Risk Factors for Post Prostatectomy Incontinence and Stricture

Up to Date Symposium on Uro-Oncology

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New York, NY
Outline

• Scope of problem

• Anastamotic Strictures
  – Demographic Factors
  – Technique-related factors

• Post Prostatectomy Incontinence
  – Demographic factors associated with PPI
  – Disease specific factors
  – Technique-related factors
  – Post-operative maneuvers

• Conclusion
Post Prostatectomy Anastomotic Stricture
Scope of Problem – Anastamotic Strictures

- Bladder Neck Contractures occur in 2-30% of patients post-prostatectomy*
- Lead to significant morbidity and additional procedures#
- Relationship to urinary incontinence$
- Large impact of changes in surgical technique

* Elliot, et al. Incidence of Urethral Stricture after Primary Treatment of Prostate Cancer: Data from CaPSURE , J Urol 2007
# Urologic Diseases of America Project 2007
$

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Incidence of Urethral Stricture After Primary Treatment for Prostate Cancer: Data From CaPSURE

Sean P. Elliott, Maxwell V. Meng, Eric P. Elkin, Jack W. McAninch, Janeen Duchane, Peter R. Carroll and the CaPSURE Investigators

From the Department of Urologic Surgery, University of Minnesota (SPE), Minneapolis, Minnesota, Department of Urology and University of California-San Francisco Comprehensive Cancer Center, University of California-San Francisco, San Francisco, California (MVM, EPE, JWM, PRC), and TAP Pharmaceutical Products, Inc. (JD), Lake Forest, Illinois

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8.4% of 3310 patients who underwent RP
Demographic Factors

- Age
- Obesity
- Medical Comorbidities
- Previous TURP
- Previous RT

* Borboroglu, Risk Factors for Vesicourethral Anastomotic Strictures after Radical Prostatectomy, Urology 2000
Age shown to be related to anastomotic stricture

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<table>
<thead>
<tr>
<th>Table 4. Cox proportional hazards model</th>
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</thead>
<tbody>
<tr>
<td>Primary treatment:</td>
<td>HR (95% CI)</td>
</tr>
<tr>
<td>p Value (Pearson’s chi-square test)</td>
<td></td>
</tr>
<tr>
<td>RP vs WW</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>RP+EBRT vs WW</td>
<td>0.1086</td>
</tr>
<tr>
<td>Cryotherapy vs WW</td>
<td>0.2044</td>
</tr>
<tr>
<td>BT vs WW</td>
<td>0.4297</td>
</tr>
<tr>
<td>BT+EBRT vs WW</td>
<td>0.0231</td>
</tr>
<tr>
<td>EBRRT vs WW</td>
<td>0.3905</td>
</tr>
<tr>
<td>Hormone vs WW</td>
<td>0.5130</td>
</tr>
</tbody>
</table>

Age at primary treatment:
- 60-69 vs Younger than 60
- 70+ vs Older than 60

BMI:
- Overw vs not overw
- Obese vs not obese

Kaplan-Meier analysis of failed stricture treatment stratified by treatment modalities for prostate cancer. Y axis is shown at 0% to 10%. 

- 3310 RP
- Risk Factors
  - age >70
Obesity also related

- BMI > 25 – HR 1.4
- BMI > 30 – HR 2.3
Technique related factors

- Excessive EBL*
- Postoperative hematoma*
- Urinary extravasation*
- Surgeon experience/volume#
- MIS v/s open$

# Begg, et al, Variations in Morbidity after Radical Prostatectomy, NEJM 2002
$ Hu, et al, Comparative Effectiveness of Minimally Invasive vs Open Radical Prostatectomy, JAMA 2009
• 4592 cases between 1997 and 2007 – single center

• Open in 75%, MIS in 25%

• 4.3% developed AS at median 3.5 months post RP
• **Risk Factors Evaluated (4592 cases)**
  
  - Age
  - BMI
  - Ethnicity
  - Charson score and Individual comorbidities
  - ASA score
  - History of Prior TURP
  - PSA
  - Clinical Stage
  - Biopsy Gleason Score
  - Specimen Weight
  
  - EBL
  - Operative Time
  - Surgeon
  - Surgeon Experience
  - Presence of Postoperative Hematoma
  - Presence of Postoperative Anastomotic Urine Leak
- Age (HR 1.03)
- Charlson Score (1.3)
- BMI (1.07)
- Type of Surgery – MIS (0.11)
- Renal dz (4.3)
- Postop anastomotic leak (2.3)
- Postop hematoma (2.8)
Post Prostatectomy Incontinence
Scope of Problem - Incontinence

