Urologic Complications After Phalloplasty or Metoidioplasty

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KEYWORDS

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

KEY POINTS

- Urethral stricture and urethrocutaneous fistulae are common after phalloplasty and metoidioplasty.
- Strictures commonly occur at anastomotic sites and fistulae commonly occur at suture lines proximal to strictures.
- Reconstruction should be tailored with respect to the type of complication, patient's preferences, and available tissue for reconstruction.

INTRODUCTION

Issues affecting the transgender population have gained increasing visibility in recent years with well-known public figures undergoing gender-affirming treatment. However, epidemiologic data on transgender patients are limited. It is estimated 355 individuals per 100,000 identify as transgender with varying degrees of gender dysphoria. Out of 100,000 people, 9.8 would seek gender-affirming therapy.[1] In a US population-based survey, an estimated 1.4 million adults, 0.6% of the population, reported identification as transgender.[2] Data regarding prevalence of affirming surgical procedures involving the genitals report a range from 10% to 30% among the transgender population.[3–6]

Gender affirming treatment is complex and involves both medical and surgical steps. Patients who have underwent urologic reconstructive surgery will present in a clinical setting in need of both general and specialized urologic care. Understanding the reconstructed anatomy and unique complications following these procedures is crucial to provide adequate care to this expanding population. This article focuses predominantly on the common urologic complications of transmale genital reconstructive surgery.[7,8]

ANATOMY OF METOIDIOPLASTY

Transgender male patients are presented with 2 options for genital reconstruction: metoidioplasty or phalloplasty. Metoidioplasty involves extension of the native urethra by tubularization of labial and vaginal flaps to produce a phallus sufficient for urination in standing position. The surgical steps of metoidioplasty are analogous to techniques for repairs of proximal hypospadias repair in pediatric patients.[9] Specifically, the vaginal cavity is resected and obliterated, the labia minora is tubularized to form the anterior urethra, and the clitoris

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is dissected and elongated to form the glans. The neoscrotum is fashioned from labia majora. After metoidioplasty, the reconstructed urethra consists of 2 parts: a native urethra proximally and a neourethra (created from labia minora) distally.

For patients who wish to avoid the morbidity of phalloplasty, metoidioplasty may be a more attractive choice because complications are usually minor. The complications may include urethra-cutaneous fistulae, occasional urethral stricture, and a remnant vaginal cavity communicating with the neourethral lumen. However, the main limitation of metoidioplasty is the insufficient length and girth of the neophallus, allowing only for voiding upright but precluding its use for penetrative intercourse.

ANATOMY OF PHALLOPLASTY

Phalloplasty is preferred by patients who want to attain both upright voiding and the ability to perform penetrative intercourse. A more invasive option, phalloplasty usually involves a combination of local and distant tissue flaps. Following phalloplasty, the urethra of the transgender male patient can be divided into separate, interconnected segments.[10,11] Proximally, the native (female) urethra is connected to the fixed urethra (pars fixa), which in turn is connected by a circumferential anastomosis with a phallic neourethra (pars pendulans), and terminates in a meatus. The pars fixa is the proximal portion of the neourethra fashioned to lengthen the native urethra using local or extragenital flaps, and epithelial grafts (skin, vaginal epithelium, or buccal mucosa).[10,12] Numerous 1-stage or multistage techniques are described for the construction of the distal neophallic urethra, pars fixa. These include tube-in-tube techniques, prelamination, and staged urethral tubularization.[12,13]

UROLOGICAL COMPLICATIONS

Urethrocutaneous Fistula

The most common urologic complication after phalloplasty or metoidioplasty is urethrocutaneous fistula. Several studies reported on outcomes of radial forearm flap phalloplasty with fistulae rates ranging from 22% to 75%.[14–17] Although fistulae can occur anywhere along the neourethra, they generally originate at the suture line of the anastomosis between the pars fixa and pars pendulans, or at the junction between the native urethra and the pars fixa.[15,18] The most common location for urethrocutaneous fistulae is just proximal to the anastomosis of the pars pendulans.[15] This may be a result of diminished vascular perfusion of that portion of the flap and the significant narrowing of the urethral caliber in the phallic urethra. The decrease in the caliber of the lumen at the anastomosis may cause a relative obstruction of the urinary stream distally and could lead to an increase in intraluminal pressure proximally, causing a urine leak through the suture lines.[15] In some cases, conservative management of fistula may result in spontaneous fistula resolution. Fang and colleagues[19] reported spontaneous closure of the fistula in 35.7% of patients within 2 months of diagnosis.

Persistent Vaginal Cavity

In the authors' 2-institution experience operating on more than 40 neophallus strictures, urethral fistulae communicating with large remnant vaginal cavities were found in a half of the patients (**Fig. 1**). In the presence of distal obstruction, urine is likely being forced through the ventral suture lines of the pars fixa, thus dissecting and expanding the previously obliterated vaginal cavity. At the time of urethral reconstruction and fistula repair, we usually perform complete vaginal cavity reexcision and obliteration. These procedures can be done through an open perineal or laparoscopic-robotic abdominal approach. Interestingly, all excised cavity specimens sent for histologic examination have shown normal vaginal epithelium despite previous history of vaginectomy.

Urethral Stricture

Urethral stricture is a common urologic problem occurring in 25% to 58% of patients after phalloplasty.[15,20,21] The most common location of stricture formation is at the anastomosis of the pars fixa and pars pendulans of the neourethra (**Fig. 2**). Lumen and colleagues[11] studied stricture formation after phalloplasty and observed anastomotic strictures in 40.7%, phallic urethral strictures in 28%, and meatal stenosis in 15.3%, followed by pars fixa strictures in 12.7% and multifocal strictures in 7.6%. In their series, the investigators reported a mean stricture length of 3.6 cm (range: 0.5–15 cm).[11] In most cases, poor perfusion and resultant ischemia were suspected to cause the stricture formation. Additionally, urine leaks around reconstructed urethra may also contribute to dense scar formation at the anastomosis of the phallic to fixed portions.[11,20] Rohrmann and Jaske[15] have described a cohort of subjects after a single-stage phalloplasty, 40% of whom subsequently developed strictures and associated more proximal fistulae. Contracture at the junction between the skin of the glans and the distal neourethral lumen can lead to meatal stenosis. Complications after