

Recalcitrant Bladder Neck Contracture and Incontinence Following Radical Prostatectomy

Dr. M. Acker PGY-2 and Dr. G. Bailly

October 20, 2010

Case

- 65 y.o. male
- RRP 2004
 - + margins, referred for adjuvant RadTx
- Develops severe BNC and incontinence
 - Multiple dilations **(failed)**
 - Multiple transurethral incisions **(failed)**
 - Deep resection and self-cath ***(failed)***
- ***Recalcitrant bladder neck contracture and incontinence***
 - What now?

Objectives

- Description and epidemiology of bladder neck contracture (BNC) and urinary incontinence post radical prostatectomy
- Identify potential etiology and risk factors
- Define strategies for reducing complications
- Critical analysis of management options for incontinence and bladder neck contracture post radical prostatectomy
- Propose a treatment pathway for management of recalcitrant BNC post prostatectomy

Literature Review

- PubMed terms:
 - Bladder neck contracture
 - Prostatectomy AND vesicourethral anastomotic stricture OR bladder neck contracture OR anastomotic stricture
 - Incontinence
 - Prostatectomy AND Incontinence OR Continence OR Urine leak
- Mesh heading terms:
 - Radical Prostatectomy AND
 - complications OR adverse events OR morbidity AND
 - bladder neck obstruction OR Urethral stricture OR incontinence
- Cochrane Library
- AUA update- *Complications of Radical Prostatectomy*
- Bibliography search of selected articles
- ***81 articles included for review***

- Paucity of high quality prospective studies
- Lack of Standardized reporting
 - Martin et al. identified 10 key elements of accurate reports of surgical complications
 - Rabbani et al.,(2010 *Eur Urol*)
 - Reviewed 109 studies on RP complications (1995-2005)
 - ***Less than 21% met 7 or more of the 10 criteria***
 - » 79% did not define complication
 - » 67% gave no severity/grade
 - » 56% did not indicate duration of reporting period

- Incontinence:
 - 1 or more pad/day
 - Does not discriminate b/w precautionary wearer vs frequent dribbler
 - Delayed incontinence: Ongoing urine leakage @ 1yr.
 - “Social continence”: 1 or less pads/day
 - QoL < for pts with 1 pad/day vs 0 or occasional pad use.
 - Pad weights
 - Poorly standardized, self reported

Continence Definition After Radical Prostatectomy Using Urinary Quality of Life: Evaluation of Patient Reported Validated Questionnaires

Michael A. Liss,* Kathryn Osann, Noah Canvasser, William Chu, Alexandra Chang, Jennifer Gan, Roger Li, Rosanne Santos, Douglas Skarecky, David S. Finley† and Thomas E. Ahlering‡

From the Departments of Urology and Medicine (KO), University of California-Irvine, Orange, California

- Bladder Neck Contracture:
 - Treatment for stricture used as surrogate for incidence
 - ICD-9 procedure codes/ Medicare billings
 - Self reported
 - Kao et al. “Since your prostate surgery, has a doctor had to dilate your urinary tract or perform any surgery to treat strictures?”



"SOMETHING FOR THE WEAK END, SIR?"

Changes in health utilities and health-related quality of life over 12 months following radical prostatectomy

Jennifer Ku, BHSoc, MSc (Cand); Murray Krahn, MD, MSc, FRCPC; John Trachtenberg, MD, FRCSC, FACS; Michael Nesbitt, BA; Robin Kalnin, BMus; Gina Lockwood, MMath; Shabbir M.H. Alibhai MD, MSc, FRCPC

- Patient-Oriented Prostate Utility Scale (PORPUS)
- QoL in pts with Incontinence or BNC post RP
 - Worst at 2 months post RRP (correlates with severity of symptoms)
 - does not return to baseline by 12 months
 - » (Ku et al. 2009 CUAJ)

• Odds ratio for willingness to be treated again

- Incontinent 0.52 ($p < 0.01$); Stricture 0.66 ($p 0.05$)
 - (Kao et al. 2000 J. Urol)

- Repeat procedures/operations
- Loss of income

Post prostatectomy incontinence

- Epidemiological data
- Etiology
- Risk Factors
- Optimizing outcomes

Incontinence rates post RRP

- 0.8 - 87.0% early post RP incontinence
- Benoit et al. (2000)
 - Medicare population (24-36 month f/u)
 - 21.7% Incontinence (any); 7.9% persist at 1 year
- Contemporary data
 - 85-95 % Continenence rate at 1 year
 - Walsh et al. (2000, *Urology*)

| | 3 mo | 6 mo | 12 mo | 18 mo |
|-------------------|------|------|-------|-------|
| Continenence (%) | | | | |
| No pads | 54 | 80 | 93 | 93 |
| Bother (no/small) | 96 | 93 | 98 | 95 |

Etiology of SUI post RRP

- Likely 2^o to intrinsic sphincter deficiency
 - Gomha et.al. (2003 *J Urol*)
 - Urodynamics on 58 consecutive pts
 - All had evidence of intrinsic sphincter deficiency
 - Impaired/poor compliance in 25.6%
 - Bladder instability in 16.3%

- Trauma
 - intrinsic sphincter muscle
 - Apical dissection
 - Ligation of DVC
 - Vesicourethral anastomosis

Etiology of SUI post RRP

– Nerve sparing (O'Donnell et al., 1989, *J Urol*)

| Operative technique | Total incontinence | SUI |
|----------------------------|--------------------|-----|
| Non nerve sparing | 12% | 18% |
| Nerve sparing | 0% | 6% |

- *Functional urethral length 23 mm vs 19mm in non-nerve sparing arm

- **Detrusor overactivity may play role**
(Hammerer et al., 1997 *J Urol*)
 - de novo detrusor instability in many pts.
 - Prospective; n= 82
 - urodynamics pre-op and 6-8 wks post-op
 - **17% pre-op bladder instability vs 41% post-op**
 - may persist up to 1 year

Potential Risk Factors for Stress Urinary Incontinence post RP

- Patient Factors

- Age
- Obesity
- Physical Inactivity
- Prostate size

- Surgical Factors

- Bladder neck sparing
- Nerve sparing
- Puboprostatic ligament sparing
- Mucosal eversion
- Surgical volume

Risk Factors for SUI post RP

- Age

- Kundu et al. (2004 *J Urol*)

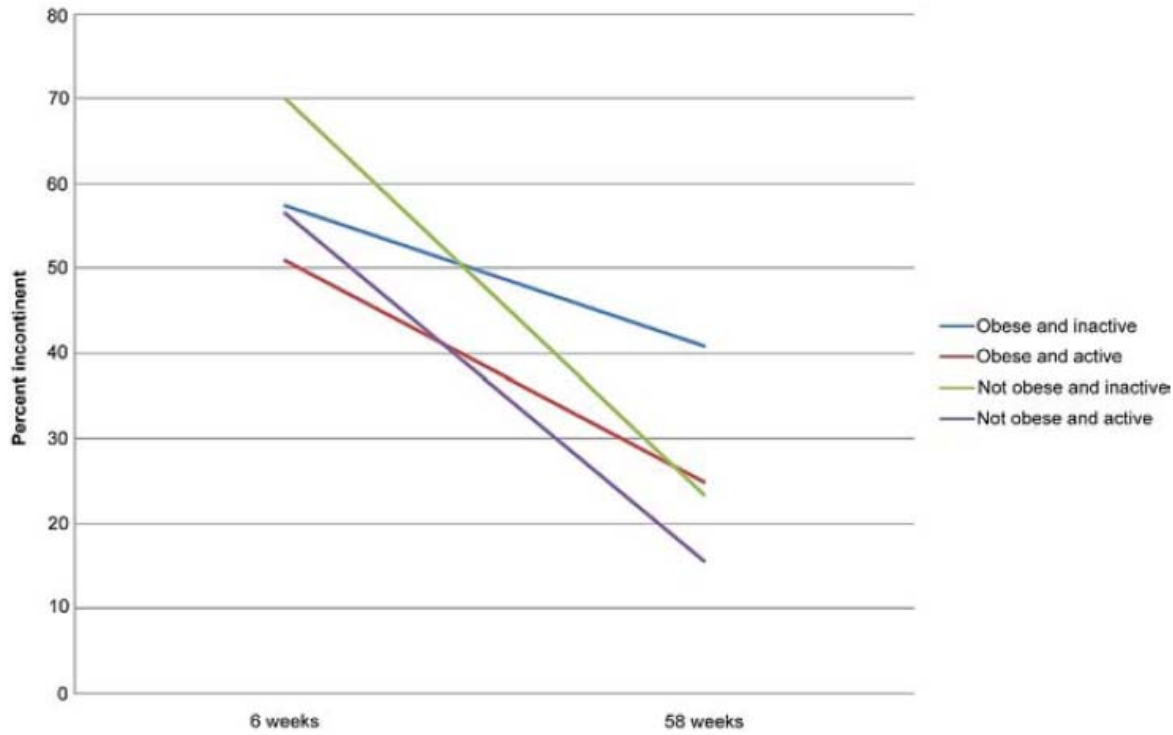
TABLE 4. *Percentage of patients with return of continence after radical prostatectomy*

| Age | No. Postop Continence/Total No. (%) |
|-----------------|-------------------------------------|
| Younger than 50 | 142/150 (95) |
| 50–59 | 843/882 (96) |
| 60–69 | 1,187/1,272 (93) |
| 70 or Older | 371/433 (86) |
| Totals | 2,543/2,737 (93) |

Armitage chi-square test $p < 0.0001$.

Physical Inactivity

– Wolin et al. (2010 *J Urol*)



Prevalence of incontinence after prostatectomy by obesity and physical activity.

Table 2. Relative risk of incontinence 58 weeks after prostatectomy

| | Crude RR (95% CI) | Multivariable RR (95% CI)* |
|---------------------|-------------------|----------------------------|
| Obese + inactive | 1 | 1 |
| Obese + active | 0.79 (0.53–1.18) | 0.85 (0.57–1.26) |
| Nonobese + inactive | 0.77 (0.52–1.15) | 0.77 (0.53–1.13) |
| Nonobese + active | 0.70 (0.49–1.00) | 0.74 (0.52–1.06) |

Risk Factors for SUI post RP

- Prostate size
 - Pettus et al. (2010 *J Urol*)
 - Retrospective, n= 1133

| | Specimen Weight (grams) | | | |
|--|-------------------------|-----------------|-----------------|------------------|
| | ≤40 N=632 | 41–50 N=862 | 51–65 N=842 | >65 N=731 |
| Median estimated blood loss ¹ (IQR), cc | 750 (300, 1250) | 750 (300, 1300) | 900 (400, 1500) | 1000 (450, 1600) |
| Allogenic blood transfusion ¹ | 64 (10.4%) | 75 (8.7%) | 101 (12.2%) | 125 (17.4%) |
| Median operating room time ¹ (IQR), min | 180 (165, 220) | 190 (175, 225) | 195 (180, 230) | 199 (180, 240) |
| Number of positive surgical margins ² (%) | 84 (14%) | 99 (12%) | 78 (10%) | 68 (10%) |
| Number continent at 1 year post-op ¹ (%) | 249 (80%) | 323 (83%) | 319 (83%) | 274 (81%) |

Prostate size is not significantly associated with continence ($p=0.08$)

Risk factors for SUI post RRP

- Anastomotic technique
 - Bladder neck sparing vs non-sparing
 - (Deliveliotise et al. 2002 *Urology*)

TABLE I. Return of continence after three different surgical variations*

| | 3 mo (%) | 6 mo (%) | 9 mo (%) | 12 mo (%) |
|--------------------------------|----------|----------|----------|-----------|
| Group 1 | 33 (69) | 38 (79) | 42 (88) | 44 (92) |
| <i>P</i> value (group 1 vs. 2) | 0.016 | 0.039 | 0.457 | 0.927 |
| Group 2 | 23 (45) | 31 (61) | 42 (82) | 47 (92) |
| <i>P</i> value (group 2 vs. 3) | 0.018 | 0.029 | 0.264 | 0.726 |
| Group 3 | 34 (68) | 40 (80) | 45 (90) | 47 (94) |
| <i>P</i> value (group 1 vs. 3) | 0.939 | 0.925 | 0.719 | 0.662 |

*Group 1, bladder neck preservation, n = 48; group 2, puboprostatic ligaments, n = 51; group 3, both techniques, n = 50.

