Urinary Complications of Prostate Cancer Treatment

Rajveer Purohit MD, MPH
Assistant Clinical Professor
Weill Medical College of Cornell University

Treatment Options for Localized Prostate Cancer

- Active Surveillance
- Radical Prostatectomy
- Radiation Therapy
- Other (Cryotherapy, HIFU)

Treatment and Urinary Symptoms

Treatment	Incontinence	Other urinary tract symptoms	Cure
Surveillance	Low	Low	Depends
Prostatectomy	Moderate	Improves	High
Radiation	Lower	Moderate	High

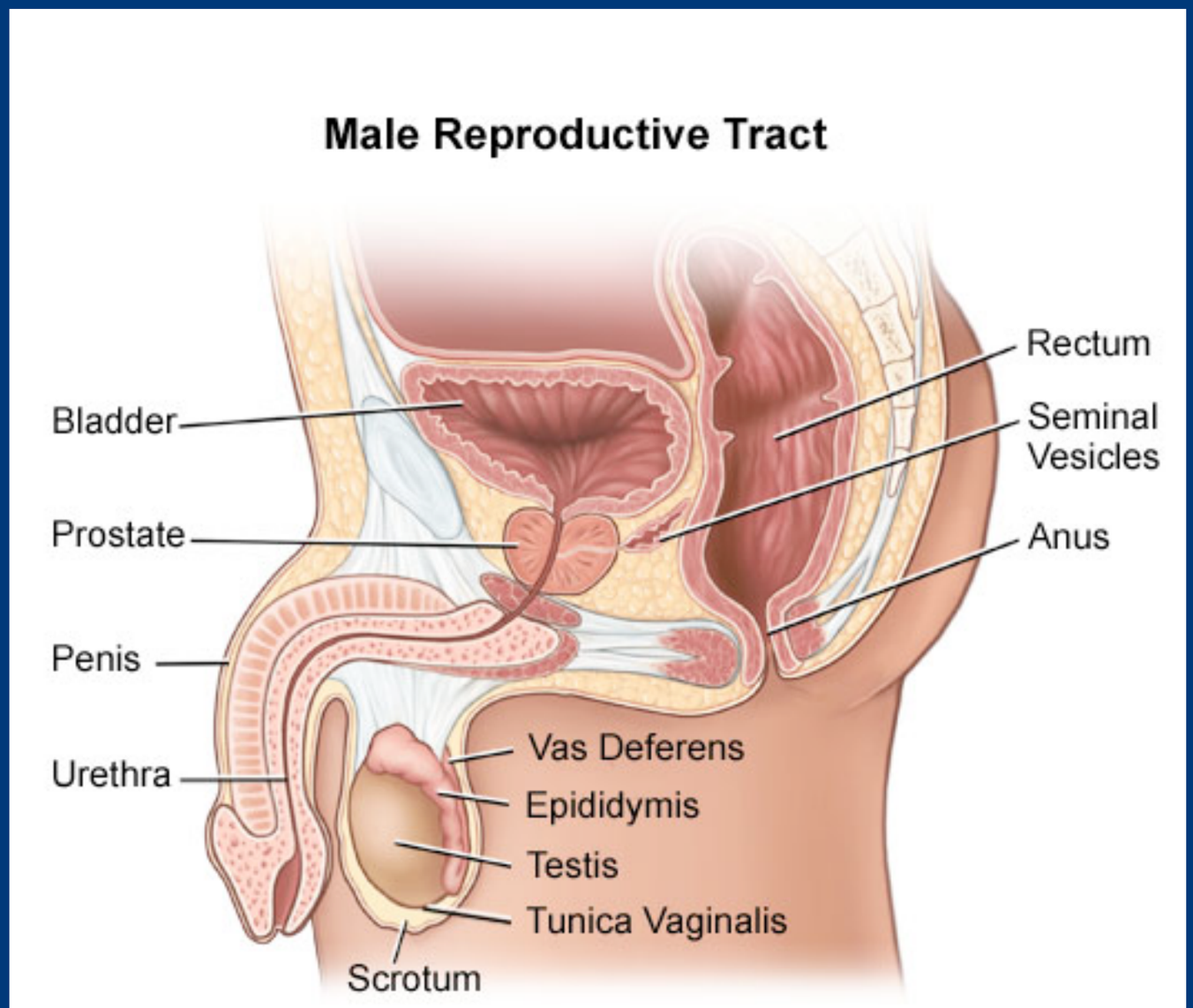
Types of Incontinence

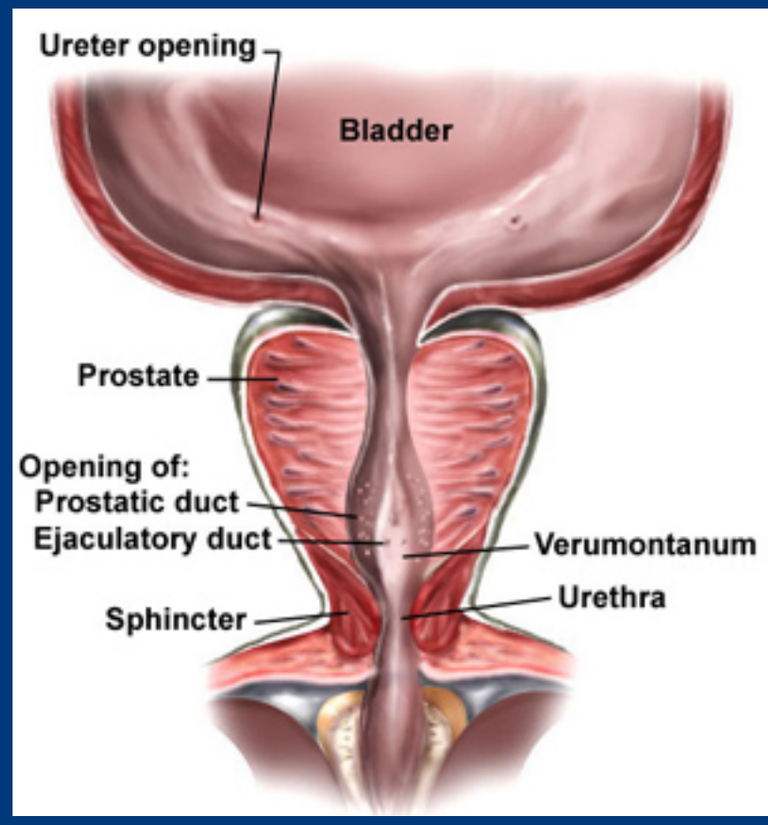
- Stress Incontinence
- Urge Incontinence
- Mixed Incontinence
- Post-Void dribbling
- Overflow Incontinence
- Unaware Incontinence

Types of Urinary Bother

- Radiation cystitis and urethritis (inflammation)
- Overactive bladder and urinary urgency
- Obstructive urinary symptoms
- Urethral scar (Bladder neck contracture or urethral stricture)
- Blood in the urine (Hematuria)

Prostate Anatomy





Evaluation

Purpose Of Workup

- Define pathophysiology
- Identify remediable causes
- Direct treatment
- Prognosticate

Evaluation

- History and Physical exam
- Uroflow and Post-void residual
- Bladder Diary
- Pad Test
- Cystoscopy
- Videourodynamics

24 Hour Bladder Diary

- For Each urination
  - Record amount
  - Time
    - Cause of urination i.e. severity of urge
- Helps distinguish polyuria from small bladder capacity
- Useful to distinguish causes of incontinence

Incontinence instrument determines outcomes

Pad Count is a Poor Measure of the Severity of Urinary Incontinence

Johnson F. Tsui, Milan B. Shah, James M. Weinberger,*,† Mazyar Ghanaat, Jeffrey P. Weiss,‡ Rajveer S. Purohit§ and Jerry G. Blaivas‖

From the State University of New York Downstate Medical Center (JFT, MBS, MG, JPW), Brooklyn and Weill Cornell College of Medicine (RSP, JGB) and Institute for Bladder and Prostate Research (JFT, MBS, JMW, MG, JPW), New York, New York

Conclusions: There was little correlation between the number of pads used and the severity of urinary incontinence ($r = 0.26$). These data suggest that pad count should not be used as an objective measure of incontinence severity. Instead, pad weight on a 24-hour pad test should be used.