- High rate of urinary incontinence after RP (up to 48%)#^  
- Roughly half seek treatment  
- Growing pubic awareness  
- Multiple factors proposed to impact subsequent urinary continence

Natural History

Achieving Optimal Outcomes After Radical Prostatectomy

Jeffery W. Saranchuk, Michael W. Kattan, Elena Elkin, A. Karim Touijer, Peter T. Scardino, and James A. Eastham

Grade Description

Continence
1. Continent (no pads)
2. Mild SUI (leak only during heavy activity/1-2 pads per day)
3. Moderate SUI (leak with moderate activity/3-4 pads per day)
4. Severe SUI (leak with normal activity, dry at night or at rest)
5. Total incontinence (continuous leakage at rest)

87% continent at 1 year
93% continent at 2 years

Fig 3. Probability of attaining full continence was 87% at 1 year and 93% at 2 years.
Demographic Factors

- Age
- BMI/physical activity
- Prostate volume
- Previous TURP
- Medical comorbidities
- Previous LUTS
- Membranous urethral length
581 consecutive patients

- Risk factors – Pt age, Anastomotic Stricture, Nerve resection, Anastomotic Technique
Membranous urethral length associated with continence recovery

211 patient – 180 evaluable

Urethral length - 14 mm
• Preoperative prostate MRIs from 2001-2004
  • 1.5 T
  • Endorectal coil utilized

• Out of 967 patients, 600 met inclusion
  • 6 and 12 month continence data (defined as no pad use)
  • Adequate MRI fidelity
• Urethral Width
• Inner Levator Distance
• Outer Levator Distance
• Urethral Length
• Urethral Volume
• Prostate Width
• Prostate Length
• Prostate Height
• Prostate Volume
• Prostate Depth
• Bony Width
• Lower Conjugate
• Mid Pelvic Area
• Symphysis Angle
Multiple soft-tissue measurements associated with continence

<table>
<thead>
<tr>
<th>Variable</th>
<th>Continence at 6 months</th>
<th>Continence at 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>Urethra width (mm)</td>
<td>1.02</td>
<td>0.935, 1.11</td>
</tr>
<tr>
<td>Urethra length (mm)</td>
<td>1.08</td>
<td>1.02, 1.13</td>
</tr>
<tr>
<td>Outer levator (mm)</td>
<td>0.952</td>
<td>0.910, 0.995</td>
</tr>
<tr>
<td>Inner levator (mm)</td>
<td>0.947</td>
<td>0.895, 1.00</td>
</tr>
<tr>
<td>Prostate width (mm)</td>
<td>0.998</td>
<td>0.968, 1.03</td>
</tr>
<tr>
<td>Prostate length (mm)</td>
<td>0.985</td>
<td>0.957, 1.01</td>
</tr>
<tr>
<td>Prostate height (mm)</td>
<td>0.988</td>
<td>0.968, 1.01</td>
</tr>
<tr>
<td>Prostate depth (mm)</td>
<td>0.994</td>
<td>0.971, 1.02</td>
</tr>
<tr>
<td>Bony width (mm)</td>
<td>0.999</td>
<td>0.974, 1.03</td>
</tr>
<tr>
<td>Lower conjugate (mm)</td>
<td>0.988</td>
<td>0.969, 1.01</td>
</tr>
<tr>
<td>Symphysis angle (degree)</td>
<td>1.01</td>
<td>0.973, 1.04</td>
</tr>
<tr>
<td>Levator thickness (mm)</td>
<td>0.968</td>
<td>0.883, 1.06</td>
</tr>
<tr>
<td>Urethra volume (per 100 mm)</td>
<td>1.04</td>
<td>1.01, 1.08</td>
</tr>
<tr>
<td>Prostate volume (cm3)</td>
<td>0.558</td>
<td>0.222, 1.40</td>
</tr>
<tr>
<td>Midpelvic area (cm2)</td>
<td>0.404</td>
<td>0.0656, 2.49</td>
</tr>
</tbody>
</table>

Associations between each MRI variable and continence at 6 months or 12 months, after adjustment for age, comorbidities, clinical stage, clinical grade, PSA and year of surgery.
• Urethral length most important factor

• Addition of MRI variables to Base Model (Age, comorbidities, etc)
  
  - AUC improved from .606 to .636 at 6 months
    • .622 with addition of urethral length alone
  