Group 1, bladder neck preservation; Group 2 puboprostatic ligament preservation; Group 3 both techniques

- **Earlier return to continence, but no long-term superiority**

Risk Factors for SUI post RP

- Does bladder neck sparing increase + margin rate?
 - Most studies show no difference
 - Srougi et al. (2000, *J Urol*)
 - N= 70; Prospective, Randomized
 - (ASCO Level 2 evidence)
 - Increased + margin rate solely at bladder neck with sparing technique

Table 3 – Clinical outcomes of bladder neck preservation

| Reference | ASCO level of evidence | Study design | No. patients | Continence rate % (time) | No. positive margins (%) | BN + margin (%) | BN sole positive margin | Conclusion |
|---------------------------|------------------------|---|--|---|--|-----------------|-------------------------|---|
| Gomez [34] | III | Prospective Nonrandomised No control group | 50 | 100 (6 mo) | 18 (36) | 6 | 0 | BNP offers significant improvement in continence without an effect in cancer control. |
| Licht [16] | III | Prospective Nonrandomised No control group | 206 | 36 (1 mo) 54 (6 wk) 77 (3 mo) | NR | 6.8 | NR | BNP results in early return of continence, may decrease rates of BN contractures, does not compromise cancer control. |
| Lowe [26] | III | Prospective Nonrandomised | Total: 188 BNP/BNR: 90/98 | BNP/BNR 23/11* (1 mo) 62/44* (3 mo) 82/70* (6 mo) 89/86 (12 mo) | BNP/BNR 17 (19)/10 (10) p = 0.1943 | NR | NR | BNP does not increase recurrence rate or long-term continence; however, it does offer the benefit of early return to continence. |
| Poon [29] | IV | Retrospective | Total: 220 BNP/TRR/ABTR: 101/63/56 | 34/33/22 (3 mo) 81/83/82 (6 mo) 93/96/97 (12 mo) | BNP/TRR+ABTR 28 (28)/35.7 (30) p = 0.619 | NR | NR | BNP was not significantly different from BNR in early or late return to continence or margin positivity. |
| Srougi [30] | II | Prospective Randomised BNR control group | Total: 69 BNP/BNR: 31/38 | 79/67 (2 d) 87/87 (2 mo) 95/97 (6 mo) | 1(3)/2(5) | 4(13)/2(5) | 3(10)/0 p = 0.08 | No difference in continence rate with technique. Accrual stopped at 70 patients due to significant increased margin positivity solely at BN with BNP. |
| Deliveloitis [25] | III | Prospective Nonrandomised No control group | Total: 149 BNP/PLS/both: 48/51/50 | 69/45/68* (3 mo) 79/61/80* (6 mo) 88/82/90 (9 mo) 92/92/94 (12 mo) | 10(21)/9(18)/ 11(22) | 3(6)/1(2)/2(4) | 1(2)/0/1(2) | Continence rate s/p BNP, PLS, and both did not differ at 1 yr. BNP offers ERC. PMR did not differ. |
| Bianco [35] | III | Prospective No control group | 555 | NR | 178 (32) | 13(2) | 2 (0.36) | BNP does not increase % positive margin and does not compromise disease-free survival. |
| Selli (2004) [†] | III | Prospective Nonrandomised No control group | 131 | 40 (1 mo) 74 (3 mo) 87 (21.7 mo) | 30 (22) | NR | 7 (5) | BNP does not improve long-term recovery but does improve early return of continence. |
| Gaker [27] | III | Prospective Nonrandomised Historical sRP control group | Total: 355 BNP/sRP: 275/80 | BNP/sRP 36/1* (immediate) 69/6* (2 wk) 78/41* (7 wk) | BNP/sRP 19 (7)/9 (11) | NR | BNP/Srp 0/0 | BNP results in earlier return to continence without compromise of oncologic control. |

ABTR = anterior bladder-tube reconstruction; ASCO = American Society of Clinical Oncology; BN = bladder neck; BNP = bladder-neck preservation; BNR = bladder-neck resection; NR = not reported; PLS = puboprosthetic ligament sparing; ERC = early return to continence; PMR = positive margin rate; sRP = standard radical prostatectomy; TRR = tennis racket reconstruction.

* Statistical significance.

Risk Factors for SUI post RP

- Srougi et al. (2000, *J Urol*)

| Technique | <i>BN + margin</i> | <i>Any + margin</i> |
|--------------------|--------------------|---------------------|
| <i>BN sparing</i> | 3/31 (9.6%) | 13% |
| <i>Non-sparing</i> | 0/39 (0 %) | 5% |

- Small numbers. Results due to chance?
- Higher volume disease in BN sparing arm?
- **Overall, bladder neck sparing has no effect on oncologic control.**

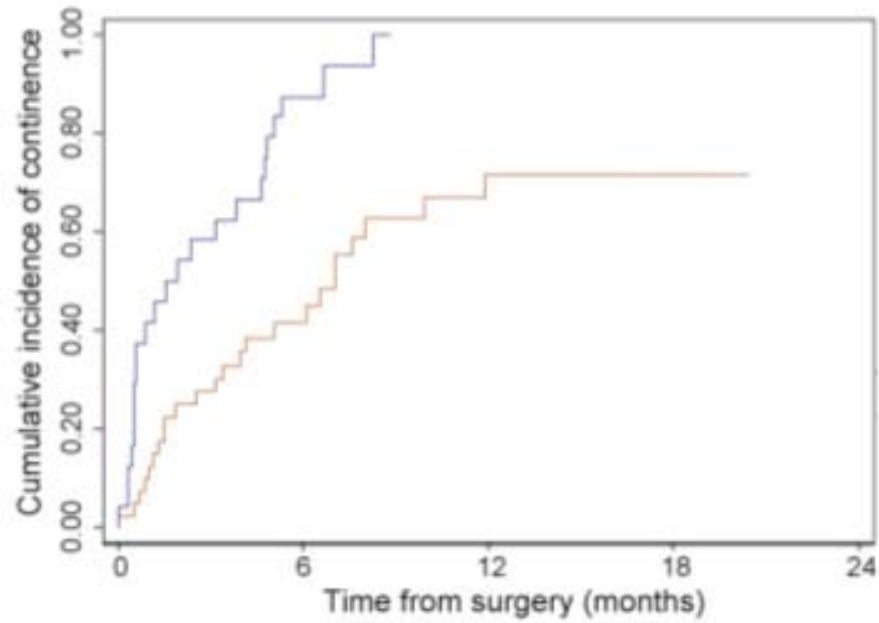
- Preservation of puboprostatic ligaments (PPL)
 - PPL role in continence mechanism?
 - Suspension of prostatomembranous urethra from pubic bone
 - Poore et al. (1998 *Urol*)
 - N= 43; randomized to PPL preservation vs non
 - No difference in continence at 1 year
 - Trend toward ***earlier return of continence***
 - Noh et al.
 - Bladder neck + PPL preservation
 - » ***longer return to continence***

No evidence for preservation of puboprostatic ligaments

- Urethral length
 - Paperal et al. (2009 *Eur Urol*)

Table 4 – Evaluation of magnetic resonance imaging (MRI) variables associated with urinary incontinence after radical prostatectomy

| MRI variable |
|--|
| Preoperative membranous urethral length |
| Postoperative membranous urethral length |
| Fraction of membranous urethral length |



| Number at risk: | | | | | |
|-----------------|----|----|---|---|---|
| ≤13mm | 40 | 19 | 8 | 6 | 5 |
| > 13mm | 24 | 5 | 1 | 1 | 1 |

Fig. 8 – Cumulative incidence of continence following radical prostatectomy, stratified by the median postoperative membranous urethral length (MUL). Red line: patients with postoperative MUL ≤ 13 mm; blue line: patients with postoperative MUL > 13 mm ($p < 0.0005$).

Table 5 – Risk factors for urinary incontinence after radical prostatectomy

| R | Age-adjusted | |
|----|--------------|---------|
| | 95% CI | p value |
| 20 | 1.07, 1.35 | 0.002 |
| 17 | 1.08, 1.26 | <0.0005 |
| 90 | 0.82, 1.00 | 0.04 |



– Mucosal eversion of bladder neck

- Srougi et al. (2005, *BJU Int.*)
 - Randomized, prospective trial.
 - N=95
 - F/u 6 months
 - No difference

| | Eversion | No Eversion |
|------------------------|----------|-------------|
| Urinary continence at: | | |
| 48 h | 33 (69) | 32 (68) |
| 2 months | 43 (90) | 41 (87) |
| 6 months | 44 (92) | 43 (92) |

