Presenting Complications to a Reconstructive Urologist After Masculinizing Genital Reconstructive Surgery

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OBJECTIVE To evaluate the presenting complications of patients to reconstructive urologists after masculinizing gender affirming genital reconstructive surgery (GRS) performed elsewhere.

METHODS We identified patients who underwent revision surgery by one of the co-authors for sequelae of masculinizing GRS. We reviewed patient demographics, medical history, details of prior GRS, and complications from GRS. Specific attention was paid to the presence of the following: suprapubic tube dependence, vaginal remnant, urethrocutaneous fistula (UCF) within the fixed urethra (pars fixa), UCF in the phallic urethra, phallic urethral stricture, meatal stenosis, and anastomotic urethral stricture. Statistical analysis was performed using the Fisher's exact test to determine differences in presenting symptoms by GRS.

RESULTS Fifty-five patients who had reconstructive surgery for complications from masculinizing GRS from September 2004 to September 2017 were identified. The median age at surgical correction was 33 years. Fifteen (27%) patients had prior metoidioplasty and 40 (73%) had prior phalloplasty. The median time from date of GRS to presentation to a reconstructive urologist was 4 months. Urethral strictures (n = 47, 86%) were the most common indication for subsequent surgery, followed by urethrocutaneous fistulae (n = 31, 56%) and vaginal remnant (n = 26, 47%). The majority of patients presented with 2 or more simultaneous complications (n = 40, 73%).

CONCLUSION There are several common presenting urologic complications after masculinizing GRS. Patients may present to reconstructive urologists early after GRS performed elsewhere. The long-term outcomes of GRS deserve further study. UROLOGY 132: 202–206, 2019. © 2019 Elsevier Inc.

Transgender and gender nonbinary individuals are those whose gender identities differ from their sex assigned at birth. Transgender and gender nonbinary people are estimated to comprise up to 0.6% of the United States adult population, numbering approximately 1.4 million.[1] Gender-affirming surgery, which includes facial, chest and genital reconstructive surgery (GRS), may be performed to better align a patient's genital anatomy to match their gender identity. Utilization of GRS has increased in recent years, even preceding changes in insurance coverage that have made gender-affirming surgery more accessible to patients.[2]

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In addition to extirpative procedures such as hysterectomy and salpingoophorectomy, transgender men and transmasculine (assigned female at birth) patients may seek reconstructive procedures such as metoidioplasty, phalloplasty, scrotoplasty, colpectomy, penile and testicular prosthesis placement, among other procedures. Metoidioplasty involves mobilization of a hormonally hypertrophied clitoris to create a small neophallus, with potential for standing micturition if urethral lengthening is performed.[3-7] Flap-based phalloplasty can be performed using a number of techniques, with goals of offering an aesthetic result that is acceptable to the patient, capacity for standing micturition with urethral lengthening, and potential for penetrative intercourse following erectile prosthesis placement.[8-12]

Urethral lengthening is performed with metoidioplasty or phalloplasty for those who desire the ability to stand to void. In metoidioplasty, this typically involves ventral tubularization of vaginal or labia minora flaps, with distal buccal mucosa graft augmentation.[5,16,17] Neophallus urethroplasty involves several components: pars fixa urethroplasty from local vaginal or labia minora flaps, regional

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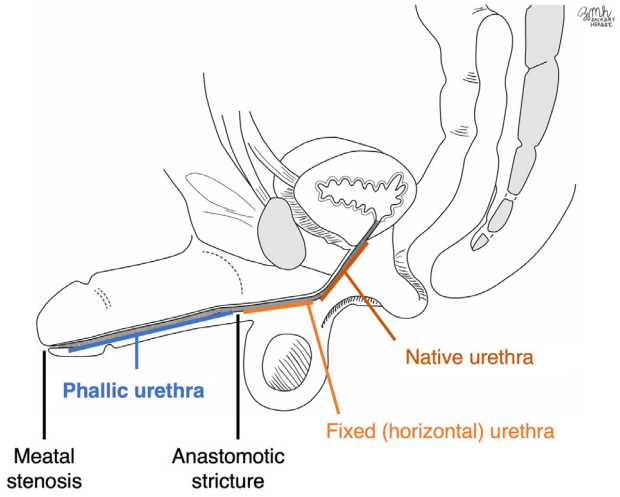

Figure 1. Neophallic urethral anatomy includes the native urethra, pars fixa or fixed/horizontal urethra, and the phallic urethra. Strictures commonly occur at the anastomosis between the pars fixa and the neophallic urethra, but may occur at any location along the reconstructed urethra. (Color version available online.) (Illustration by Zackary Herbst.)

