Internal Urethrotomy, Dilation and Stenting for Anterior Urethral Strictures

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Objectives:

• Evaluate and document location and extent of stricture disease to improve treatment and reduce recurrences

• Confidently offer open surgical repairs reducing repetitive endoscopic procedures and improving outcomes

• Evaluate urethral trauma/disruption and offer definitive surgical options

• Counsel patients on endoscopic and open approaches and outcomes; and develop treatment plan with the patient

• No relevant financial relationships to disclose
Internal Urethrotomy/Dilation

- Goal: to obtain a patent urethra for unobstructed voiding through a minimally invasive procedure without the need for further intervention

- Concept: Re-epithelialization across the incision/dilation will proceed faster than wound contracture

- 1974, Sachse DVIU
Practice Patterns

ICUD International Committee: Urethral Stricture Disease

- Internal Urethrotomy, Dilation and Stenting for Anterior Urethral Stricture
- Marrakech, Morocco

Jill C. Buckley, USA Co Chair
Chris Heyns, South Africa Co Chair
Peter Gilling, New Zealand
Jeff Carney, USA
IU/Dilation vs. Open Urethroplasty

- Fast
- Simple
- Minimally Invasive
- Minimal Morbidity
- Lack of Resources and Expertise for Reconstruction
- Low cost burden
  - Time away from work
  - Out patient/Office
  - Can be done under local anesthesia
Literature Review

- Conflicting and Wide Range of Results
- Diverse patient population
  - non matched patients for age, etiology, location, length
- Techniques vary- single, multiple incisions, cold knife, laser, dilation
- Definition of success—symptoms, flow rate, imaging, cystoscopy
- Duration of follow up--varied and short
Evidence of IU/Dilation

- No level I data
- One level II Study
  - Equivalent Efficacy
  - Incremental increases in stricture length lead to higher failure rates
- Recommend: Initial Dilation for stx <2cm, >4cm urethroplasty, 2-4cm trial of IU/Dil

Evidence of IU/Dilation

• Heyns 1998
  • Time to Recurrence and Long-term Outcomes
  • Recurred <3 months: a 2nd IU had only a 30% SFR at 24 months and 0% 48 months
  • 3rd IU had a 0% Success

Evidence of IU/Dilation

- **Level III-varied, many small**
- **Pansadoro 224pt**
  - Median follow up of 98 months for short strictures
  - Stricture Recurrence Rate overall 68%
    - Location bulb 58%, penile 84%, penoscrotal 89%
    - Length <1 cm vs. > 1cm 29% vs. 82% recurrence
    - Primary vs. Repeat IU 53% vs. 100% recurrence
    - Single vs. Multiple 50% vs. 84% recurrence
    - Lumen diameter >15fr vs. <15fr 31% vs. 66%

- **Albers 580pt**
  - F/up 3.2yrs
  - Length, penile location, and multiple strictures had a much higher recurrence rate

Evidence of IU/Dilation

- Best Rx: ~60-70% success
- Bulbar Urethra
- Short <1cm
- Single stricture
- Primary treatment
- Caliber >15F
Endoscopic Outcomes

~50% < 1-2cm bulbar strictures

* Steenkamp--no difference between dilation and dviu (equally sized groups)

Wright et al, Decision Analysis for 1-2 cm Bulbar Urethral Strictures, Urology 2006,
* Roehrborn & McConnell, Analysis of Factors Contributing to Success Or Failure of 1 Stage Urethroplasty For Urethral Stricture Disease
Cost Effective Management of Bulbar Urethral Strictures

- The most cost-effective strategy for the management of short, bulbar urethral strictures is to reserve urethroplasty for patients in whom a single endoscopic attempt fails.
- For longer strictures for which the success rate of IU is expected to be less than 35%, urethroplasty as primary therapy is cost-effective.

Wright J et al. 2006 Urology, Rourke K et al. 2005 J Urol.
Laser IU

- Variety of different lasers
  - Argon, Excimer, Diode, KTP, Nd:YAG, Holmium, Thulmium
- The various wavelengths, energy sources and tissue penetration
- Similar success to IU/Dilation
- Cost of laser IU >> cold knife with no proven benefit
IU + CIC

- It has not been shown to have any benefit over IU alone

- It can be done in conjunction with IU but should be considered a palliative maneuver to keep the urethra open
Repeat IU/Dilation

• Much Lower Stricture Free Rate
• Can adversely effect outcomes of future Urethral Reconstruction
• Becomes less cost efficient than urethroplasty
• Palliative

Prior treatment has a profound effect on the outcome of single stage urethroplasty..... failure rate doubled overall when the patients had a previous manipulation for the stricture... *
Recommendation

• **Primary IU/Dil- (LE II/III)**
  - **Grade A**: short <1cm, bulbar location, single stricture, primary treatment, caliber >15f
  - Grade C: all urethral strictures