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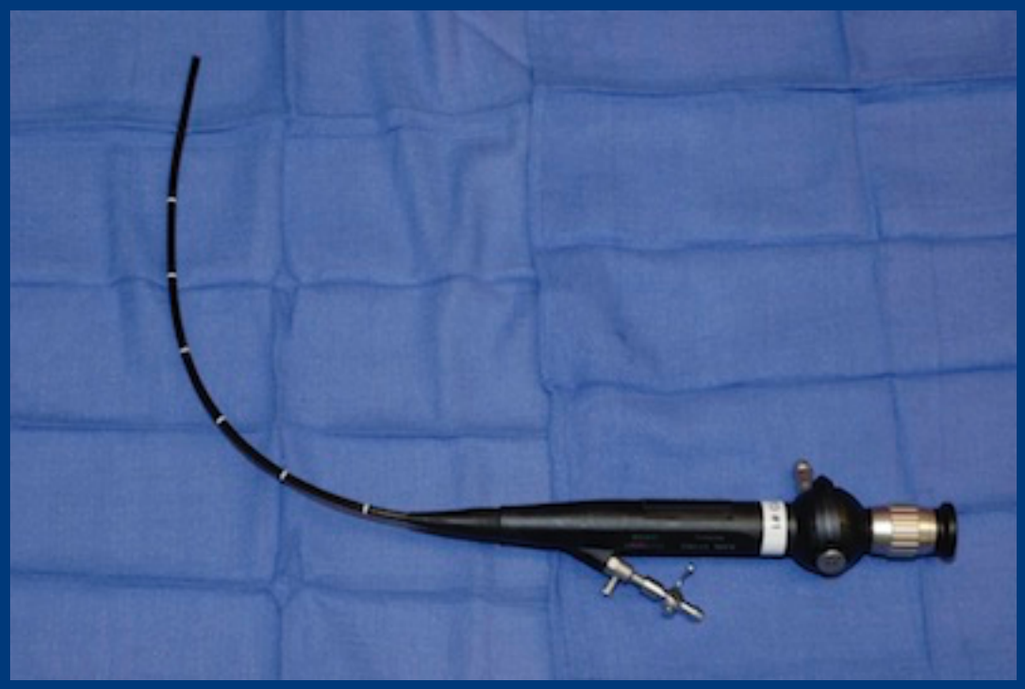
24 Hour Pad test

- All urinary pads used in 24 hour period
- Place pads in plastic bag
- Subtract weight of dry pad
- Assess incontinence
  - <25 gm/day: Mild
  - 25-100 gm/day: Moderate
  - >100 gm/day: Severe

Cystoscopy

- Endoscopic examination of the urethra and bladder
- Evaluate status of sphincter
- other contributing factors e.g urethral stricture or bladder neck contracture



Videourodynamics

Urinary Problems after Prostatectomy

Overview

- Prior symptoms of BPH e.g slow stream, nocturia, urgency frequency often improve
- Post prostatectomy incontinence (PPI) is the major post-surgical urinary symptom
  - Up to 1 year post-op for continence
- Urethral scar tissue (Stricture/Bladder neck contracture) less common

Risk Factors of PPI

- Patients Age and Prior Urinary symptoms
- Experience of Surgeon more important than technique
- Tumor at prostatic apex
- Extent of nerve sparing operation
- Urethral length at time of surgery

Risk of PPI

- Depends on how you define it
  - subjective measures
    - pad count
    - 1 hour pad test
    - 24 hour pad test
- Ranges between 1%-30%

