

A New Staging System for Anterior Urethral Strictures

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Abstract

Introduction: Currently there is no widely accepted staging system for anterior urethral strictures. We developed and evaluated the reliability of an easy to use classification system for anterior urethral strictures in men.

Methods: We devised a staging system based on cystoscopic findings of no stricture (stage 0), wide caliber stricture (stage 1), stricture requires gentle dilation with a 16Fr flexible cystoscope (stage 2), stricture cannot be dilated (stage 3) and no visible lumen (stage 4). Content validity was established by a panel of 5 urologists. On 2 separate occasions 3 urologists independently viewed videos obtained during cystoscopy and staged the tightest visible stricture. If multiple strictures were present, the stricture with the smallest visible lumen was used for the purpose of this study. All men who had undergone cystoscopy at our institution between 2011 and 2012 were included in the study. Exclusion criteria were poor video quality and not visualizing the entire urethra during cystoscopy.

Results: A total of 101 videos of consecutive cystoscopies were reviewed. Intra-observer agreement was 76% to 94% (Cohen κ 0.65–0.90) and interobserver agreement was 73% to 82% (Cohen κ 0.51–1.00, 0.69 overall, $p < 0.001$). The intra-observer and interobserver agreement increased for each stage, with 3 and 4 almost unanimously identified by all 3 observers (Cohen κ 0.93 and 1.00, $p < 0.001$).

Conclusions: This new staging system is simple and easy to use, and has excellent intra-observer and good interobserver reliability. The staging system provides a simple lexicon for describing the appearance of anterior urethral strictures.

Key Words: urethral stricture, diagnosis

The rate of visits to physician offices for urethral stricture disease in men ranges from 229 to 312/100,000 visits.¹ Classification systems exist for anterior and posterior urethral trauma and for urethral cancer^{2–4} but no commonly accepted staging system currently exists for anterior urethral strictures. The absence of a staging system limits precision and concision in clinical discussions describing urethral strictures due to the lack of a common lexicon.

Strictures can be subjectively described as dense, complete, partial, wide caliber or pinpoint tight. Although descriptions

can be helpful, they may not be systematically reproducible among practitioners. Currently, strictures are effectively staged with an ad hoc binary classification system in practice and in the literature with patients described as either having a stricture or not. We believe it would be more appropriate and more useful to describe strictures in a graded or staged fashion, particularly for general urologists making referrals for patients with stricture. Furthermore, comparing surgical outcomes for strictures is difficult without a common staging system. The use of nonstandardized outcome measures likely has a significant impact on the reported success of procedures to treat urethral strictures.⁵

Webster et al believed the 3 important factors to describe a stricture were lumen size, location (anterior or posterior) and length.⁶ We evaluated the reliability of a new, simple and easy to use classification system for anterior urethral strictures

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which currently involves only flexible cystoscopy to assess lumen size. Other aspects of the anterior stricture, including retrograde urethrogram results, length and number, as well as the amount of spongiofibrosis will be incorporated into a more detailed classification scheme in the future.

Materials and Methods

We performed a prospective, blinded study of interuser and intra-user reliability for a staging system of anterior urethral stricture disease in men. The staging system was devised by 2 of us (RSP and JGB) based on clinical experience with this entity. Content validity was established by a panel of 5 urologists, including a senior urology resident, a general urologist and 3 voiding dysfunction specialists, 2 of whom are reconstructive surgeons. All men who underwent cystoscopy at our institution between 2011 and 2012 were included in the study. We evaluated the recorded videos of routine flexible cystoscopy of consecutive men with voiding complaints or hematuria, or who were undergoing bladder cancer surveillance. Exclusion criteria were poor video quality and inability to visualize the urethra distal to the stricture.

On 2 separate occasions at least 1 month apart, 3 urologists, in the presence of a nonurologist researcher, independently viewed a video of the entire urethra obtained during diagnostic cystoscopy. The urologists were blinded to the patient and to the results of prior assessments of each patient. Video recorded flexible cystoscopy with a Stryker® 16Fr flexible cystoscope is a standard part of our practice. The urethra was classified as stage 0—no stricture, stage 1—wide caliber stricture that easily allows scope passage, stage 2—passable stricture but requires gentle dilation with a 16Fr flexible cystoscope, stage 3—impassable stricture with scope but lumen visible and stage 4—stricture with no visible lumen (figs. 1 to 4). If there were multiple strictures, the stricture with the smallest visible lumen was evaluated for the study. Spongiofibrosis, retrograde urethrogram results and