Reducing the risk of post prostatectomy SUI

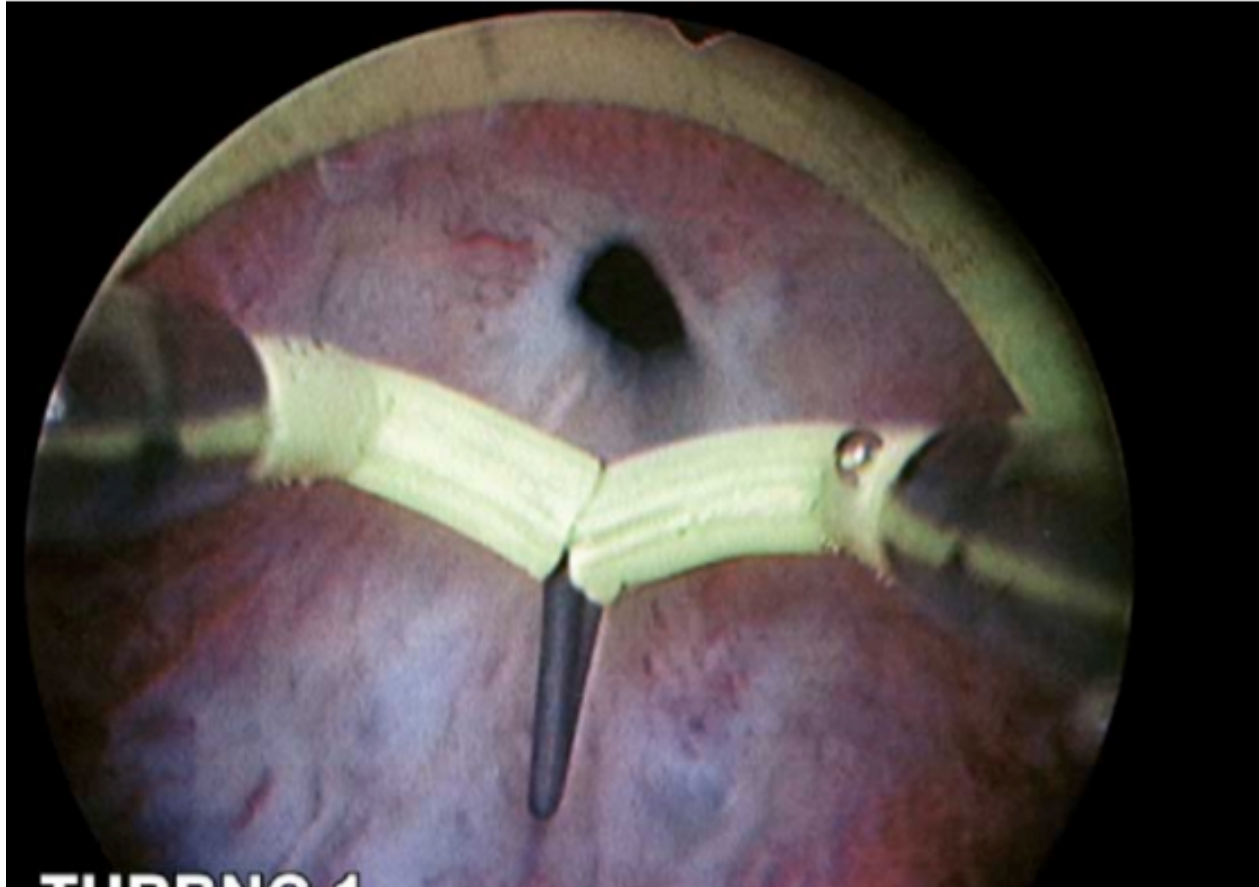
Patient Factors:

- Physical Activity
 - Pelvic floor training

Surgeon Factors:

- Minimize trauma to intrinsic sphincter
- Maximize urethral length
- Nerve sparing
- Bladder neck sparing
 - Earlier return to continence

Bladder Neck Contracture



Cystoscopic appearance of Severe BNC < 5F

BNC rates post RRP

- Widely variable 2.7 to 29%
 - Most are retrospective studies
 - Some do not include dilatation
- Gillitzer et al. (2010 *Urol*) 5.5%
 - 72% resolved with incision (Recurrence rate not reported)
- CapSURE data 277/3310 (8.4 %) (Elliot et al. 2010 *J Urol*)
- Benoit et al. (2000 *Urol*)
 - 25,651 Medicare pts; 19.5% BNC
- SEER data 28% BNC rate! (Lowrance et al. 2010 *J Urol*)
 - Open = Laparoscopic
- Military survey 20.5% (Kao et al. 2000 *J Urol*)
 - “Since your prostate surgery, has a doctor had to dilate your urinary tract or perform any surgery to treat strictures? “
- **Rabbani (2010 *Eur Urol*)**
 - MSK data 5.5%
- **Lepor, Walsh, Breyer and others 2-5%**

Clinical presentation of BNC

- Weak stream
- Incomplete voiding
- Overflow incontinence

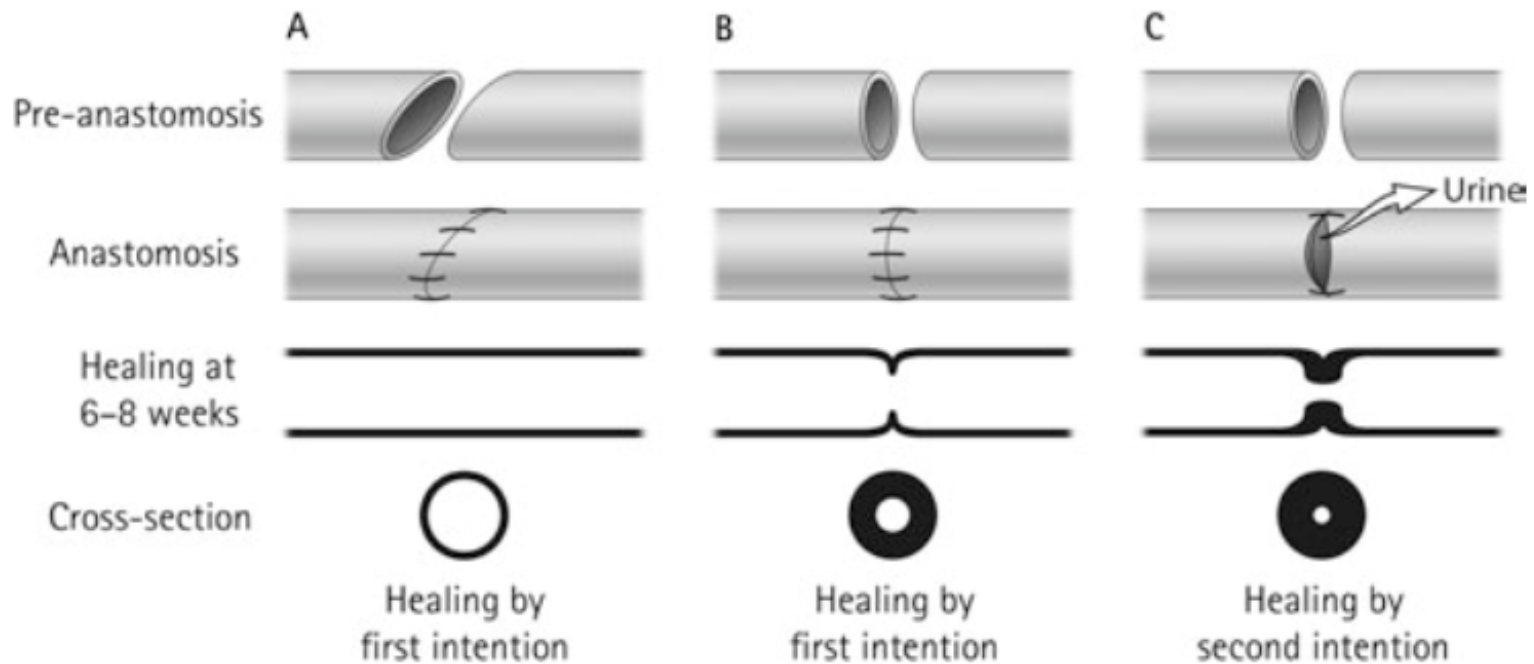
- Usually present >1 month post-op
- Most interventions are at 3-6 months
 - CapSURE data (Elliot et al. (2007 *J Urol*))



Etiology of bladder neck contracture

- Goal: ***tension free, water-tight anastomosis***
- BNC occurs 2° to impaired healing
 - Anastomotic gap most likely cause
 - Urinary leakage
 - Result of gap, but ***not direct cause of BNC***
 - Surya et al. (1990, *J Urol*)
 - Levy et al. (1994, *Urology*)
 - Srougi et al. (2005, *BJU Int*)
 - Inflammation at anastomosis
- Most BNC are clinically apparent by 6-8 weeks

FIG. 1. The anastomotic healing processes.



» From Webb et al., (2010 *BJU Int.*)

- Gap heals by granulation/secondary intention
 - Leads to increased:
 - myofibroblast proliferation
 - aggressive wound contracture

Potential Risk Factors for bladder neck contracture

- Patient Factors

- Smoking
- Prior TURP
- Pre-op PSA
- Gleason score

- Surgical Factors

- Surgical volume
- Bleeding/hematoma
- Delayed catheter removal

Risk Factors for BNC

- Cigarette smoking

» Borboroglu et al (2000, *Urol*)

- Smokers = probable microvascular disease
(higher rates of macrovascular complications/CAD)
- Leads to impaired VUA healing

| Comorbidity | No. Patients | BNC (%) | P |
|-----------------|--------------|---------|---------|
| Smoking history | | | |
| Current smoker | 62 | 16 (26) | <0.001* |
| Past smoker | 207 | 18 (9) | |
| Never smoked | 168 | 15 (9) | |

Current smoking increases the risk of bladder neck contracture

*BNC rate did not correlate with prior TURP.

Risk Factors for BNC

- **Prior TURP**

- Gillitzer et. al (2010, *Urol*)

- 2052 RRP and 866 RPP

- 2.4 fold risk for BNC if prior TURP

Table 3. Multivariate logistic regression analysis of preoperative risk factors (n = 2495) and multivariate logistic regression analysis of postoperative risk factors (n = 2164) for development of AS

| | Odds Ratio | 95% CI | Coefficient | P |
|---|------------|----------------|-------------|--------|
| Preoperative Predisposing Factors | | | | |
| Serum PSA | 1.0113 | 0.9979-1.0248 | 0.01121 | .0989 |
| Suspicious DRE | 0.9351 | 0.6404-1.3654 | -0.06711 | .7282 |
| Gleason score on Biopsy >7 | 4.3839 | 2.5061-7.6686 | 1.4779 | <.0001 |
| Neoadjuvant androgen ablation | 1.2681 | 0.7555-2.1285 | 0.2375 | .3686 |
| Previous TUR-P | 2.3862 | 1.3134-4.3353 | 0.8697 | .0043 |
| Prostate volume | 1.0109 | 1.0036-1.0183 | 0.01086 | .0034 |
| Postoperative predisposing factors | | | | |
| Extracapsular tumor extension | 1.8821 | 1.2645-2.8014 | 0.6324 | .0018 |
| Final Gleason Score >7 | 2.1848 | 1.3447-3.5497 | 0.7815 | .0016 |
| Transfusion | 3.5203 | 2.3371-5.3025 | 1.2585 | <.0001 |
| AUR | 8.9792 | 5.0475-15.9735 | 2.1949 | <.0001 |
| Extravasation | 1.4552 | 0.9728-2.1769 | 0.3752 | .0679 |
| RPP vs RRP | 0.4216 | 0.2685-0.6621 | -0.8636 | .0002 |

Prior TURP *may* increase risk the of Bladder Neck Contracture

Risk Factors for BNC

Pre-op PSA

- Erickson et al. (2009 *Eur Urol*)

TABLE 1 Univariate analysis of risk factors for BNC formation after RRP

| Variable | BNC | | P |
|--------------------|----------------|--------------|--------|
| | Yes | No | |
| Number of patients | 110 | 4022 | |
| Median (range): | | | |
| Age, years | 65 (48–77) | 61 (36–80) | <0.001 |
| PSA level, mg/dL | 6.7 (0.6–37.2) | 5.7 (0.0–98) | 0.009 |

-Gillitzer et al. (2010, *Urol*)

| | Odds Ratio | 95% CI | Coefficient | P |
|--|------------|---------------|-------------|--------|
| Preoperative Predisposing Factors | | | | |
| Serum PSA | 1.0113 | 0.9979-1.0248 | 0.01121 | .0989 |
| Suspicious DRE | 0.9351 | 0.6404-1.3654 | -0.06711 | .7282 |
| Gleason score on Biopsy >7 | 4.3839 | 2.5061-7.6686 | 1.4779 | <.0001 |

Higher pre-op PSA may slightly increase risk of BNC.