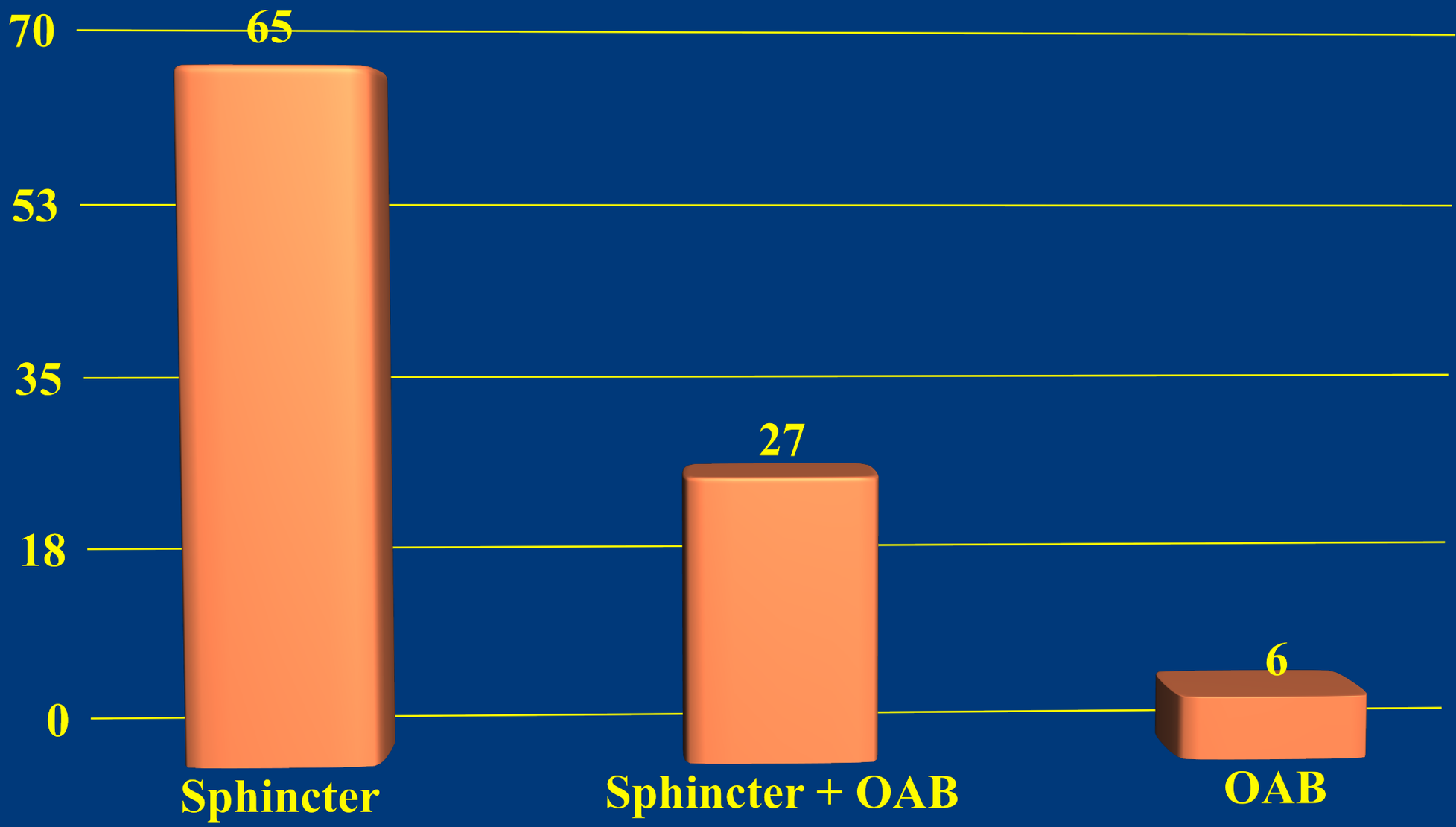
PPI Mechanism

- Sphincter Abnormality
  - Sphincter deficiency
    - Stricture or bladder neck contracture
- Bladder abnormality
  - Overactive bladder
  - Other e.g. bladder compliance

Diagnostic Evaluation

- History & physical exam
- U/A & culture
- Diary & pad test
- Uroflow & PVR
- +/- Urodynamics
- +/- Cystoscopy