flaps, and skin or mucosal grafts (fixed urethra); anastomosis of the skin flap urethra from the donor site neophallus to the distal aspect of the fixed urethra;[18] and phallic urethral construction using tube-within-tube, prelamination, or pedicled flap techniques (phallic urethra).[19-24]

Urethral complications are common following masculinizing GRS, with published rates from 25% to 75%.[9,14,15,20,25,26] Strictures may occur at any level, from the fixed (horizontal) urethra, through the phallic urethra to the meatus, with most occurring at the anastomosis between the fixed and phallic urethra (anastomotic strictures) (Fig. 1).[25,26]

Outcomes of masculinizing GRS are derived primarily from single-institution case series, with large geographic catchment areas describing complication rates within their primary patient population.[9,10,13-15] Primary metoidioplasty or phalloplasty is performed at few institutions worldwide. Patients undergoing GRS may present to other surgeons, often closer to home, for the management of complications. In this study, we sought to evaluate the presenting concerns of patients to reconstructive urologists after masculinizing gender confirming GRS performed elsewhere. We hypothesized that a significant proportion of patients who have urological complications after masculinizing GRS present with numerous simultaneous urological findings including urethral fistula, stricture and remnant vaginal cavity.

MATERIALS AND METHODS

We performed a multi-institutional retrospective review of patients who between September 2004 and September 2017 underwent revision surgery by one of the co-authors (reconstructive urologists AJV, BV, KFR, SPE, DN, LCZ) for complications of masculinizing GRS. We collected demographic data and clinical details from outpatient and inpatient records. Inclusion criteria included history of prior masculinizing GRS, defined as metoidioplasty or phalloplasty, presentation to a reconstructive urologist for sequelae of GRS, and receipt of additional reconstructive surgery.

We collected information on baseline patient characteristics including: previous masculinizing GRS procedure, time to presentation to a reconstructive urologist, and patient-reported complaints and complications from GRS. Age at revision surgery was recorded. Patients were categorized as having had either metoidioplasty or phalloplasty based on the most recent masculinizing GRS. We assessed for presence or absence of the following at time of presentation: suprapubic tube (SPT) dependence, vaginal remnant, pars fixa urethrocutaneous fistula (UCF), phallic UCF, anastomotic urethral stricture (between the fixed and phallic urethra), phallic urethral stricture, and meatal stenosis.

Approval for the retrospective chart review was obtained from each participating institution's Institutional Review Board.

Statistical Analysis

Statistical analysis was performed using SAS version 9.4 (Cary, NC). Fisher's exact test was used to determine differences in complications by primary GRS type, with Bonferroni correction for multiple comparisons. Statistical significance was defined as $P < .05$.

RESULTS

Fifty-five patients who underwent reconstructive surgery from September 2004 to September 2017 for complications of masculinizing GRS were identified. Fifteen (28%) patients had metoidioplasty. Forty (73%) had phalloplasty, including four patients with a history of metoidioplasty converted to phalloplasty prior to presentation, and two with prior metoidioplasty, followed by phalloplasty without incorporation of prior metoidioplasty into phalloplasty. The median patient age at time of surgical revision was 33 years (range 17-60). The median time from the date of GRS to presentation to a reconstructive urologist was 4 months (range 1-84 months, interquartile range 3-8).

Nearly half of patients (n = 27) were dependent on a suprapubic tube at time of presentation. There was no difference in the rate of SPT presence based on type of prior GRS.

Patients had a median of 2 concurrent complications (range 1-5). Twenty-three patients (42%) had greater than 2 complications and 14 (26%) had more than 3 concurrent complications. Table 1 details the presenting complication stratified by initial GRS type. Vaginal remnant was present in 26 (47%) patients overall. All patients had a UCF, stricture/meatal stenosis or both. The majority had a stricture or meatal stenosis (n = 47, 86%), most commonly an anastomotic stricture between the pars fixa and phallic urethra (n = 35, 66%). Urethrocutaneous fistulae were present in 56% (n = 31), arising at roughly equal rates from the phallic (n = 17, 31%) and fixed urethra (n = 17, 31%).

After adjusting for multiple comparisons (Bonferroni correction), there was no difference in presenting complication rates across all categories based on the initial GRS type other than meatal stenosis (Table 1). The rate of meatal stenosis was lower among primary metoidioplasty only patients (n = 2, 13%) vs phalloplasty patients (n = 25, 63%) ($P = .002$).