Risk Factors for BNC

- Gleason score
 - Gillitzer et al. (2010, *J Urol*)

Table 3. Multivariate logistic regression analysis of preoperative risk factors (n = 2495) and multivariate logistic regression analysis of postoperative risk factors (n = 2164) for development of AS

| | Odds Ratio | 95% CI | Coefficient | P |
|---|------------|----------------|-------------|--------|
| Preoperative Predisposing Factors | | | | |
| Serum PSA | 1.0113 | 0.9979-1.0248 | 0.01121 | .0989 |
| Suspicious DRE | 0.9351 | 0.6404-1.3654 | -0.06711 | .7282 |
| Gleason score on Biopsy >7 | 4.3839 | 2.5061-7.6686 | 1.4779 | <.0001 |
| Neoadjuvant androgen ablation | 1.2681 | 0.7555-2.1285 | 0.2375 | .3686 |
| Previous TUR-P | 2.3862 | 1.3134-4.3353 | 0.8697 | .0043 |
| Prostate volume | 1.0109 | 1.0036-1.0183 | 0.01086 | .0034 |
| Postoperative predisposing factors | | | | |
| Extracapsular tumor extension | 1.8821 | 1.2645-2.8014 | 0.6324 | .0018 |
| Final Gleason Score >7 | 2.1848 | 1.3447-3.5497 | 0.7815 | .0016 |
| Transfusion | 3.5203 | 2.3371-5.3025 | 1.2585 | <.0001 |
| AUR | 8.9792 | 5.0475-15.9735 | 2.1949 | <.0001 |
| Extravasation | 1.4552 | 0.9728-2.1769 | 0.3752 | .0679 |
| RPP vs RRP | 0.4216 | 0.2685-0.6621 | -0.8636 | .0002 |

Pre-op Gleason score >7 increases risk of developing BNC.

Risk Factors for BNC

- Urinary retention

Table 3. Multivariate logistic regression analysis of preoperative risk factors (n = 2495) and multivariate logistic regression analysis of postoperative risk factors (n = 2164) for development of AS

| | Odds Ratio | 95% CI | Coefficient | P |
|------------------------------------|------------|----------------|-------------|--------|
| Preoperative Predisposing Factors | | | | |
| Serum PSA | 1.0113 | 0.9979-1.0248 | 0.01121 | .0989 |
| Suspicious DRE | 0.9351 | 0.6404-1.3654 | -0.06711 | .7282 |
| Gleason score on Biopsy >7 | 4.3839 | 2.5061-7.6686 | 1.4779 | <.0001 |
| Neoadjuvant androgen ablation | 1.2681 | 0.7555-2.1285 | 0.2375 | .3686 |
| Previous TUR-P | 2.3862 | 1.3134-4.3353 | 0.8697 | .0043 |
| Prostate volume | 1.0109 | 1.0036-1.0183 | 0.01086 | .0034 |
| Postoperative predisposing factors | | | | |
| Extracapsular tumor extension | 1.8821 | 1.2645-2.8014 | 0.6324 | .0018 |
| Final Gleason Score >7 | 2.1848 | 1.3447-3.5497 | 0.7815 | .0016 |
| Transfusion | 3.5203 | 2.3371-5.3025 | 1.2585 | <.0001 |
| AUR | 8.9792 | 5.0475-15.9735 | 2.1949 | <.0001 |
| Extravasation | 1.4552 | 0.9728-2.1769 | 0.3752 | .0679 |
| RPP vs RRP | 0.4216 | 0.2685-0.6621 | -0.8636 | .0002 |

AUR on trial of void increases risk of BNC

- Surgical volume

- Begg et al. (2002, *NEJM*)

- SEER database (1992-1996)

- N= 11,522

- “Late urinary complications”

- » BNC, intestinal or vesical fistulae, pelvic abscess

- » 94% were BNC

The New England Journal of Medicine

Special Article

VARIATIONS IN MORBIDITY AFTER RADICAL PROSTATECTOMY

COLIN B. BEGG, PH.D., ELYN R. RIEDEL, M.A., PETER B. BACH, M.D., M.A.P.P., MICHAEL W. KATTAN, PH.D.,
DEBORAH SCHRAG, M.D., M.P.H., JOAN L. WARREN, PH.D., AND PETER T. SCARDINO, M.D.

Risk factors for BNC

TABLE 3. RELATION BETWEEN HOSPITAL VOLUME AND OUTCOMES IN 11,522 MEN WHO UNDERWENT RADICAL PROSTATECTOMY BETWEEN 1992 AND 1996.

| OUTCOME | HOSPITAL VOLUME* | | | | P VALUE | |
|-----------------------------|------------------|------------------|----------------|---------------------|-----------------------------|---|
| | LOW (N=280) | MEDIUM (N=67) | HIGH (N=37) | VERY HIGH (N=19) | ADJUSTED FOR CLUSTERING† | ADJUSTED FOR CLUSTERING AND CASE MIX‡ |
| | % of patients | | | | | |
| Surgery-related death | | | | | | |
| 30 days | 0.5 | 0.5 | 0.5 | 0.5 | 0.92 | 0.81 |
| 60 days | 0.6 | 0.6 | 0.6 | 0.5 | 0.94 | 0.68 |
| Postoperative complications | 32 | 31 | 30 | 27 | 0.02 | 0.03 |
| Late urinary complications | | | | | | |
| Symptoms or procedures | 28 | 29 | 23 | 20 | <0.001 | <0.001 |

Low= 1 to 33 cases/year; Medium = 34 to 61; High= 62 to 107; Very high = 114 to 252

Low hospital volume is associated with increased risk of BNC

Risk factors for BNC

TABLE 4. RELATION BETWEEN SURGEON VOLUME AND OUTCOME AMONG 10,737 MEN WHO UNDERWENT RADICAL PROSTATECTOMY BETWEEN 1992 AND 1996.

| OUTCOME | SURGEON VOLUME* | | | | P VALUE | |
|-----------------------------|-----------------|-------------------|-----------------|---------------------|-----------------------------|---|
| | LOW (N=642) | MEDIUM (N=198) | HIGH (N=103) | VERY HIGH (N=56) | ADJUSTED FOR CLUSTERING† | ADJUSTED FOR CLUSTERING AND CASE MIX‡ |
| | % of patients | | | | | |
| Surgery-related death | | | | | | |
| 30 days | 0.4 | 0.5 | 0.5 | 0.5 | 0.71 | 0.74 |
| 60 days | 0.5 | 0.5 | 0.6 | 0.6 | 0.74 | 0.59 |
| Postoperative complications | 32 | 31 | 30 | 26 | 0.008 | <0.001 |
| Late urinary complications | | | | | | |
| Symptoms or procedures | 28 | 26 | 27 | 20 | 0.003 | 0.001 |

Low = 1 to 10 RP/yr; Medium = 11 to 19; High= 20 to 32; very high = 33 to 121.

10,737 (11,522) pts. Primary surgeon not identified in ~800 cases

Low surgeon volume increases risk of BNC.

Risk Factors for BNC

- Intra-operative blood loss

- Gotto et al. (AUA 2010 abstract)

1873

**PREDICTORS OF BLADDER NECK CONTRACTURE
FOLLOWING RADICAL PROSTATECTOMY**

Geoffrey Gotto, Jaspreet Sandhu, Luis Herran Yunis, James Eastham, Peter Scardino, Farhang Rabbani, New York, NY*

- 3458 consecutive RP's from 1999-2007
- Hazard Ratio for BNC was only 1.02 per 100 cc of blood loss

- Webb et al. (2008, BJUI)

- Intra-op blood loss not significantly different for BNC pts.

Intra-operative blood ***may*** be associated with BNC

Poor visualization during anastomosis?

Risk Factors for BNC

– Post-operative bleeding

- Huang and Lepor (2006, *BJU Int*)
 - Prospective, 708 pts

| Variable | Developed AS | No AS |
|-------------------------------------|--------------|-------|
| Mean age, years | 58.6 | 58.7 |
| Mean Gleason sum | 6.2 | 6.3 |
| Bilateral nerve-sparing, % of cases | 82 | 82 |
| Mean blood loss | | |
| EBL, mL | 815 | 782 |
| Δ Intraoperative haematocrit | 13.5 | 13.1 |
| Δ Postoperative haematocrit | 3.1 | 2.2* |

- No difference in mean intra-operative blood loss
- Post-op Hct change associated with increased BNC rate
 - Hematoma confined to space of Retzius disrupts anastomosis
 - Liquefaction of hematoma incites inflammatory response

Post-op bleeding and hematoma increase risk of BNC

Risk Factors for BNC

- Delayed catheter removal
 - Altinova et al. (2009, *Int Urol Neph*)
 - Cystogram at 7 days
 - If no extravastion then foley removed.

| | Postoperative urethral stricture | | Total | <i>P</i> |
|------------------------------|----------------------------------|-----------|-----------|--------------|
| | + | - | | |
| Catheter removal time | | | | |
| 7th day | 1 (4) | 24 (96) | 25 (44.6) | 0.004 |
| 14th day | 2 (12.5) | 14 (87.5) | 16 (28.6) | |
| 21th day | 6 (40) | 9 (60) | 15 (26.8) | |
| Total | 9 (16.1) | 47 (83.9) | 56 (100) | |

Risk Factors for BNC

- Lepor et al. (2000, Urol)
 - Foley catheter removed on POD#7 or POD#4
 - No difference in BNC or incontinence rates at 3 months
- Tiguert et al. (2004, Urol)
 - Single surgeon, 345 pts.
 - Foley catheter removed on POD#4 or >POD#4

| Foley removal | BNC rate |
|---------------|----------|
| POD#4 | 2% |
| > POD#4 | 6% |

Delayed foley catheter removal may increase risk of BNC

Reducing the risk of BNC

- Patient factors:
 - Smoking cessation
- Surgeon factors:
 - High volume surgeon/hospital
 - Ensure good hemostasis
 - Early foley catheter removal?

Management options for post
prostatectomy incontinence
and bladder neck contracture

Management of post RP incontinence

- Conservative
 - Cochrane review 2009:
 - “no clear support that conservative management of any type for postprostatectomy UI is either helpful or harmful.”
 - Pelvic floor training
 - Pharmacologic
- Surgical
 - Bulking agents
 - Male sling/Adjustable sling
 - Artificial Urethral Sphincter (AUS)

Grade of evidence for Incontinence interventions

Table 3 – Quality of evidence for male incontinence treatment options

| Treatment | Level of evidence | Grade of recommendation |
|-------------------|-------------------|-------------------------|
| PFMT | 2 | B |
| Duloxetine | 3–4 | C |
| PFMT + Duloxetine | 1 | A |
| Bulking agents | 3 | B |
| Slings | 3 | B |
| ProAct | 3 | B |
| AUS | 1 | A |

PFMT = pelvic floor muscle training; AUS = artificial urinary sphincter.