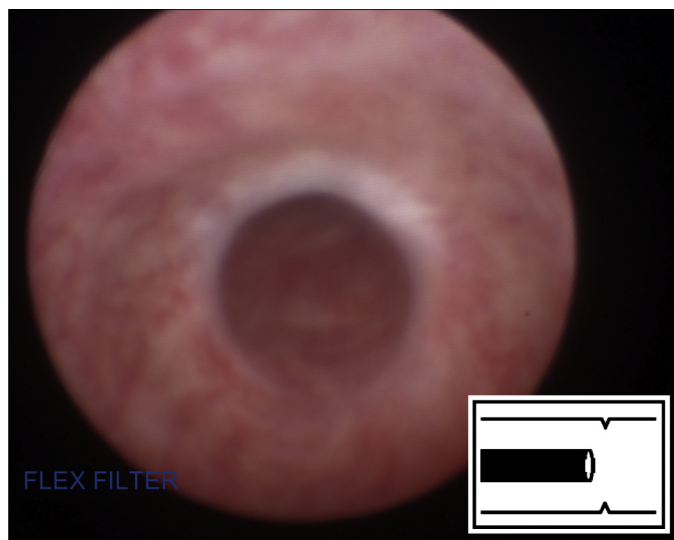


Figure 1. Stage 1

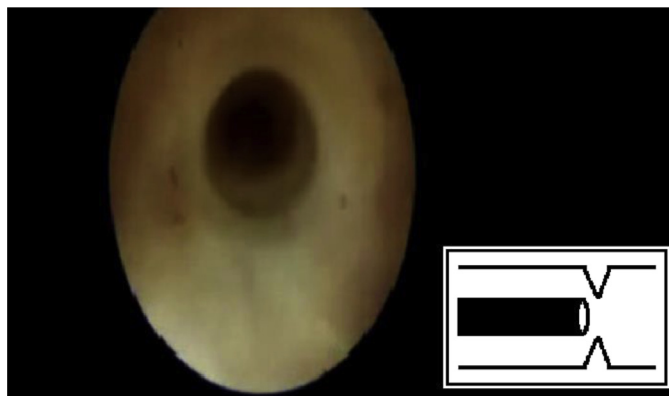


Figure 2. Stage 2

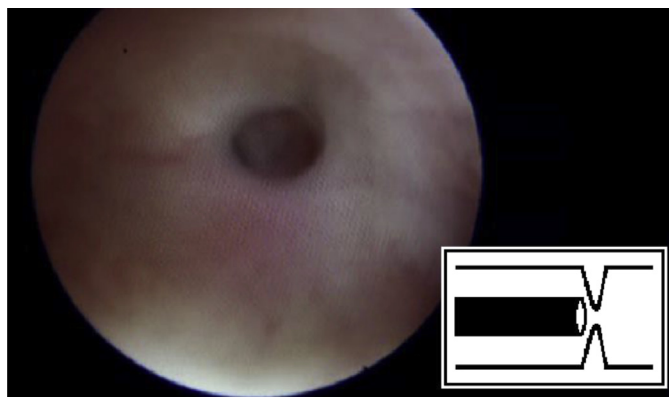


Figure 3. Stage 3

multiple strictures are not included in this initial version of the staging system.

Intra-observer and interobserver reliability was calculated with unweighted Cohen κ , a measure of reliability. Reliability was calculated to measure differences within and between observers. A κ of 0.81–0.99 is interpreted as almost perfect, 0.61–0.80 substantial, 0.41–0.60 moderate, 0.21–0.40 fair and below 0.20 poor agreement.⁷ This project was reviewed by the Cornell University internal review board.

Results

Videos of 108 consecutive cystoscopies in men were reviewed by the researcher. Five videos were excluded from study because the entire urethra was not visualized during cystoscopy and 2 were excluded because of poor video quality, leaving 101 cystoscopies for staging. Indications for cystoscopy included recurrent urinary tract infection in 3 cases, lower urinary tract symptoms in 66, hematuria in 16 and bladder cancer surveillance in 16. There was either a suspicion or known history of urethral stricture in 20 cases. The distribution of staging was stage 0 in 36 to 52 cases, stage 1 in 15 to 34, stage 2 in 7 to 12, stage 3 in 19 to 20 and stage 4 in 1. Counts are different because strictures were graded differently. Intra-observer agreement was 76% to 94% (Kappa 0.65 to 0.90) (table 1). Most disagreements were between stages 0 and 1 or stages 1 and 2. Interobserver agreement was 73% to 82% (Kappa 0.51 to 1.00, 0.69 overall,

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