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Immediate pedicled gracilis flap in radial forearm flap phalloplasty for transgender male patients to reduce urinary fistula☆

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Summary *Background and aim:* Radial forearm phalloplasty is accompanied by high rates of fistula formation. We examined the effect of placing a pedicled gracilis myofascial flap around the urethral anastomosis at the time of radial forearm flap transfer on the development of postoperative urethrocutaneous fistula.
Methods: Fifteen patients underwent phalloplasty with urethroplasty between June 2012 and October 2015, and they met the inclusion and exclusion criteria for the study. We retrospectively reviewed patients' medical records and extracted patient demographic data, prelamination technique used (mucosa, skin graft, both, or neither), and whether or not a gracilis myofascial flap was harvested at the time of flap transfer and used to reinforce the native-neourethral anastomosis. The chi-squared test was used to evaluate the association between the presence of a gracilis flap and fistula formation.
Results: Four patients received a gracilis flap as part of their primary phalloplasty operation. None of these patients developed a fistula. Eleven patients did not receive a gracilis flap at the

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time of initial surgery and seven developed a fistula.
Discussion: In our patient series, inclusion of a pedicled myofascial gracilis flap at the time of radial forearm phalloplasty with urethroplasty was associated with an absence of fistula formation. Therefore, we have since made inclusion of this flap a standard practice for all transmales undergoing phalloplasty with urethroplasty.

Introduction

Radial forearm phalloplasty was originally described by Chang in 1984[1] and still remains the most popular technique for phalloplasty as it offers reliable anatomy and neurotized, supple tissue with a long vascular pedicle.[2] The medial and/or lateral antebrachial cutaneous nerves, which are transferred with the flap and anastomosed to the ilioinguinal, genitofemoral, and clitoral nerves, often allow for both erogenous and tactile sensation.[2]

However, the radial forearm flap, such as other forms of phalloplasty with urethroplasty, is accompanied by high rates of fistula formation.[3,4] Fistula rates vary widely among surgeons, with some studies reporting rates as low as 14%[1] and others as high as 64%.[5] The anastomosis of the neourethra and native lengthened urethra is most susceptible to fistulas.[3] Factors contributing to fistula development following phalloplasty include infection, insufficient soft tissue at the urethral anastomosis, and compromised blood supply secondary to a scarred tissue bed.[5] Urethral lengthening performed in transgender males, usually with labia minora tissue and anterior vaginal flaps, which are both tissues with a tenuous blood supply, further contributes to higher fistula rate among this patient demographic[6]

Surgical technique has evolved in an effort to reduce fistulas. At present, some surgeons perform staged flap prelamination[7] and report a decrease in postoperative fistula formation.[8,9] Nevertheless, further adaptations are needed.

At our institution, we started treating patients who developed urethrocutaneous fistulas postphalloplasty with a gracilis myofascial flap to reinforce the neourethral anastomosis and observed that no recurrent fistulas developed. We therefore hypothesized that inclusion of a gracilis myofascial flap prophylactically at the time of radial forearm flap transfer would lead to a decrease in the prevalence of fistula.

The purpose of the current study is to examine the effect of using a pedicled gracilis myofascial flap around the urethral anastomosis at the time of flap transfer on the rate of urethrocutaneous fistula development.

Methods

Patients and methods

We performed a retrospective chart review of our experience with urethroplasty in the setting of radial forearm flap phalloplasty. We identified and reviewed the medical records of all transmale patients who underwent gender confirmation bottom surgery with radial forearm flap phalloplasty between June 2012 and October 2015 at the University of Miami Miller School of Medicine. The same surgeon (CS) performed all operations. To be included, patients had to be transmales who elected to undergo phalloplasty with urethroplasty as treatment for gender dysphoria. Patients who opted to urinate from their native urethra were excluded from the study. Of the 16 patients who underwent phalloplasty during the designated time period, one patient was excluded because he underwent phalloplasty without urethroplasty and received a tube within a tube phallus without a neourethra. The remaining 15 patients met inclusion and exclusion criteria and were selected for the present case series.

We extracted demographic data (age, race, body mass index (BMI), and medical comorbidities), type of tissue used for prelamination (mucosa only, skin graft only, mucosa and skin graft, or no mucosa and no skin graft), whether a pedicled myofascial gracilis flap had been used (at the time of initial surgery, as part of a salvage procedure, or not at all), and whether or not the patient developed the complication of urethrocutaneous fistula. Urethrocutaneous fistula was defined as leakage of urine from disrupted skin wounds other than the urethral orifice, as confirmed at bedside clinically or with a retrograde cystourethrogram. Data are available for all patients from the time of surgery until December 2015. No patients were lost to follow-up.

Surgical technique

Radial forearm phalloplasty and urethroplasty techniques are well documented in the literature. We performed radial forearm phalloplasty in a standard manner. Before transferring the flap, grip and pinch strength testing were used to determine each patient's nondominant hand, which was selected for flap harvest.

Prelamination was performed 6—8 weeks before radial forearm flap transfer with mucosa (buccal, vaginal, and/or uterine), a skin graft (thigh or abdomen), or both (Figure 1a). Whenever possible, we preferred to prelaminate the neourethra with mucosa instead of skin graft; however, mucosal sources were not always adequate in patients who had previously undergone metoidioplasty with vaginectomy. In these patients, buccal mucosa alone was insufficient for prelamination and skin grafts were also used. Prelamination was not