» From Bauer et al., 2009 *Eur Urol*

Pelvic floor muscle training (PFMT)

- Centemero et al. (2010, *Eur Urol*)
 - Randomized, prospective trial, 118 pts.
 - Group 1- PFME daily for 30 days pre-op + daily post-op
 - Group 2- PFME post-op only
 - Outcomes: Self-reported continence and International Continence Society male short form (ICS-SF)

| | Group 1 | Group 2 |
|--------------------------------------|------------|-------------|
| Mean ICS male SF questionnaire score | | |
| At 1 mo | 14.6 ± 5.7 | 18.3 ± 5.9* |
| At 3 mo | 8.1 ± 7.6 | 12.2 ± 7.5* |
| Continence recovery, % | | |
| At 1 mo | 44.1% | 20.3%* |
| At 3 mo | 59.3% | 37.3%* |
| Nerve-sparing procedure | 59 | 59 |

Pre-op + post-op PFME is superior to pre-op PFME alone.

Pelvic floor muscle training

- **Physiotherapy vs. self-teaching of PFMT**
 - Moore, ***Byrniak*** et al. (2008, *J Urol*)
 - 3 Canadian Centres
 - 216 pts., Randomized at 4 weeks post-op to:
 - 1 time verbal instruction + written handout on PFMT (control) **vs.**
 - Same + weekly biofeedback session/PFMT with Physiotherapist

TABLE 1. 24-hour pad test results (continence = ≤ 8 g)

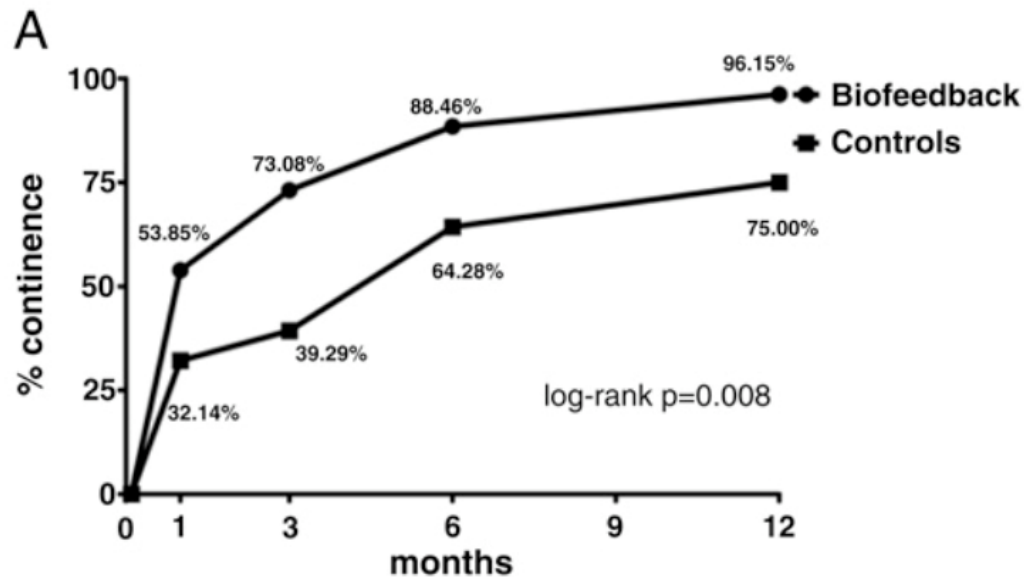
| | Baseline | | 4 wk | | 8 wk | | 12 wk | | 16 wk | | 28 wk | | 1 yr | |
|---------------------|--------------|--------------|------------------|------------------|------------------|------------------|-----------------|------------------|-----------------|-----------------|----------------|-----------------|--------------|-----------------|
| | Control | PFMT | Control | PFMT | Control | PFMT | Control | PFMT | Control | PFMT | Control | PFMT | Control | PFMT |
| N | 88 | 96 | 91 | 105 | 88 | 101 | 82 | 93 | 80 | 94 | 74 | 87 | 78 | 89 |
| Mean (SD) | 4.8 (2.8) | 5.1 (3.5) | 242.2 (328.2) | 317.9 (417.4) | 115.8 (208.8) | 166.7 (289.7) | 71.5 (144.2) | 114.9 (299.8) | 61.1 (193.9) | 75.9 (259.4) | 35 (100.95) | 44.7 (141.7) | 8.4 (9.7) | 46.5 (214.6) |
| Median | 4.3 | 4.4 | 66.5 | 165.4 | 21.1 | 25.3 | 13.9 | 13.8 | 9.8 | 9.2 | 7.3 | 7.8 | 6.1 | 7.0 |
| Range | 0.0–16.7 | 0.0–24.4 | 3.6–1440.8 | 3.0–2111.6 | 1.5–1292.8 | 0.9–1596.3 | 0.2–872.5 | 0–2295.3 | 0–1521.9 | 0–2205.6 | 0–745.7 | 0–1148.1 | 0–62.7 | 0–1971.7 |
| Continent, n (%) | | | | | 20 (23) | 20 (20) | 23 (28) | 30 (32) | 32 (40) | 41 (44) | 37 (50) | 41 (47) | 47 (64) | 53 (60) |

PFMT = pelvic floor muscle training.

Self instruction may be equal to Physiotherapist teaching of PFMT.

Pelvic floor muscle training

- Biofeedback + Pelvic floor muscle training
 - Ribiero et al. (2010, *J Urol.*)
 - 73 patients, randomized post-op to:
 - PFMT with biofeedback and teaching **vs.**
 - Brief PFMT instruction from Urologist (“Controls”)



The addition of Biofeedback to PFMT may improve continence rates.

Pharmacologic Interventions

- Duloxetine (Cymbalta)
 - Selective Serotonin/ Norepinephrine reuptake inhibitor (SSNRI)
 - Mechanism of action
 - Increases Neurotransmitter levels:
 - » Increase striated urethral sphincter tone
 - » Decrease detrusor activity
 - Proven on urodynamics (Zahariou et al. 2006 *Urol Int.*)
 - » Increased maximal urethral closure pressure (MUCP)
 - » Increased Abdominal leak point pressure (ALPP)
 - Schlenker et al. (2006 *Eur Urol*)
 - 15 pts with persistent SUI post RP despite PFMT x 3 weeks.
 - Mean pad use decreased from 8 to 4/day overall after 9 wks Duloxetine
 - 7/15 became continent (1 or less pads/day)
 - No control arm. Benefit due to time alone?

Duloxetine may improve return to continence post RP.

Urethral Bulking agents

- Collagen, autologous fat, Teflon, Deflux etc., etc.
 - No long term durability
 - Westney et al.,
 - Collagen; mean duration of response 6.4 months
 - Complete continence in only 17%
 - Risks
 - Anaphylaxis
 - Migration
 - Reports of Teflon in lymph nodes, lung, brain
 - Newer agents eg. Deflux, minimal migration
 - Repeat procedures

Bulking agents are not recommended in treatment of SUI post RP.

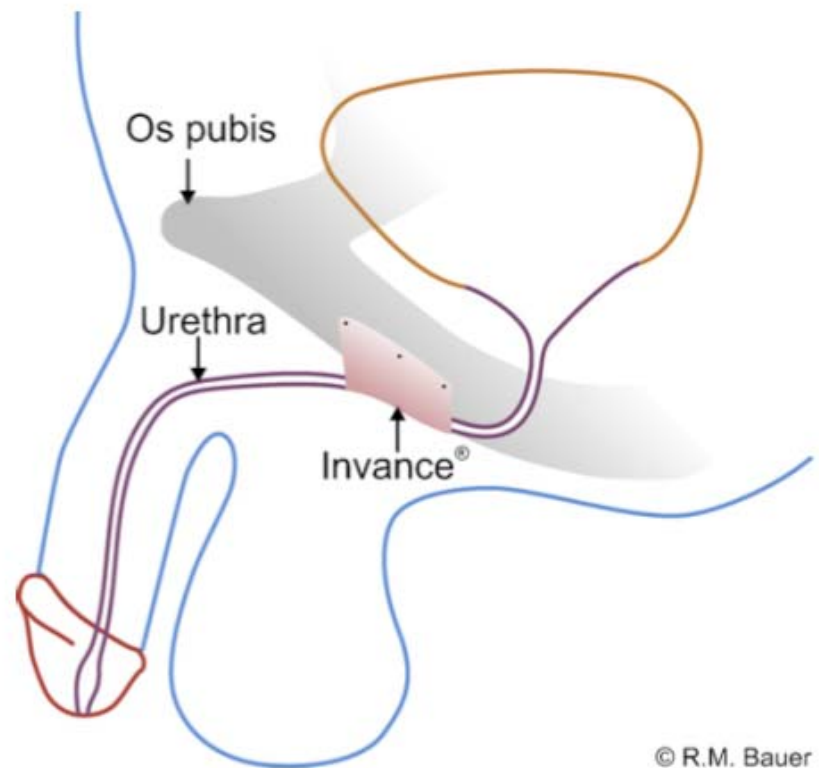
Bone anchored slings

*InVance*TM (AMS)

- Woven polyester mesh (silicone coat)
- Titanium bone screws (3-6)
- Works by Passive urethral compression

Steps:

- Perineal incision
- Positioned under bulbar urethra
- Screwed into ischiopubic rami



Bone anchored slings

| Author | Cured | Improved |
|---|-------|----------|
| <i>Gilberti et al. N=40</i> <i>(2009 J Urol)</i> | 55% | 32% |
| <i>Fassi-Fehri N=50</i> <i>(2007 Eur Urol)</i> | 50% | 26% |

Only 25% cure rate if prior RadTx.

–High complication rate:

- Perineal pain (resolved at 3 mths.) 73%
- Sling infection 15%
- Explantation 8%
- Denovo detrusor overactivity 5%

Bone anchored slings are falling out of favour b/c of lower success rate and higher complications vs other options.