  - AUC improved from .597 to .634 at 12 months
    • .628 with addition of urethral length alone
Disease Specific Factors

- Nerve sparing surgery
- Previous RT
- Grade, stage, PSA
  - NOT thought to be associated with post-op urinary continence
  - Possible relation to nerve sparing
Nerve sparing surgery potentially improves post-prostatectomy urinary function

- 505 patients
Technique Related Factors

• Surgeon experience
• Open versus MIS
• Anastomotic technique/stricture
• Urethral fixation
• Puboprostatic sparing
• Bladder neck preservation
• Reconstruction of periurethral tissue
• Intraoperative slings
- Diagnostic codes for UI
  - 15.9% v/s 12.2%
- No difference in procedures
• 3 year period - 612 lap, 818 RRP –prospective

• 415 out of these patients also enrolled in a QOL study
Intraoperative maneuvers

- Bladder neck preservation associated with higher rates of positive margin
- Mucosal eversion and anastomotic techniques are fairly standard in RRP and MIS prostatectomy

**FIG. 4. Actuarial probability of achieving continence for entire group of 581 patients and for old (191) and new (390) anastomotic techniques. With new technique median time to continence was 1.5 months and 95% of patients were continent at 24 months.**
SLING MAY HASTEN RETURN OF CONTINENCE AFTER RADICAL PROSTATECTOMY

J. STEPHEN JONES, SANDIP P. VASAVADA, JOSEPH B. ABDELMALAK, LOUIS LIOU, ELAZAB S. AHMED, CRAIG D. ZIPPE, AND RAYMOND R. RACKLEY


- 15 patients

TABLE I. Patients no longer requiring pads

<table>
<thead>
<tr>
<th></th>
<th>Sling Patients (%)</th>
<th>Sling Patients (Under Slight Tension) (%)</th>
<th>Controls (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preoperative</td>
<td>15/15 [100]</td>
<td>10/10 [100]</td>
<td>15/15 [100]</td>
</tr>
<tr>
<td>&lt;24 hr</td>
<td>4/15 [27]</td>
<td>4/10 [40]</td>
<td>0/15 [0]</td>
</tr>
<tr>
<td>1 mo</td>
<td>10/15 [67]</td>
<td>8/10 [80]</td>
<td>6/15 [40]</td>
</tr>
<tr>
<td>3 mo</td>
<td>14/15 [93]</td>
<td>10/10 [100]</td>
<td>7/15 [47]</td>
</tr>
<tr>
<td>6 mo</td>
<td>15/15 [100]</td>
<td>10/10 [100]</td>
<td>12/15 [80]</td>
</tr>
<tr>
<td>12 mo</td>
<td>15/15 [100]</td>
<td>10/10 [100]</td>
<td>14/15 [93]*</td>
</tr>
<tr>
<td>24 mo</td>
<td>15/15 [100]</td>
<td>10/10 [100]</td>
<td>14/15 [93]*</td>
</tr>
</tbody>
</table>

* Two patients in control group lost to follow-up between 6-mo and 12-mo visits; both were continent at 6-mo visit and were considered continent for purposes of comparing groups thereafter.
Post-Operative Maneuvers

- Pelvic floor muscle exercises
  - Immediate peri-operative

- Biofeedback
Effectiveness of Early Pelvic Floor Rehabilitation Treatment for Post-Prostatectomy Incontinence

Maria Teresa Filocamo, Vincenzo Li Marzi*, Giulio Del Popolo, Filippo Cecconi, Michele Marzocco, Aldo Tosto, Giulio Nicita

Clinica Urologica II, University of Florence, Viale Pieraccini, 18, 50139, Florence, Italy

European Urology 48 (2005) 734–738

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Fig. 1. Percentage of patients achieving continence of group A and B at 1, 3, 6, and 12 months after RRP.

Fig. 2. Correlation between age and continence in group A and B at 1, 3, and 6 months.
Incontinence episodes improved after

- Behavior – 55%
- Behavior + biofeedback and nerve stim – 51%
- Control – 24%
Conclusion

Multiple factors related to post-RP urinary incontinence and stricture formation

- Some modifiable
  - Technique related
  - Post-operative maneuvers
  - Few demographic factors (eg BMI)

- Some non-modifiable
  - Most demographic factors
  - Disease specific factors

- With the advent of MIS, AS rates will likely continue to decrease
- Further research needed to determine if modifying factors leads to improved continence
Thank You