• **Second IU/Dil- (LE II/III) Grade B**
  - short <1cm, bulbar location, single stricture, caliber >15F

• **Third IU/Dil- (LE II/III) Grade A**
  - Is not recommended except if necessitated by patient comorbidities or economic resources
Urethral Stents

- 1988 WallStent-permanent
  - Originally approved for the bulbar urethra
  - Early results - patency 52%-86% at 24months
  - Patency continued to decline over time
  - 45% patency rate at mean 77 months

Urethral Stent Complication

- 55% had stent related complications
- 45% requiring surgical intervention
  - perineal pain, post voiding dripping, incontinence, stent migration, stent obstruction and recurrent strictures proximal and distal to the stent

1. Inferior Success
2. Incontinent
3. Painful
Urolume Extraction
Inter-operative Sono urethrogram

Distal

Proximal
Urolume Extraction
Dorsal Onlay Urethroplasty
Follow Up

- Cystoscopy
  - widely patent urethra
- QOL
  - Pre= 5 Post= 1 (Pleased)
- IEFF
  - Pre= 24, Post=24

Results of UROFLOWMETRY

- Voiding Time: T100 = 56 s
- Flow Time: TQ = 53 s
- Time to max Flow: TQmax = 2 s
- Max Flow Rate: Qmax = 57.1 ml/s
- Average Flow Rate: Qave = 6.5 ml/s
- Voided Volume: Vcomp = 342 ml
Temporary Urethral Stent

- Removable
  - MemoKath
  - Urocoil
  - Available but no literature to make a recommendation for their use in the anterior urethra

- Biodegradable
  - Self Expanding
  - +/- drug eluting
  - Still experimental

Isotalo et al, 2002 J of Endourol, Isotalo et al., J of Urol 1998, Kotsar et al., 2008 BJU1
Urethral Stenting Recommendation

- Grade B:
- Permanent urethral stenting is not recommended for routine therapeutic management of any anterior urethral stricture for any patient considered a surgical candidate.
Recommendation

• Open Reconstruction Consider as Primary Management- (LE II/III) **Grade B**
  • Pendulous and penobulbar
  • Long stricture
  • Multiple strictures
  • Early stricture recurrence <6 months
  • Refactory to 2nd IU
  • Complete Urethral Obliteration
Factors Effecting Management

- Location
- Length
- Etiology (lichen sclerosus, hypospadias, radiation)
- Density—Diameter
- Spongiofibrosis
- Prior treatment
Delong J, Buckley J. Patient-reported outcomes combined with objective data to evaluate outcomes after urethral reconstruction. Urology. 2013 Feb;81(2):432-6
Methods

- IRB approved database queried
  - 110 consecutive patients
- All patients seen at 3, 6, and 12 months
  - Yearly thereafter
- Cystoscopy performed at 6 months
- Each patient used as own control
Methods

110 patients

32 (29%) Anastomotic

60 (55%) Onlay

11 (10%) Fasciocutaneous Flap

7 (6%) Staged

IIEF, AUASS, QOL, FR, PVR, Cysto
## Results - Demographics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Result</th>
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<tbody>
<tr>
<td>Age (range)</td>
<td>46.8 (17-81) years</td>
</tr>
<tr>
<td>&lt;45y</td>
<td>49 (46%)</td>
</tr>
<tr>
<td>≥45y</td>
<td>57 (54%)</td>
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<tr>
<td>Data available</td>
<td>90% (complete pre op / post op data)</td>
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<tr>
<td>Follow up</td>
<td>1 year</td>
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Follow up 1 year
Results - AUASS

Median improvement of 14

p<0.0001
Results - QOL

Median improvement of 4

p<0.0001
Results – IIEF All Ages

![Bar chart showing IIEF scores before and after treatment with a p-value of 0.2155.](chart.png)
Results – Flow Rate

Median improvement of 12 cc/sec

p<0.001
PVR – Preop >150cc

Median improvement of 243 cc

p<0.001
Success Rate at 1 year

- 94% Stricture Free Rate
- Able to pass 17fr flexible cystoscope
- No recurrence of symptoms (AUA, QOL, IEFF)
- No significant change in uroflow parameters (FR/PVR)
Summary

• Patients reported significant **qualitative symptom and QOL improvement** after urethral reconstruction

• **Erectile Function – no change overall**
  • Patients <45yrs old have a <1% risk of ED
  • 8 patients had significant improvements in erectile function

• Valuable for patient education and counseling
Thank you
Anterior Urethral Reconstruction

- Anastomotic Urethroplasty
- Graft
- Flap
- Augmented Urethroplasty-Combined Techniques
  - multiple strictures, panurethral stricture, complete obliteration
- Staged Repair