Readjustable sling systems

- Remeex

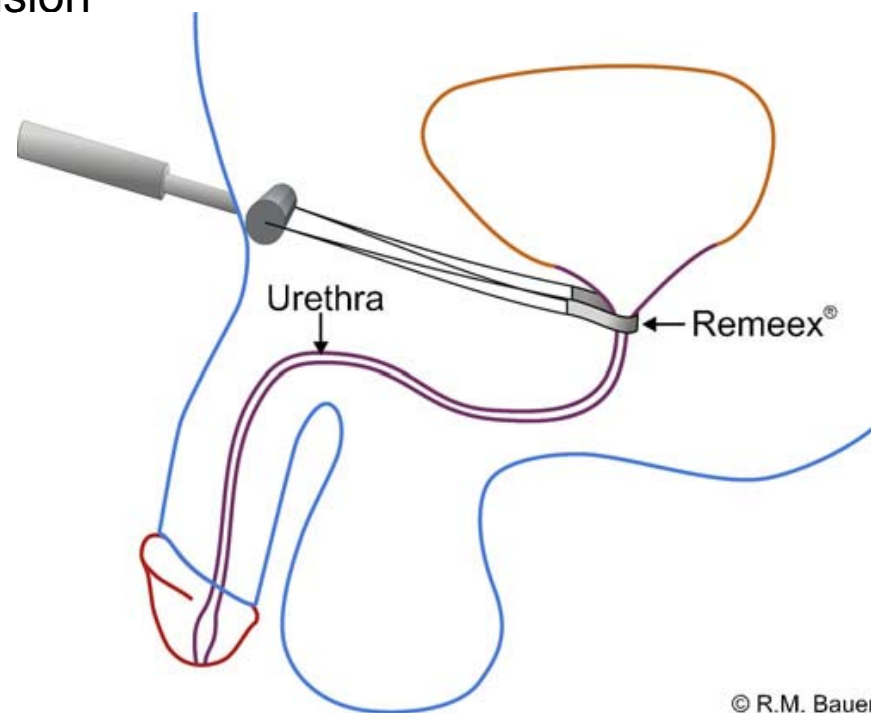
- “Readjustable” suburethral sling
- Urethral compression from ventral tension
- Requires SP and perineal incisions

- Success rate 65-73%

- Sousa-Escandon (2007 *Eur Urol*)
- Romano (2006 *BJU Int*)

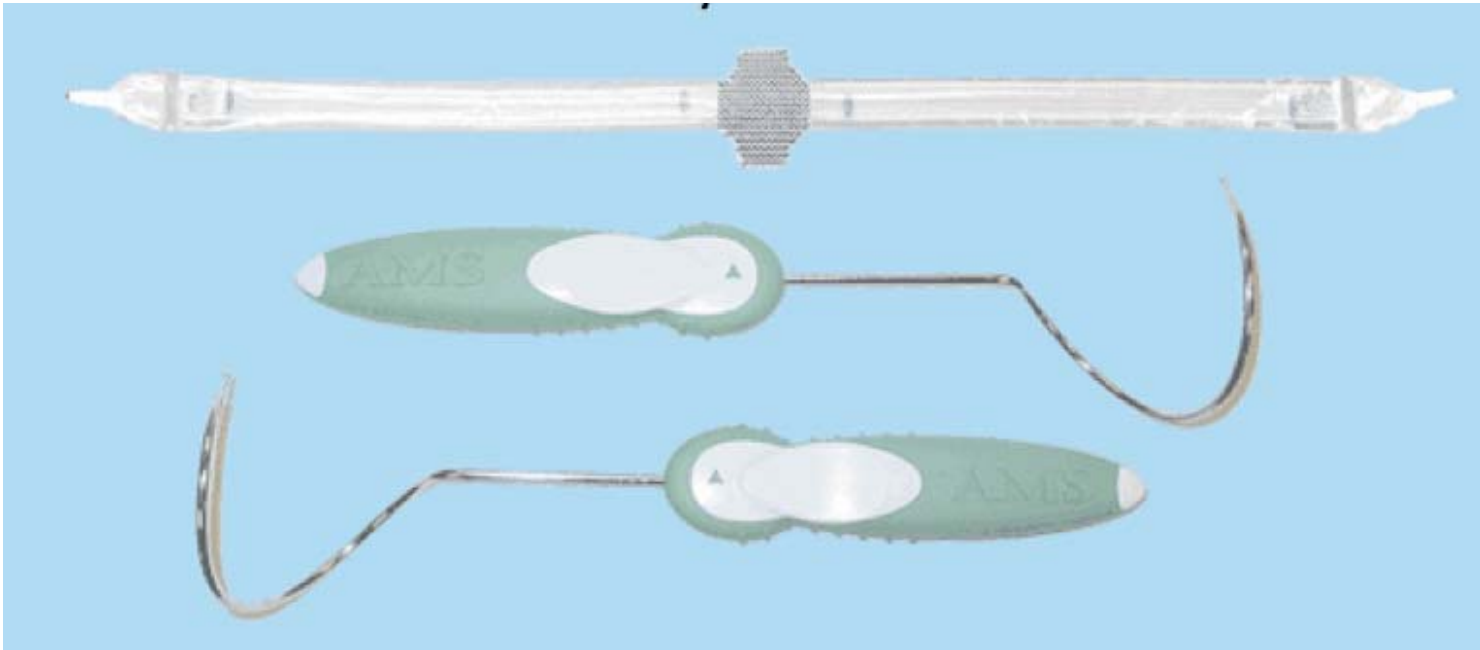
- Complications:

- Readjustment 95%
- Sling removal 6%
- Urethral erosion 2%
- Infected regulator 4%
- Bladder perf. 10%



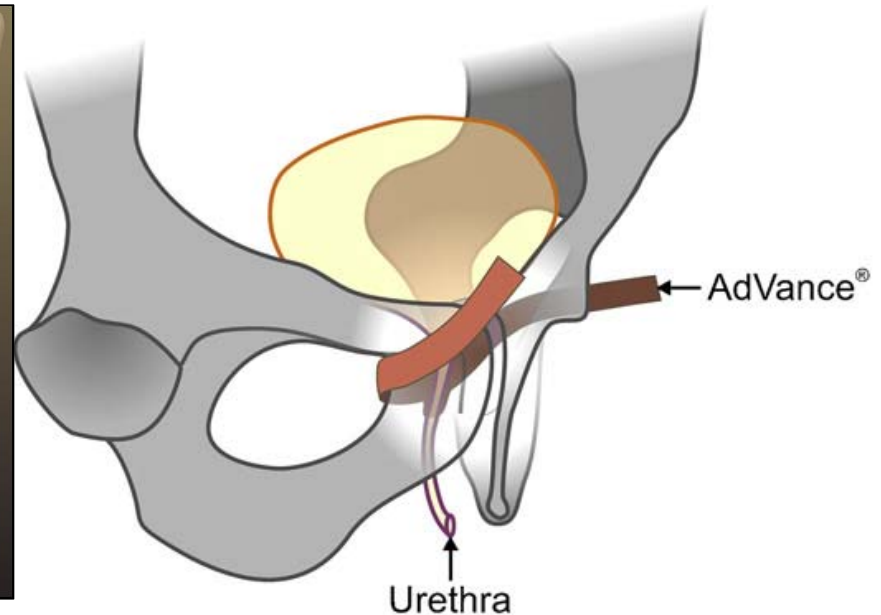
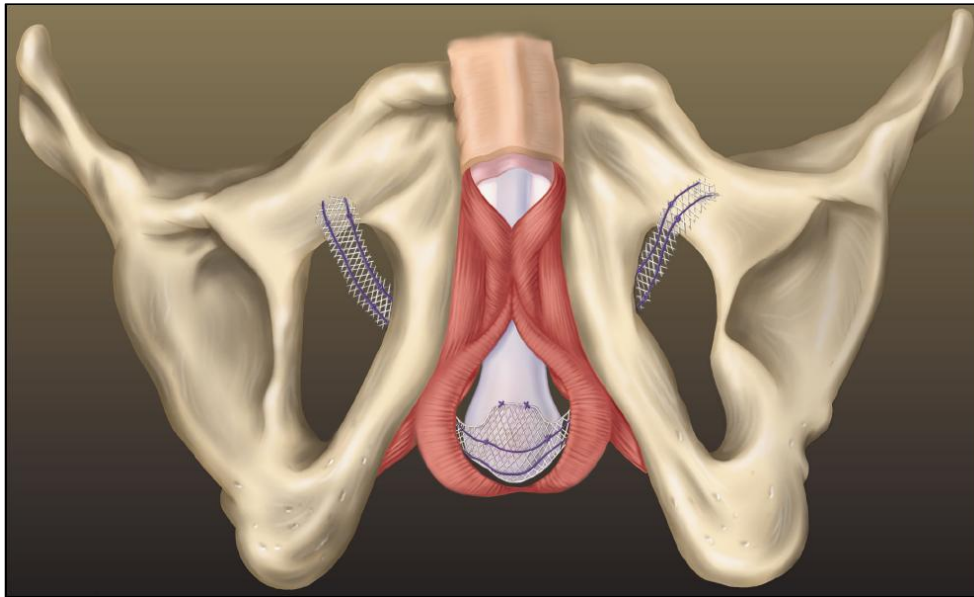
Transobturator sling *AdVance™ (AMS)*

- Kit contains polypropylene tape and 2 needle passers
- Tape placed under membranous urethra via perineal incision



Transobturator sling *AdVance™ (AMS)*

- “Functional retrourethral sling”
- Repositions lax proximal urethra
 - Returns supporting structures of sphincter to pre prostatectomy location
 - Non-obstructive



© R.M. Bauer

From Bauer et al. (2009 *Eur Urol*)

Transobturator sling
AdVanceTM (AMS)

- Davies et al. (2009 *J Urol*)
 - N=13
 - Urodynamics at baseline and 6 months post-op
 - Increased valsalva leak point pressure after AdVance (p=0.032)
 - Postvoid residual and flow rates unchanged

Table 1. Preoperative and postoperative urodynamic parameters

| Parameter | Preoperative | Postoperative | P Value* |
|---|---------------|---------------|----------|
| Valsalva leak point pressure (mm Hg) | 29.3 ± 15.3 | 46.6 ± 11.2 | .03 |
| Detrusor voiding pressure at Qmax (mm Hg) | 26.2 ± 18.9 | 32.1 ± 24.7 | .50 |
| Postvoid residual urine volume (mL) | 19.6 ± 12.1 | 19.2 ± 12.4 | .90 |
| Maximal uroflow (mL/s) | 23.5 ± 21.1 | 21.9 ± 12.6 | .82 |
| Average uroflow (mL/s) | 9.7 ± 6.8 | 10.6 ± 5.5 | .72 |
| Total voided volume (mL) | 225.7 ± 120.1 | 257.4 ± 124.3 | .52 |

Qmax = peak flow rate

Transobturator sling
AdVanceTM (AMS)

- Cornu et al. (2009, *Eur Urol*)
 - N= 102
 - 64 were “cured” (No pad, or only 1 “security” pad/day)
 - 18 others improved
 - Overall, 80 % cured or improved
 - Previous radiation associated with higher rate of failure (p=0.039)

Transobturator sling
AdVance™ (AMS)

- Rapoport and Webster (2009, *AUA abstract*)
 - N=86 ; Median f/u 11 months
 - Subgroup analysis:
 - “Ideal” candidates **vs.**
 - “Suboptimal” candidates
 - Prior radiation
 - Prior incontinence surgery
 - Concurrent bladder neck contracture

| Candidate type | Success rate |
|--------------------------|---------------------|
| <i>Ideal (n=60)</i> | 90% |
| <i>Suboptimal (n=26)</i> | 78% |

Transobturator sling *AdVance™ (AMS)*

Complications of transobturator sling

| | |
|-------------------------|--------|
| Infection | <2% |
| Erosion | <1% |
| AUR post-op (transient) | 10-15% |
| Scrotal numbness/pain | 10-15% |

Bauer (2009 *Eur Urol*)

Carlson (2008 *CUAJ*)

Cornu (2009 *Eur Urol*)

Gozzi (2009 *J Urol*)

In carefully selected patients, AdVance sling offers excellent results.