URODYNAMIC DIAGNOSIS



Groutz, Blaivas, et al. J Urology 2000

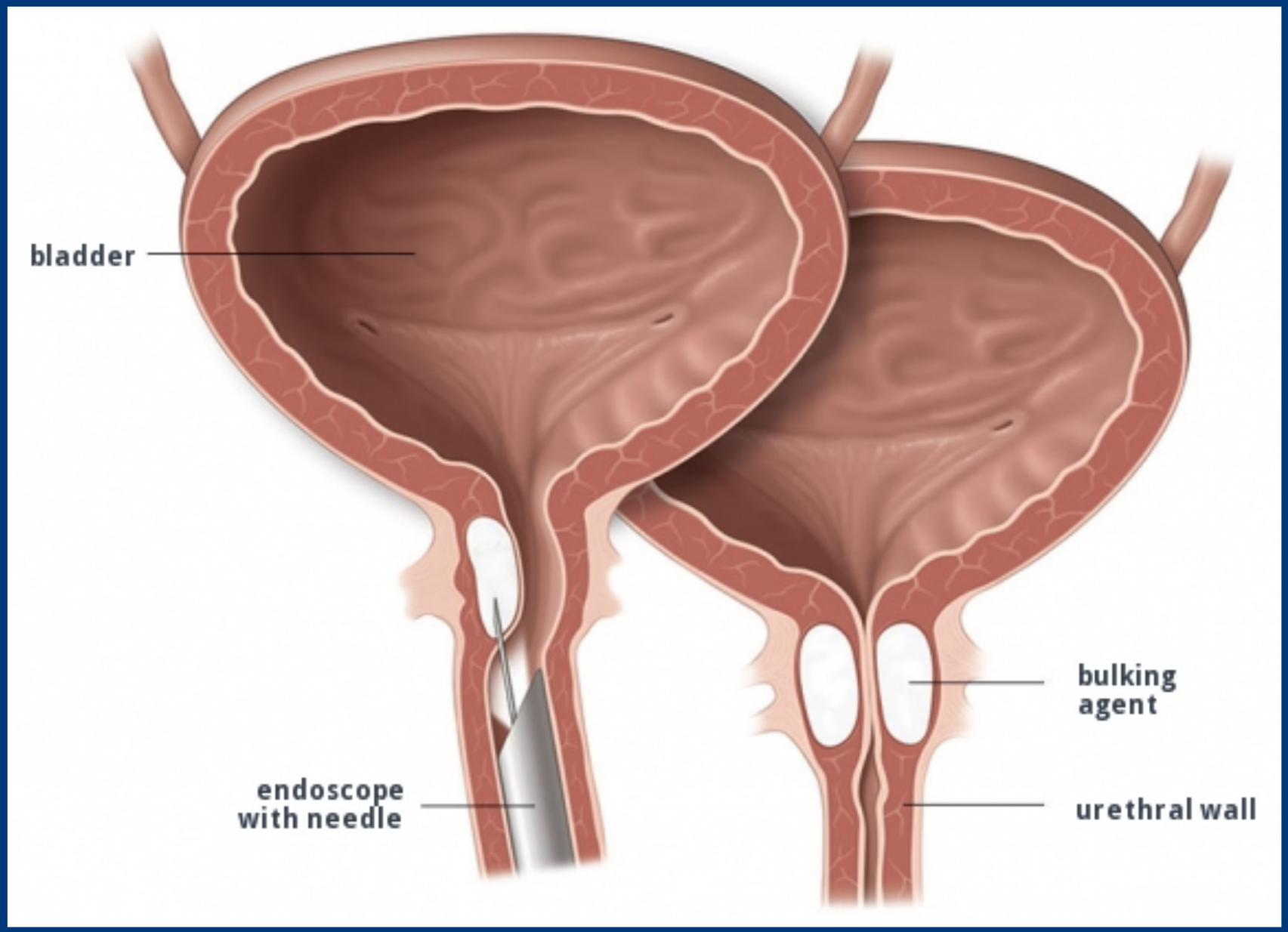
“Conservative” Management

- Surveillance
  - Early continence predicts long term continence
    - Pads and appliances
- Behavioral therapy
  - 24 hour diary
- Biofeedback/Pelvic Floor Physical Therapy

Medical Treatment for Incontinence

- Medicines that Relax the bladder
  - Anticholinergics e.g. Detrol, Vesicare
  - Myrbetriq
- Medicines that tighten the sphincter
  - Imipramine
  - Cymbalta

Urethral Bulking Agents



Bulking Agents Results

Bulking agent and study	No. of patients	Results after first injection	Side-effects
Macroplastique			
Kylmala et al [71]	50	After first injection: 12% continent, 56% improved continence After repeated injections (max. 4): Max. 4: 60% continent, 24% improved continence, 16% no change	Dysuric complaints
Imamoglu et al [70]	25	After 1–2 injections: 80% mild incontinence, 23% severe incontinence	Two urinary tract infections One urinary retention
Deflux			
Alloussi [72]	72	After 4–8 wk: 58% continent, 39% improved	Urinary tract infection
Durasphere			
Secin et al [73]	8	No subjective or objective cure	–