Urethral strictures were repaired using a number of techniques across the 7 centers, based upon the location and size of the

Table 1. Baseline characteristics and presenting complications stratified by initial gender confirming surgery type

	Metoidioplasty (n = 15)	Phalloplasty (n = 40)	Total (n = 55)	*P Value*
Age at revision surgery (median, range)	38 (28-60)	32 (17-60)	33 (17-60)	
Time to presentation (months) (median, range)	4.5 (2-72)	4 (1-84)	4 (1-84)	
SPT present	3 (20.0)	24 (60.0)	27 (49.1)	0.014
Vaginal remnant	4 (26.7)	22 (55.0)	26 (47.3)	0.076
Urethrocutaneous fistula				
Fixed UCF	4 (26.7)	13 (32.5)	17 (30.9)	0.754
Phallic UCF	8 (53.3)	9 (22.5)	17 (30.9)	**0.047**
Any UCF	12 (80.0)	19 (47.5)	31 (56.4)	**0.037**
Urethral stricture or stenosis				
Phallic urethral stricture	2 (13.3)	17 (42.5)	19 (34.5)	0.058
Anastomotic stricture	8 (53.3)	28 (70.0)	36 (65.5)	0.341
Meatal stenosis	2 (13.3)	25 (62.5)	27 (49.1)	**0.002***
Any stricture or stenosis	10 (66.7)	35 (92.1)	45 (84.9)	0.032

Values presented as n (%).
Values in bold represent $p < 0.05$; *Meatal stenosis still significant after Bonferonni correction (adjusted $P < .05$).

stricture, as well as surgeon preference. These included: DVIU, perineal urethrostomy, stricturoplasty, anastomotic urethroplasty, dorsal or ventral inlay or onlay of buccal mucosa graft urethroplasties, staged urethroplasty with buccal mucosa graft, rotational fasciocutaneous flaps, and various meatoplasty techniques. Additional coverage was also addressed with a number of flaps including gracilis, vaginal, Martius and rectus flap. The vaginal remnants were typically managed with excision and repeat attempt at vaginal cavity closure, though the approaches (robotic vs perineal) varied based upon surgeon preference.

DISCUSSION

In this retrospective review of complications following masculinizing genital reconstructive surgery, we describe a range of common sequelae requiring surgical correction. We present a relatively early timeline for these presentations to another reconstructive surgeon, though some presented many years after primary GRS.

The short timeframe from initial surgery to revision by an alternate surgeon suggests that even in the immediate postoperative period, patients may not routinely seek surgical follow-up with their primary surgeons. Few centers worldwide offer metoidioplasty and phalloplasty; due to geographic and cost constraints, patients may have difficulty maintaining a close follow-up at the same centers after GRS. Patients should be counseled that the potential for operative complications persists years after the initial operation, but that the initial 4 months after surgery is a common interval for additional intervention. Patients should ensure their access to a reconstructive urologist, accordingly.

In this study, all 55 patients (100%) presented due to some form of urethral complication (fistula and/or stricture/meatal stenosis) requiring surgery. Anastomotic stricture was the most common finding (66%, n = 36). This is consistent with contemporary reports of urethral complications after masculinizing GRS. Urethrocutaneous fistulae, reported in 22%-75% of radial forearm free flap (RFFF) phalloplasties, are often located immediately proximal to a stricture.[16-18] Among the 31 (56%) patients who had UCF, all had a concurrent urethral stricture. UCF may be less difficult to manage than stricture, with a spontaneous closure rate of up to 35%.[19]

The heterogeneity in urethroplasty and fistula repair techniques among our 7 reconstructive urologists highlights: (1) the variation in techniques for primary masculinizing GRS, (2) the broad range of potential urethral complications, in etiology, location and severity, and (3) the lack of standardized approaches to address these. A patient who underwent primary prelamination of the neophallic urethra with buccal mucosa graft harvested from bilateral cheeks, for example, may no longer have buccal graft available for stricture repair. Patients who have undergone multiple attempts at prior urethral repair have progressively fewer options for reconstruction. In the limited literature on the repair of postphalloplasty strictures or fistulae, the techniques are based upon those developed for urethroplasty in cisgender individuals; however, given the limited vascular supply to the neourethra in the transmasculine individual, surgical repair is associated with far lower success rates, and more aggressive measures may be needed for the secondary flap coverage.[17,20-23]

Rates of vaginal remnant after colpectomy and subsequent management techniques are rarely reported in the literature. Vaginal remnant was discovered in 47% of patients in our study (n = 26). Techniques for primary vaginectomy vary from mucosal cauterization to formal mucosal excision and closure using perineal or laparoscopic/robotic-assisted approaches.[24,25] If the mucosa is incompletely resected yet the introitus surgically closed, re-epithelialization can lead to accumulation of secretions into a draining sinus or mucocele. Remnants may become incorporated into the urinary tract as ventral false passages or diverticulae, potentially leading to fistulae in the presence of distal obstruction. Symptoms may also include obstructive voiding, urinary leakage, perineal pain, and recurrent urinary tract infections.[25] Several studies have indicated that colpectomy lowers urethral fistula rates after phalloplasty and metoidioplasty.[13,26]

