheek [24]. The width of the buccal mucosa graft was consistently 15 mm. Before harvesting, the length of the buccal mucosa graft was measured in all patients. Bipolar electrocautery was used for hemostasis of the donor site. When eligibility criteria were met, physicians of the special consultation hour for reconstructive urology of our department enrolled patients in the trial. Afterward, participating patients were randomized to the C group or NC group in a 1:1 ratio using a computer-based randomization list containing consecutive numbers. Within the process of patient information on the surgical procedure on the day prior to the surgical intervention, all participating patients received a number, which was recorded on the written informed consent for BMGU. For concealment, neither physicians nor patients knew which number coded for C or NC before the buccal mucosa harvest. Only the statistician and the surgical nursing staff could know which number coded for C or NC. The surgical nursing staff kept the randomization list with the specific coding for C versus NC in a locked drawer in a separate nursing-staff room in the OP wing. Only during the buccal mucosa harvest, the surgical nursing staff revealed whether the number encoded for C or NC of the donor site. In the C group, the donor site was closed with interrupted 4-0 monofil sutures. In contrast, the donor site was not closed in the NC group. One piece of cottonoid gauze was placed at the harvest site in both groups and was removed at the end of the surgical procedure. In total, six surgeons dedicated to urethral reconstructive surgery performed BMGU in all patients.

2.3. Postoperative management

Postoperative management has been outlined in detail previously [19]. In brief, patients received analgesics according to the World Health Organization Analgesic Ladder consisting of nonsteroidal anti-inflammatory drugs (NSAIDs; ie, novalgin) and paracetamol, combined with weak opioids (ie, tramadol) according to the needs of patients [25]. According to institutional standards, all patients performed daily oral rinsing with chamomile and cooling of the cheek from postoperative days 1–5. All patients were routinely discharged on postoperative day 5. On postoperative day 21, all patients received a cystourethrogram at our institution.

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