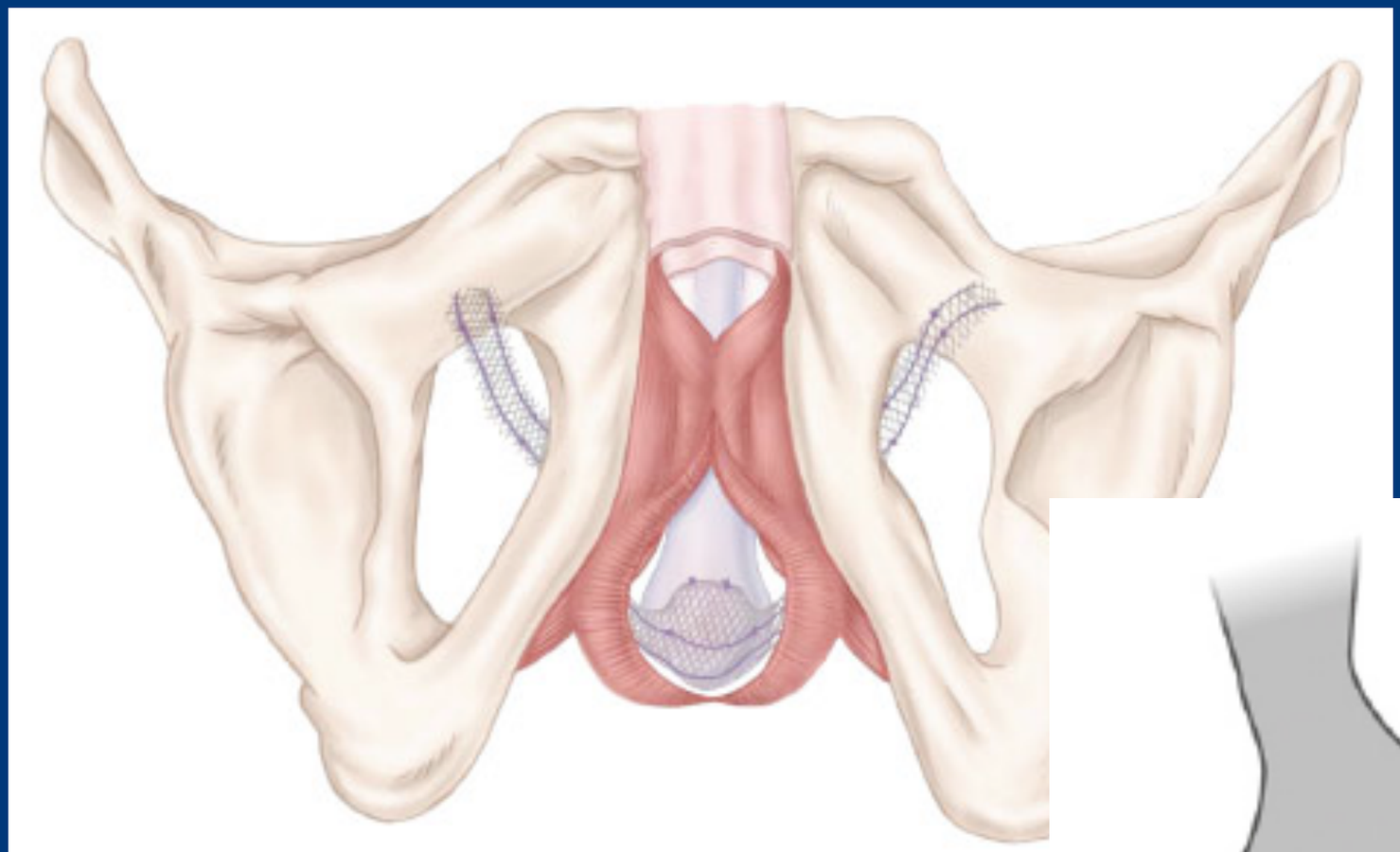
Postprostatectomy Incontinence: All About Diagnosis and Management

