Urologic Sequelae Following Phalloplasty in Transgendered Patients

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KEYWORDS

• Urethral stricture • Fistula • Phalloplasty • Metoidioplasty • Transgender reconstruction • Complications

KEY POINTS

- Urinary fistula and urethral stricture are common after neophallus reconstruction.
- Fistulas commonly occur at sites of anastomosis.
- Reconstruction must be tailored to the patient's anatomy and goals.

INTRODUCTION

In recent years, the issues of the transgender population have become more visible in the media worldwide. It has been estimated that approximately 355 individuals per 100,000 population consider themselves transgender or experience gender dysphoria to a varied degree, and approximately 9.8 per 100,000 would seek affirmation therapy.[1] Complete transformation to the new gender involves several pharmaceutical and surgical steps. Transgender patients at various stages of their transformation will present to urologic clinics requiring general or specialized urologic care. Knowledge of specifics of reconstructed anatomy and potential unique complications of the reconstruction will become important in providing urologic care to these patients.

Our review of literature combined with the authors' personal experience suggest that in patients undergoing male-to-female transformation, the genitourinary complications are uncommon: recto-neovaginal fistula (1%) and meatal stenosis (5%).[2,3] Thus, in this review, we have concentrated on describing the more common urologic complications after female-to-male reconstructions.

UROLOGIC ISSUES IN FEMALE-TO-MALE TRANSGENDER PATIENTS

One goal of neophallus construction in female-to-male transgender surgery is to achieve the ability for the individual to void while standing. Although some patients use external "urinary assist" devices from the native urethra to facilitate urination while standing,[4–6] many undergo neourethra construction, as the ability to stand to void is a high priority among female-to-male transgender individuals. More than 98% reported a desire to stand to void.[7] The management of urologic sequelae is important after neourethra construction, as

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fistulae, strictures, and persistent vaginal cavities are common complications.

ANATOMY OF METOIDIOPLASTY AND PHALLOPLASTY

Female-to-male transgender patients are typically offered 2 options for genital reconstruction: metoidioplasty versus phalloplasty. Metoidioplasty in its many forms involves lengthening of native urethra by means of local vaginal and labial flaps to create a neophallus long enough for urination in a standing position. The techniques are similar to proximal hypospadias repair in pediatric patients.[8] At the end of the operation, the labia minora is tubularized to form the distal urethra, the clitoris is freed from the attachments and elongated to form the glans, and the labia majora is used to create a neoscrotum and to cover the shaft of the neophallus. As a result, the urethra after metoidioplasty consists of 2 parts: the proximal native urethra with its meatus connected to a distal neourethra created from the labia minora.

Metoidioplasty is an attractive option for patients who would want to avoid more invasive phalloplasty options that involve distant tissue flaps and grafts. The complications are typically minor and may involve ventral fistulae, infrequent stricture at the level of neourethra, and remnant vaginal cavity. The main disadvantage of this procedure is limited length and girth of the resultant neophallus, precluding its use for intercourse.

In contrast, phalloplasty is offered to patients who desire to achieve both voiding and sexual functions. As expected, this is a more invasive option, involving a combination of local and distant tissue transfer techniques. The urethra of the male-to-female transgendered patient after phalloplasty can be divided into distinct segments,[6,9] from proximal to distal: native (female) urethra, fixed urethra, anastomotic urethra, phallic urethra, and meatus. The fixed urethra is the portion of the urethra formed after lengthening the native urethra via local vaginal or labial flaps, extragenital flaps, and grafts of skin or mucosa.[6,10] The phallic urethra can be constructed through a variety of techniques, including prelamination, prefabrication, tube-in-tube techniques, and pedicle flaps.[6,10]

FISTULA

Urethrocutaneous fistula is the most common urethral complication. The fistula rate of radial forearm free flap phalloplasty ranges from 22% to 75%.[11–14] Urethral fistulas commonly occur at points of anastomosis: between the phallic urethra and fixed urethra, and between the fixed urethra and the native urethra, although fistulae can occur anywhere along the neourethra.[15] Fistulas occur most commonly at or just proximal to the anastomosis between the phallic urethra and fixed urethra[12] due to vascular insufficiency of the flap, and the decreased lumen of the phallic urethra. The change in caliber of the lumen from fixed to phallic urethra may cause a relative obstruction of the urinary stream distal to the site of the fistula.[12] The small-caliber lumen of the phallic urethra may be due to tissue shrinkage or insufficient size of the urethra at the time of construction. Spontaneous closure of the fistula tract has been reported, with Fang and colleagues[16] reporting spontaneous closure of the fistula within 2 months in as many as 35.7% of patients.

PERSISTENT VAGINAL CAVITY

In our combined experience, fistulae proximal to the anastomosis commonly communicate with large remnant vaginal cavities and are unlikely to close spontaneously if there is distal obstruction (**Fig. 1**). We suspect that in the presence of distal obstruction, pressurized urine finds its way through the ventral suture lines of the fixed urethra and into the obliterated vaginal cavity after previous vaginectomy or colpocleisis. If this persistent cavity is found, we routinely perform complete cavity excision and obliteration at the time of the fistula repair. Surprisingly, in our experience, pathologic analysis showed normal vaginal epithelium in all cavity specimens, despite the previous history of vaginectomy.

STRICTURE

Urethral stricture is another common urologic complication with reports of incidence varying from 25% to 58%.[12,17,18] Although stricture can occur in any segment of the urethra, the most common location of stricture formation is at the anastomosis of the fixed and phallic portion of the neourethra (**Fig. 2**). Lumen and colleagues[9] characterized stricture formation after phalloplasty and determined that urethral stricture occurred at the anastomosis in 40.7%, phallic portion in 28%, the meatus in 15.3%, fixed segment in 12.7%, and multifocal in 7.6%. Ischemia is thought to be the etiology of strictures at all levels. Fistula formation also may contribute to dense scar formation and kinking of the tissues, especially at the anastomosis of the phallic to fixed portions.[9,17] At the meatus, contracture of the anastomosis between the skin of the glans and the neourethral tissue can lead to meatal stenosis. Mean stricture length in this series was 3.6 cm (range: 0.5–15 cm).[9] Fistula and urethral