Male Urethral Trauma and Strictures: Evaluation and Surgical Management

The anatomy, physiology and nomenclature of urethral strictures, urethral stenoses and traumatic urethral injuries will be reviewed.

The current evidence-based recommendations for the evaluation and management of urethral strictures, urethral stenoses and traumatic urethral injuries will be reviewed in detail.

The 2014 AUA Guidelines on Urotrauma will be discussed with the focus on anterior and posterior urethral trauma.

The 2016 AUA Guidelines on Male Urethral Stricture will be discussed with the focus on anterior urethral stricture dilation, direct vision internal urethrotomy, and primary anastomotic urethroplasty as well as urethroplasty for posterior urethral injuries. The management of urethral injuries involving rectourethral fistula will also be discussed.

The audience is recommended to review the section on Urethral Trauma in the AUA Guideline on Urotrauma (https://www.auanet.org/education/guidelines/urotrauma.cfm) and the AUA Guideline on Male Urethral Stricture (https://www.auanet.org/education/guidelines/male-urethral-stricture.cfm) for more information.

Nomenclature - Anatomy

- **Urethra**
  - lumen of an epithelialized tube for the passage of urine and semen
  - from distal bladder neck to urethral meatus
- **Corpus spongiosum**
  - elastic vascularized tube like organ surrounding the anterior urethra
- **Anterior urethra**
  - surrounded by the corpus spongiosum
  - from meatus to distal membranous urethra
- **Posterior urethra**
  - from distal bladder neck to proximal bulb urethra
  - includes prostatic urethra and membranous urethra (encompasses the voluntary external sphincter mechanism)

**Anterior Urethra**

- **Meatus**
  - termination of urethra at distal end of the penis
  - “external meatus” is redundant; “meatus” is sufficient and descriptive enough
- **Fossa navicularis**
  - distal portion of penile urethra within glans penis proximal to meatus
  - “granular” urethra is part of the penile urethra; use of this term is not acceptable
- **Penile urethra**
  - from distal bulbospongiosus muscle to meatus
  - term “pendulous” is not descriptive/not acceptable; preferred term is “penile”
- **Bulbar urethra**
urethral segment enclosed by bulbospongiosus muscle
- from distal membranous urethra to proximal penile urethra
- term “bulbous” is an adjective; preferred term is a noun - “bulbar”

Posterior Urethra
- **Membranous**
  - from distal verumontanum to proximal bulb urethra
  - encompasses the voluntary external sphincter mechanism
- **Prostatic urethra**
  - from bladder neck to the distal verumontanum
  - surrounded by the prostate
- **Bladder neck**
  - **Bladder neck stenosis** with the prostate in situ
  - **Vesicourethral anastomotic stenosis** after prostatectomy
  - Bladder neck contracture /stricture is not acceptable
- **Normal anatomic description of the urethra is with the penis in the erect state**
  - **dorsal** urethra - aspect of the urethra closest to the corpus cavernosum
  - **ventral** urethra - contralateral aspect of the urethra, farthest from corpus cavernosum

**Nomenclature** – **Pathophysiology**
- **Urethral stricture**
  - is the preferred term to describe an abnormal narrowing of the anterior urethra
  - implies varying degrees of spongiofibrosis and urethral scarring
- **Spongiofibrosis** - scarring of the corpus spongiosum of varying degrees
- **Urethral Stricture Disease**
  - implies etiology
  - urethral terminology should be anatomic: first tier term to describe urethral narrowing / obliteration should be “urethral stricture”
  - “urethral stricture disease” should be reserved as a second tier term
- **Urethral stenosis**
  - “stenosis” is reserved for posterior urethral narrowing (non pelvic fracture injury) as the membranous & prostatic urethra do not have a corpus spongiosum
  - implies no spongiofibrosis
- **Urethral injury from a pelvic fracture**
  - **Pelvic Fracture Urethral Injury** (PFUI) is the preferred term
  - various injury mechanisms, results in fibrosis
  - includes urethral disruption with loss of urethral continuity
  - not a urethral stricture, does not involve spongiofibrosis
  - **Pelvic Fracture Urethral Disruption Defect** (PFUDD) is also a preferred term
  - “urethral distraction defect” is an alternative second tier term
  - “posterior urethral stricture” is a not acceptable

**Nomenclature** – **Management**
- **Urethral calibration**
  - measurement of the caliber (diameter) of the urethral lumen by various techniques
- **Dilation**
  - stretching or enlargement of urethral lumen by various techniques
  - the term dilatation is used interchangeably
- **Urethrotomy**
  - general term to describe the incision of urethral epithelium and spongiosum by either endoscopic or open techniques

- **Internal urethrotomy**
  - endoscopic urethrotomy performed with or without visual guidance
  - **direct vision internal urethrotomy (DVIU)** - an endoscopic visually guided incision of the scarred urethra using various techniques; preferred term
  - second tier terms: optical urethrotomy (OIU), visual internal urethrotomy (VIU)

- **Onlay** - expanding the caliber of the urethra with a tissue graft or flap

- **Inlay** - not an acceptable term

- **“Excision and Primary Anastomosis” urethroplasty**
  - narrowed urethral segment & corresponding spongiofibration is excised, with reapproximation of the two healthy ends
  - most descriptive, accurate and appropriate term
  - “anastomotic urethroplasty” should be reserved as a second tier term
  - “end to end” should be reserved as a third tier term

- **Posterior Urethroplasty**
  - reconstruction of the posterior urethra by various techniques
  - includes subcategory: anastomotic repair for PFUI / PFUDD

- **Augmented Urethroplasty** - urethral reconstruction with tissue graft or flap

- **Substitution Urethroplasty** - urethral reconstruction with tubularized tissue

- **Graft**
  - tissue transfer technique of healthy tissue harvested from one part of the body, transferred to another in order to replace diseased or injured tissue
  - without its own blood supply, relies on diffusion from host bed for initial survival
  - further description of grafts are based on their anatomic donor site of origin

- **Flap**
  - tissue transfer technique of transferring healthy tissue on a vascular pedicle from one part of the body to another in order to replace diseased or injured tissue

- **Augmented Anastomotic Urethroplasty**
  - urethroplasty technique where the urethral stricture is excised, a portion of the urethra is anastomosed (either ventral or dorsal), and a graft or flap is placed on the contralateral side to complete the urethroplasty