

LSE: Development and Validation of a Urethral Stricture Classification System

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Objective: To develop and validate a classification system for urethral stricture disease (USD) based on retrograde urethrogram (RUG), patient history, and physical exam

Methods:

-Classification system developed from 3 useful and predictive variables

L: stricture length

S: stricture segment/location

E: stricture etiology

-Validated in a multi-step process of distributing clinical vignettes detailing stricture clinical history, physical exam findings, and a RUG to 20 reviewers (reconstructive urologists and fellows)

-Reviewers classified each vignette

-Inter-rater reliability calculated (using Light’s Kappa analysis after each step)

-Reviewer feedback and analysis of vignettes with poor agreement used to revise the classification system in an iterative fashion (3 rounds)

-Final LSE definitions agreed upon at in-person TURNS meeting

TURNS LSE Anterior Urethral Stricture Classification System

L – Length*	
1	< 2cm
2	> 2cm & < 7cm
3	> 7 cm
S – Urethra Segment**	
1	Bulbar Urethra
1a	Bulbar Urethral Stricture without Distal Bulbar Urethra involvement.
1b	Bulbar Urethral Stricture Involving the Distal Bulbar Urethra.
2	Penile Urethra
2a	Stricture involving both bulbar and penile urethral segments without involvement of the fossa navicularis and/or urethral meatus.
2b	Stricture isolated to the penile urethra without fossa navicularis or meatal involvement.
2c	Stricture isolated to the penile urethra with fossa navicularis and/or meatal involvement.
2d	Stricture isolated to the fossa navicularis and/or urethral meatus.
3	Stricture involving the meatus/fossa, penile urethra and bulbar urethra (i.e. pan-urethral stricture).
S – Modifiers	
x	Portion(s) of the Stricture with Obliterated Lumen (e.g. S1ax, S2ax)
m	Separate strictures involving two or more distinct areas of the anterior urethra (managed with separate urethroplasty techniques). (e.g. Sm1a and Sm2d)
p	Extension of stricture into posterior urethra (non-PFUDD; e.g. S1ap), or isolated non-PFUDD posterior urethral stricture (e.g. Sp)
E – Etiology ***	
1	External Trauma (e.g. known straddle injury)
2	Idiopathic/Unknown Etiology
3	Iatrogenic
3a	Internal Trauma (e.g. post TURP/TURBT stricture)
3b	Recurrent Urethral Stricture in Prior Urethroplasty Segment (excluding hypospadias repairs (E5))
3c	Radiation Induced Urethral Stricture
4	Infectious/Inflammatory (e.g. post-gonococcal)
5	Stricture in Segment of Prior Hypospadias Repair
6	Lichen Sclerosus

* Total length of the diseased urethra being managed with a single urethroplasty technique. If an m modifier is utilized, two L variable values will be listed.

** If multiple strictures are radiographically isolated but are managed with a single technique, classify as a single stricture. If the strictures are managed separately (e.g. anastomotic repair for bulbar stricture, onlay for penile repair) then the m modifier should be utilized

*** If multiple etiologies suspected/known, stage with highest numbered etiology.

Results:

-Overall Kappa= **0.79 (substantial agreement)**

Kappa:

- 0.0–0.2: indicates none to slight agreement,
- 0.2–0.4: fair,
- 0.4–0.6: moderate,
- 0.6–0.8: substantial
- 0.8–1.0: as almost perfect agreement

-Individual component kappa values increased with each validation step

- L: 0.71 to 0.72 to 0.76
- S: 0.50 to 0.56 to 0.70
- E: 0.85 to 0.98 to 0.93

Conclusions

-The inter-rater reliability of the LSE classification system was sufficiently high to be used clinically.

-Widespread use of a classification system in clinical and research endeavors will improve clinical communication, with prospective patients, and will facilitate multi-institutional outcomes studies and meta-analyses.

-This system has also now been validated in complementary studies for its ability to predict urethroplasty type and surgical outcomes.