Artificial Urethral Sphincter *AS-800™ (AMS)*

- First introduced in 1972
- Gold standard
 - Best option for severe incontinence
 - Still good results with Hx of XRT
- Disadvantages:
 - More expensive than slings
 - More invasive surgery
 - Inflatable periurethral cuff
 - Requires dexterity, mental capacity

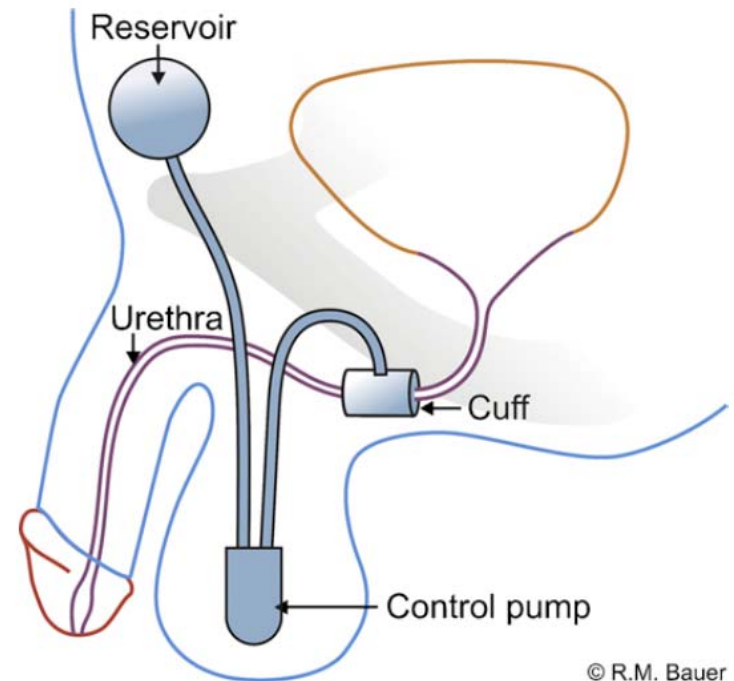


TABLE V. Results of the Artificial Urinary Sphincter in Post-Radical Prostatectomy Incontinence

| Refs. | No. of patients | Follow-up (years) | 0–1 pad/day (%) |
|---------------------------------------|-----------------|-------------------|-----------------|
| Montague ¹³⁹ | 66 | 3.2 | 75 |
| Perez and Webster ¹³⁷ | 49 | 3.7 | 85 |
| Martins and Boyd ¹⁴⁰ | 28 | 2 | 85 |
| Fleshner and Herschorn ¹⁴¹ | 30 | 3 | 87 |
| Mottet et al. ¹⁴² | 96 | 1 | 86 |
| Madjar et al. ¹⁴³ | 71 | 7.7 | 59 |
| Klijn et al. ¹⁴⁴ | 27 | 3 | 81 |
| Haab et al. ¹⁴⁵ | 36 | 7.2 | 80 |
| Trigo-Rocha et al. ⁴⁴ | 40 | 4.5 | 90 |
| Kim et al. ¹⁴⁷ | 124 | 6.8 | 82 |
| Lai et al. ¹⁴⁸ | 218 | 3.1 | 69 |
| Goldwasser et al. ¹⁴⁶ | 42 | 1.2 | 82 |

“Success” rate 59-90% (0-1 pads/day)

From Herschorn et al. (2010 *Neurourol and Urodyn*)

Durability of Artificial Urinary Sphincter

- Fulford et al. (1997 *BJU Int*)
 - 75% of pts with implanted AUS still had or died with a functioning AUS at 15 years
 - Revisions for:
 - Malfunctioning resevoir or control pump
 - Cuff replacement
 - Repositioning or downsizing due to urethral atrophy

AUS in presence of BNC

- Subset of patients with BNC have concurrent SUI
- Can be successfully treated with AUS, but:
 - Must ensure stability of stricture to decrease risk of erosion.
 - Will require dilation, incision or urethral stent **prior to AUS**.

Management of BNC post RP

- Dilation
- Cold knife incision
- Laser incision
- Transurethral resection of bladder neck excision
- Urethral Stent +/- AUS
- Urethral reconstruction
- Creation of catheterizable limb +/- augment

Dilation

- Mainstay for initial management of BNC
 - Assumes lumen can be cannulated (not severe BNC)
 - Serial, graduated dilations to up 18-26F
 - May be followed by self cath to maintain patency
 - Variable regimes/time frames recommended
 - Recurrence rates as high as 70% reported

Dilation

- Besarani et al. (2004, *BJU Int*)
 - N=48; mean f/u 30 months
 - Dilation up to 26F
 - Foley catheter x 12hrs only
 - 19% required 2 or more procedures
 - **All** voided well with normal flow at end of f/u
 - Did not stage degree of BNC
 - Presumably mild BNC if dilated to 26F
- Severe strictures
 - Success rate from single dilation is 25-70%

Cold knife incision

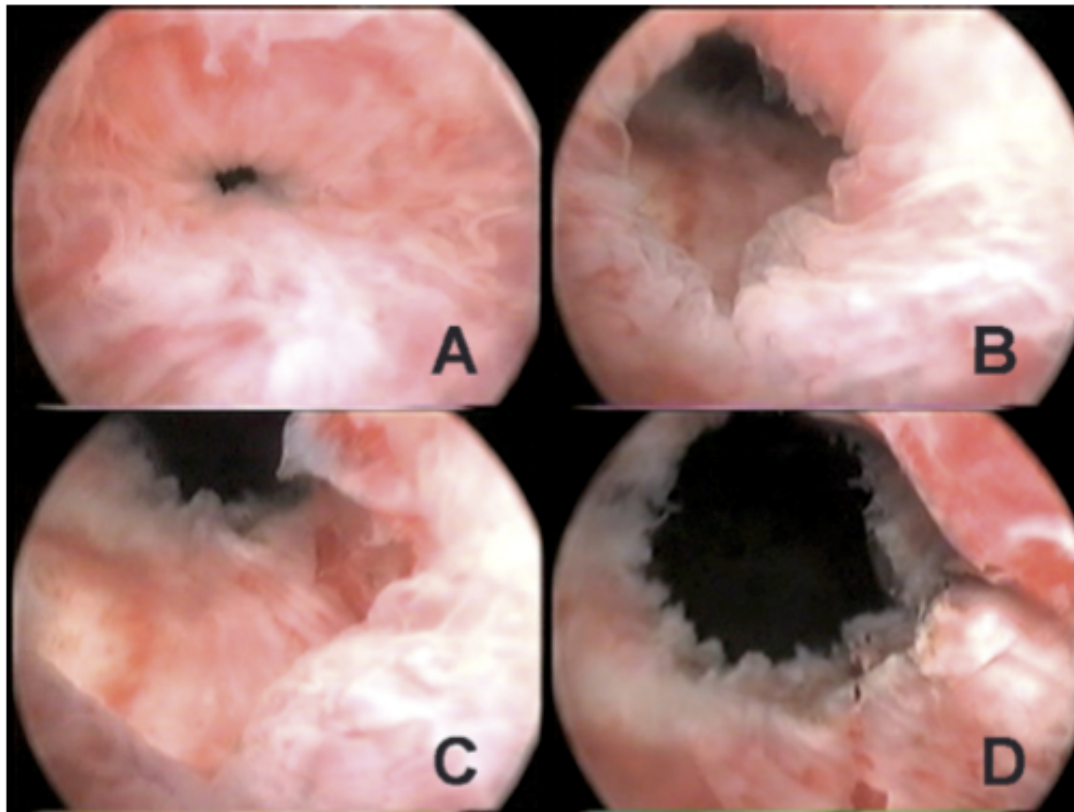


Fig. 3 – Sequential images of urethroscopy performed immediately after cold-knife incision of an anastomotic stricture using a 24F, 0° lens instrument: (A) competent external sphincter; (B) passage through sphincter; (C) incised anastomotic stricture located approximately 15 mm proximally to the external sphincter; (D) end result of cold-knife incision.

Deep incisions at 4, 8 and 12 o'clock or 3 and 9 o'clock along length of stricture.

Cold knife incision

- Giannarini et al. (2008 *Eur Urol*)
 - N=648 RP pts, median f/u 48 months
 - 46 (7.1%) developed urethroscopically proven BNC
 - 3 were dilated with no recurrence
 - 43 had Cold knife incision
 - » Deep incisions 4, 8, 12 o'clock for entire stricture length
 - » Foley catheter x 4 days
 - 26% recurrence rate
 - No pts developed de novo urinary incontinence
- Recurrence rates in literature:
 - 26-38%
 - Very low incidence of denovo incontinence
 - » Westney et al., (2008, *Curr Opin Urol*)
 - » Dalkin et al., (1996, *J Urol*)

Holmium laser incision

- Small retrospective series with limited f/u

| Author | Median f/u (months) | Recurrence free rate (%) | Repeat Laser incision (%) |
|---|--------------------------------|-------------------------------------|--------------------------------------|
| Eltahawy (n=24) <i>2008 BJU Int</i> | 24 (6-72) | 79% | 21% |
| Lagerveld (n=10) <i>2005 J Endourol</i> | 18 (2-29) | 100% | 0% |

On the basis of limited evidence, BNC recurrence rates are lower than cold knife.

