

## Incidence and Predictors of Complications due to Urethral Stricture in Patients Awaiting Urethroplasty



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### Abbreviations and Acronyms

CIC = clean intermittent catheterization

LUTS = lower urinary tract symptoms

SPC = suprapubic catheter

UTI = urinary tract infection

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**Purpose:** We examined the incidence and predictors of complications due to urethral stricture in patients awaiting urethroplasty.

**Materials and Methods:** We retrospectively reviewed the charts of patients who underwent urethroplasty from 2009 to 2013. The primary outcome was complications, defined as any unplanned interaction with the health care system due to urethral stricture during the period between the decision to perform surgery and urethroplasty.

**Results:** A total of 276 patients were identified for analysis. Median stricture length was 4.0 cm and 67.4% of strictures were in the bulbar urethra. The most common stricture etiologies were idiopathic in 47.8% of cases and traumatic in 15.9%. Overall 15.9% of patients presented with a complication with a median time to complication of 43 days. Median surgical wait time was 151 days. Complications included urinary tract infections in 56.8% of patients, acute urinary retention in 20.5%, genitourinary pain in 5.8% and catheter related issues in 15.9%. Univariate analysis suggested that catheter dependent status, number of prior endoscopic treatments, a hypospadias and/or trauma etiology, and prior urethroplasty were potential significant predictors of complications. Multivariate analysis yielded only catheter dependent status (HR 5.2, 95% CI 2.4–11.3,  $p < 0.0001$ ) and prior failed urethroplasty (HR 1.6, 95% CI 1.1–2.3,  $p = 0.03$ ) as significantly associated with complications.

**Conclusions:** To our knowledge our study is the first to examine and quantify the morbidity of urethroplasty wait time. Approximately 16% of patients experienced a complication while awaiting urethroplasty. The optimal wait time should be less than 43 days. Patients with prior urethroplasty and catheters at the time of the surgical decision should be prioritized as they may be more likely to experience complications.

**Key Words:** urethral stricture, waiting lists, complications, urinary tract infections, urinary catheterization

URETHROPLASTY is the most definitive treatment of urethral stricture, especially strictures for which endoscopic measures have failed.<sup>1,2</sup> Despite these well established outcomes urethroplasty is under performed relative to temporizing measures such as direct visual internal urethrotomy.<sup>3–6</sup> Reasons include lack of

access to a urethroplasty surgeon, repeat management by conservative measures or concerns about urethroplasty complications.<sup>6</sup>

The AUA (American Urological Association) guidelines on male stricture disease recommend considering urethroplasty after the failure of 1 endoscopic treatment or in

patients at high risk for recurrent stricture.<sup>7</sup> Additionally, these guidelines recommend that surgeons who do not perform urethroplasty should offer patients referral to centers where there is urethroplasty expertise. Adherence to these guidelines may create significant urethroplasty wait times at high volume centers, especially in regions with universal health care systems such as Canada or Europe. As a result of this wait there is the potential to incur further complications from the urethral stricture, including acute urinary retention, urinary tract infection, worsening symptoms and acute renal failure.

We hypothesized that there is a risk of complications due to urethral stricture in patients awaiting urethroplasty. The objective of this study was to examine the incidence and predictors of complications due to urethral stricture in patients awaiting urethroplasty. To our knowledge this represents the first study to date to examine and quantify the morbidity of urethroplasty wait times.

## METHODS

We retrospectively reviewed the charts of patients who underwent urethroplasty from September 2009 to 2013 at a single tertiary care center. Appropriate ethics approval was obtained from our institutional review board. The study primary outcome was complications related to urethral stricture, defined as any unplanned interaction with the health care system due to the urethral stricture during the period between the decision for surgery and urethroplasty. These complications included treatment for a symptomatic UTI, lower tract urolithiasis, acute urinary retention, acute genitourinary pain and catheter related complications, including a blocked catheter, a dislodged catheter and infection at the catheter site. A UTI was considered evidence of pyuria and a positive urine culture with symptoms of infection was treated with an antibiotic prescription.

The records of all urology related emergency room visits, urine cultures obtained and antibiotics prescribed in the province were examined in addition to the electronic health records of all urologists at our center. To minimize missed complication events patients outside the immediate regional health authority were excluded from study.

Univariate analysis was done to assess for factors associated with the development of complications. Multivariate analysis was then performed based on the results of univariate analysis to determine significant independent predictors of complications. Multivariable covariates were chosen based on significance or close to significance on univariate analysis. Kaplan-Meier regression modeling was done to demonstrate freedom from complication as a function of time. All statistical tests were 2-sided with  $p < 0.05$  considered statistically significant. All analysis was performed on IBM® SPSS®, version 24.0.

## RESULTS

Overall 276 patients were included in analysis. Table 1 lists baseline patient and stricture characteristics. Median stricture length was 4.0 cm (95% CI 3.0–5.0). The most common etiology was idiopathic, which was noted in 132 of the 276 patients (47.8%), followed by trauma in 44 (15.9%) and lichen sclerosus in 33 (12.0%). Regarding catheter status, patients were only considered to have a catheter if they had one at the time of the decision to perform surgery but not if they required one due to urinary retention during the waiting period.

Table 1 lists complications experienced during the waiting period between the decision to perform urethroplasty and the date of urethroplasty. Median wait time for urethroplasty was 151 days (95% CI 85–214) and median time to the complication was 43 days (95% CI 21–92). Of the 276 patients 44 (15.9%) experienced at least 1 complication. The most common complication was UTI in 25 of the 276 cases (9.1%), followed by catheter specific issues in 7 (2.5%), acute urinary retention in 9 (3.3%) and genitourinary pain in 3 (1.1%).

**Table 1.** Patient and stricture demographics, and complications while awaiting urethroplasty

No. pts	276
Median age (95% CI)	44 (31–56)
Median cm stricture length (95% CI)	4.0 (3.0–5.0)
No. stricture etiology (%):	
Idiopathic	132 (47.8)
Trauma	44 (15.9)
Lichen sclerosus	33 (12.0)
Radiation	11 (4.0)
Hypospadias	17 (6.2)
Iatrogenic	30 (10.9)
Infectious	9 (3.3)
No. stricture location (%):	
Penile	42 (15.2)
Bulbar	186 (67.4)
Posterior	14 (5.1)
Penobulbar	8 (2.9)
Bulbomembranous	10 (3.6)
No. previous treatment (%):	
Endoscopic	228 (82.6)
Urethroplasty	44 (15.9)
No. prior endoscopic treatments (%):	
0	48 (17.4)
1	76 (27.5)
2–4	116 (42.0)
5–10	22 (8.0)
Greater than 10	14 (5.1)
No. catheter status (%):	
None	241 (87.3)
Self-catheterization	4 (1.5)
Suprapubic catheter	31 (11.2)
No. pts with complication (%)	44 (15.9)
Median days to complication (95% CI)	43 (21–92)
Median days surgical wait time (95% CI)	151 (85–214)
Mean No. complications/pt (95% CI)	1.2 (1.0–1.3)
No. urinary tract infection (%)	25 (9.1)
No. acute urinary retention (%)	9 (3.3)
No. genitourinary pain (%)	3 (1.1)
No. catheter related (%)	7 (2.5)

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