Treatment of vaginal remnants typically includes complete excision with simultaneous closure of associated fistulous tracts from the neourethra. As with treatment of postphalloplasty urethral stricture, there is no consensus as to the best technique for managing these symptomatic remnants. Excision of recurrent vaginal tissue is treacherous given proximity to adjacent bowel, rectum, the bladder and urethra. Robotic-assisted vaginal remnant excision has emerged as an alternative to the perineal approach with the potential for improved exposure and lower blood loss, while avoiding violation of the perineal closure.

Our findings must be interpreted in the context of our study's limitations: the use of retrospective data, the small number of patients, and incomplete operative details from other institutions. Only the data captured in the medical record were available for collection and are subject to selection bias. Data on individuals with nonoperative complications were not available. However, our aim was to describe which types of masculinizing GRS complications prompt presentation to a reconstructive urologist and require additional surgery, and to understand the timing of these presentations after surgery. Because all primary GRS were performed at other centers, the details surrounding surgical technique were not consistently available and varied widely. Thus, we cannot make conclusions about technical risk factors for complications, other than stating the associations between primary GRS type and surgical complication within this small cohort.

These limitations notwithstanding, we describe a unique cohort of patients requiring surgical intervention with reconstructive urologists who were not their primary surgeons, many within a short duration from their primary surgery. This study highlights the need for thorough preoperative counseling on timing, signs and symptoms of urethral complications, and for emphasis on long-term local follow-up of transgender patients who undergo masculinizing GRS. Despite the growing number of centers that offer GRS, many patients still travel long distances across the United States and globally to access these services. Surgeons should consider providing traveling patients with comprehensive procedural details which may assist in their subsequent care. Our findings highlight the need for reconstructive urologists who are prepared to evaluate and treat patients who present with complex surgical needs following GRS.

CONCLUSION

There is a wide spectrum of sequelae after masculinizing GRS that require operative intervention. Patients present with complications to reconstructive urologists early after GRS performed elsewhere. Prior to metoidioplasty or phalloplasty, patients must understand that urethral complications can arise in the months immediately following surgery and should be counseled regarding potential need for additional surgical intervention.

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EDITORIAL COMMENT

The interest in and use of reconstructive urologic procedures for affirmation of gender interventions is increasing in both the numeric frequency of these surgeries and centers providing this care. This article presents an increasingly frequent scenario, that being the need for revision surgery or management of complications of primary surgery done at other institutions seen de novo by urologic and reconstructive surgeons. It would be reasonable to assume that the experience of this center is being encountered and repeated in multiple other centers in this country. Not surprisingly, these authors encountered urethral complications as being the most commonly encountered for male assignment procedures. Of this group of complications, urethral strictures were most frequently encountered followed by urethra-cutaneous fistulae. Some patients also had problematic vaginal remnants that required intervention. Interestingly, these complications often occurred together thus complicating the overall presentation.

This paper underscores the importance of experienced surgeons, in experienced centers, performing these procedures. These reconstructive specialists should also have the ability to provide comprehensive care and most importantly manage their personal complications. Many general and reconstructive urologists are now seeing patients with complications emanating from other centers with the expectation that management occur. This scenario can be very complicated given the fact that a preexisting relationship with of the patient, with an informed awareness of complications as explained by the operating surgeon, has not actually taken place with the remediating surgeon. The risk for dissatisfaction with any intervention, even those meant to temporize, until more optimal circumstances exist for formal revision therefore can be quite significant. It is incumbent on centers that perform these interventions to ensure patient awareness of the critical need for durable follow-up by the original reconstructive surgeon.

This paper, by design, does not mention feminizing genitoplasty and attendant complications. It is to be noted that these complications are also occurring more frequently, often specifically related either neovaginal creation and/or external genital cosmesis.

Informed consent is a critical aspect of the management of these patients as is the communication of reasonable expectations as "perfection" of the result is a difficult bar to attain under the circumstances of major reconstructive surgery. The above-noted urethral complication experience has been noted both historically and now in more recent publications and therefore should be a foundational concept in any informed consent dialectic.

The overriding message of these findings is the importance of preoperative planning, intervention by a skilled reconstructive surgeon who has had prior experience with these procedures and the awareness by the patient that complications are frequent, even in the best hands. These complications can result in a significant quality of life impact and over all dissatisfaction with the final result. In summary, this paper underscores the lack of an adequate quality of life assessment for these individuals and lacking that we are unable to determine the overall impact of the complications and the success of the procedure.

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