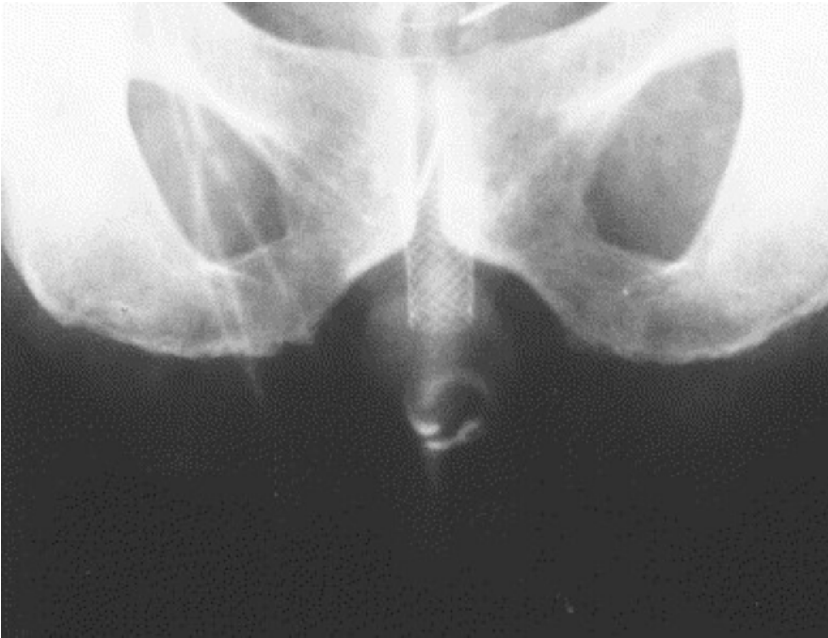
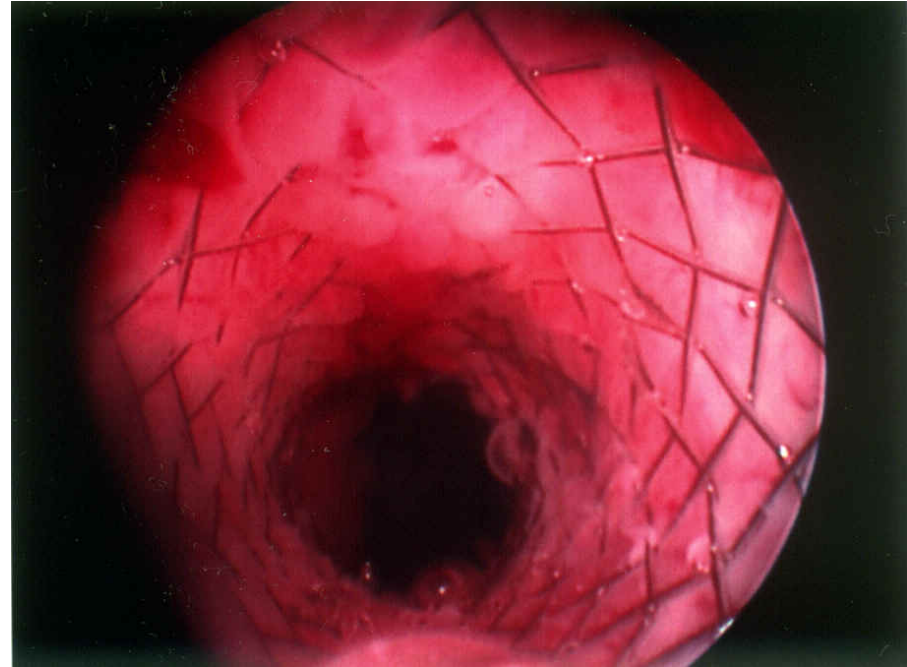
Electrocautery resection

- Generally reserved for longer, dense strictures
 - In pts who failed CKI, or
 - In pts with concurrent SUI in preparation for stent +/- AUS
- Results/durability poorer than CKI, but
 - Selection bias towards worse strictures
- Recurrence and de-novo incont. rates are higher
 - Anger et al. (2005 *J Urol*)

Urethral stent

Urolume™ (AMS)

- Braided mesh wire
 - Placed cystoscopically
 - after BN resection
 - Expandable to 42F
 - Lengths 1.5 - 3 cm
 - Stabilizes with urothelial ingrowth



High risk of denovo incontinence !

Urethral stent

Urolume™ (AMS)

- Erickson et al., (2010 AUA abstract)
 - N=14, median f/u 21.5 months
 - All failed endoscopic treatment; Mean 3 (1-9)
 - Urethrotomy immediately followed by stent insertion

| | Follow-up (mo) | Time to Stricture from CAP Therapy (years) | Length of Stricture (cm) | Post-op Recurrence (yes %) | Time to restenosis (mo) | Incontinence (yes %) |
|------------------------|----------------|--|--------------------------|----------------------------|-------------------------|----------------------|
| Overall (38) | 21.5 ± 25 | 2.9 ± 3.2 | 3.0 ± 1.7 | 14 (37%) | 18.6 ± 26.5 | 27 (71%) |
| RP (no radiation) (14) | 27.7 ± 33.9 | 1.3 ± 2.3 | 2.0 ± 0.7 | 3 (21%) | 39.5 ± 44.4 | 7 (50%) |
| Radiation (24) | 17.8 ± 18.6 | 3.8 ± 3.3 | 3.6 ± 1.9 | 11 (46%) | 12.3 ± 17.6 | 20 (83%) |

Urethral stent + AUS

- Stent associated with high rate of denovo incontinence
 - What next?
- Magera et al. (2009 *J Urol*)
 - N=25; urethral stent + delayed AUS
 - 25/25 severe recurrent BNC despite aggressive resection
 - 23/25 had concurrent SUI
 - 92% had improved QoL scores after Stent + delayed AUS

Urethral stent + AUS

One stage vs. two stage procedure

- Magera et al. (2009 *J Urol*)
 - Aggressive Resection plus stent
 - 4 month observation period (*local cysto*)
 - 37% BNC recurrence rate
 - AUS only once BNC stable
 - 92% improvement in QoL scores after stent + AUS

Urethral stent + AUS

- Gousse et al. (2005 *J Urol*)

- N=15
- median f/u 11 month

| Parameter | Patients (n) | Mean Follow-up (mo) |
|--|--------------|---------------------|
| Patent BN after single TUIBNC | 12/15 | 15 |
| Developed BNC recurrence 5–8 wk after TUIBNC | 3/15 | 9 |
| Reincised after recurrence of BNC | 3/3 | 9 |
| Patency 5–8 weeks after 2nd reincision of BNC | 3/3 | 7 |
| Continent (0–1 pad/day) after AUS (AMS 800) bulbar urethra | 12/13 | 11 |

- Delayed AUS insertion allows time to confirm stabilization of stricture
- 2-stage stent + AUS preferred over 1-stage

Urethroplasty/ Reconstruction

- For dense, long, recurrent strictures after urethral stent placement.
- Various approaches reported
 - abdominoperineal, transpubic, perineal
- Widely variable continence rates (0-100%)
 - AUS may be necessary to achieve continence

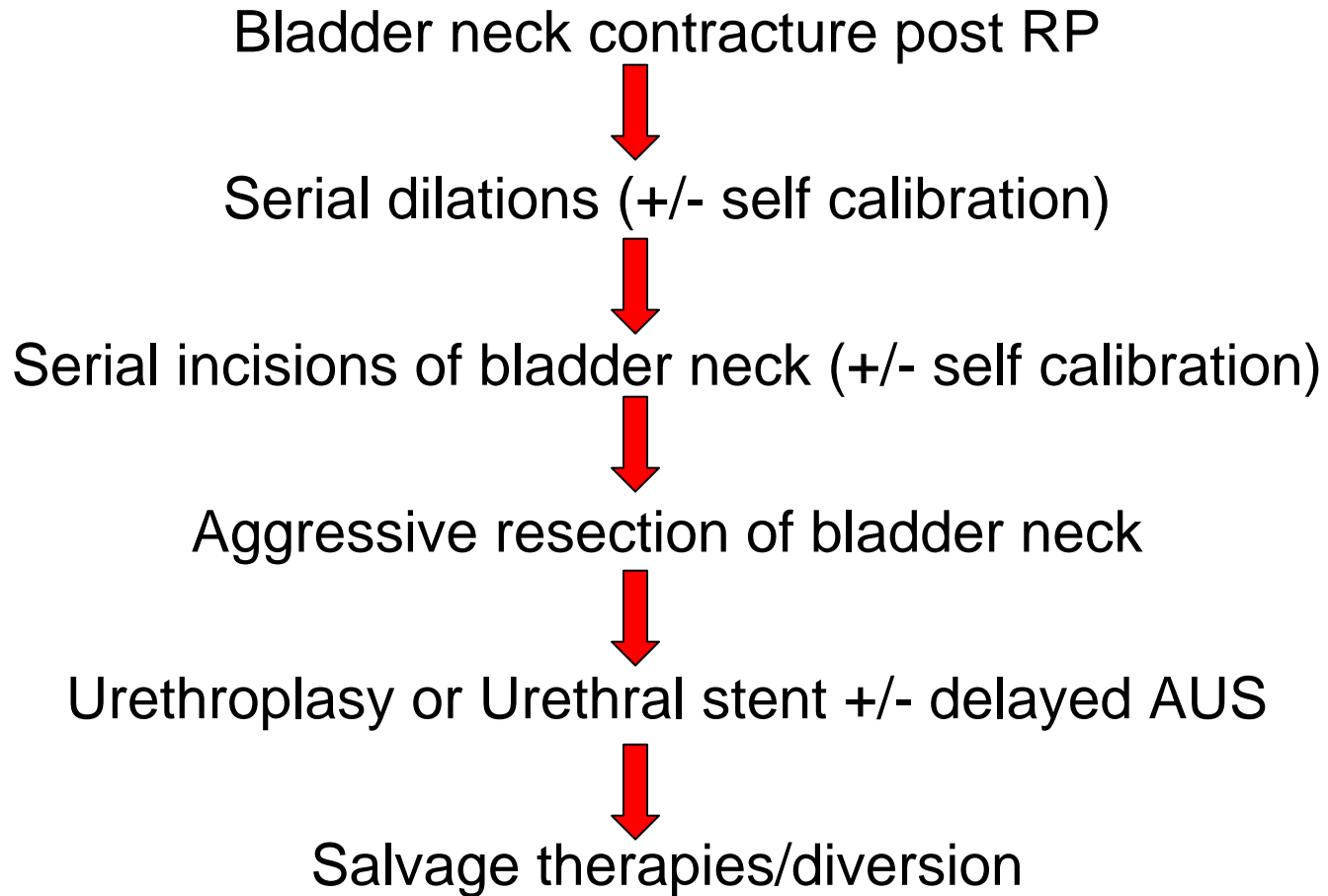
Salvage therapy

- **Diversion/ Catheterizable limb**
 - For severe, recurrent BNC, despite multiple procedures
 - Appendicovesicostomy (Monti)
 - Reconstructed ileal segment
 - No need to close bladder neck, as rapid restenosis likely
- **Cystectomy with ileal conduit or catheterizable diversion**
 - Last resort, mostly pts with Hx of radiation

Case

- 65 y.o. male
- RRP 2004
 - + margins, referred for adjuvant RadTx
- Develops severe BNC and incontinence
 - Multiple dilations ***failed***
 - Multiple transurethral incisions ***failed***
 - Deep resection and self-cath ***failed***
- ***Recalcitrant bladder neck contracture and incontinence***
 - What now?

Treatment pathway for recalcitrant bladder neck contracture



Summary

- Bladder neck contracture and SUI post RP significantly impact QoL
- 5-15 % will be incontinent 1 yr post RP
- 5-10% will develop BNC requiring procedure
- SUI and BNC often occur concurrently

Summary

- Stress Urinary Incontinence

- Trauma to intrinsic sphincter most likely etiology
- Reducing risk:
 - PFMT is recommended pre and post-op
 - Physical activity
 - Maximize urethral length
 - Nerve sparing
 - Bladder neck sparing may offer earlier return to continence
- Surgical management
 - Urethral bulking agents not recommended
 - AUS remains the gold standard (effective even if prior XRT)
 - Male slings are less expensive, less invasive option
 - Excellent results in well selected pts.

Summary

- Bladder neck contracture
 - Impaired healing of watertight VUA most likely etiology
 - Often concurrent SUI
 - Reducing risk
 - Smoking cessation
 - High volume surgeon / hospital
 - Minimize post-op bleeding/hematoma
 - Early foley catheter removal may decrease risk
 - Surgical management
 - Dilation and transurethral incision are often effective
 - Aggressive resection for frequently recurrent, severe BNC
 - Urethral stents effective but high incidence of denovo incontinence
 - AUS may be necessary
 - Salvage therapies include urethroplasty, diversion

???