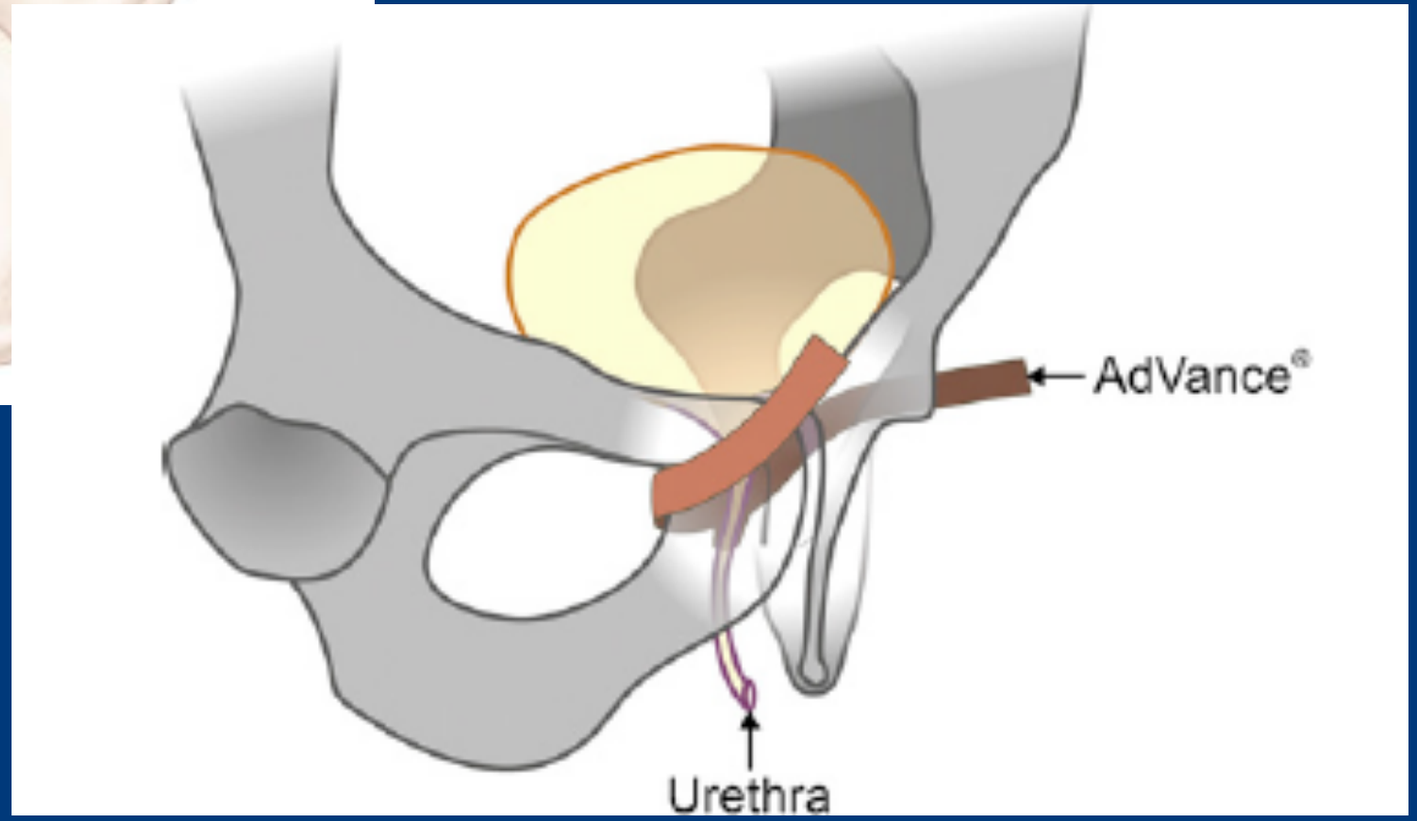
Ricarda M. Bauer, Patrick J. Bastian, Christian Gozzi, Christian G. Stief*

Urologische Klinik und Poliklinik, Ludwig-Maximilians-Universität München, Klinikum Großhadern, Munich, Germany

EUROPEAN UROLOGY 55 (2009) 322–333

AdVance Sling

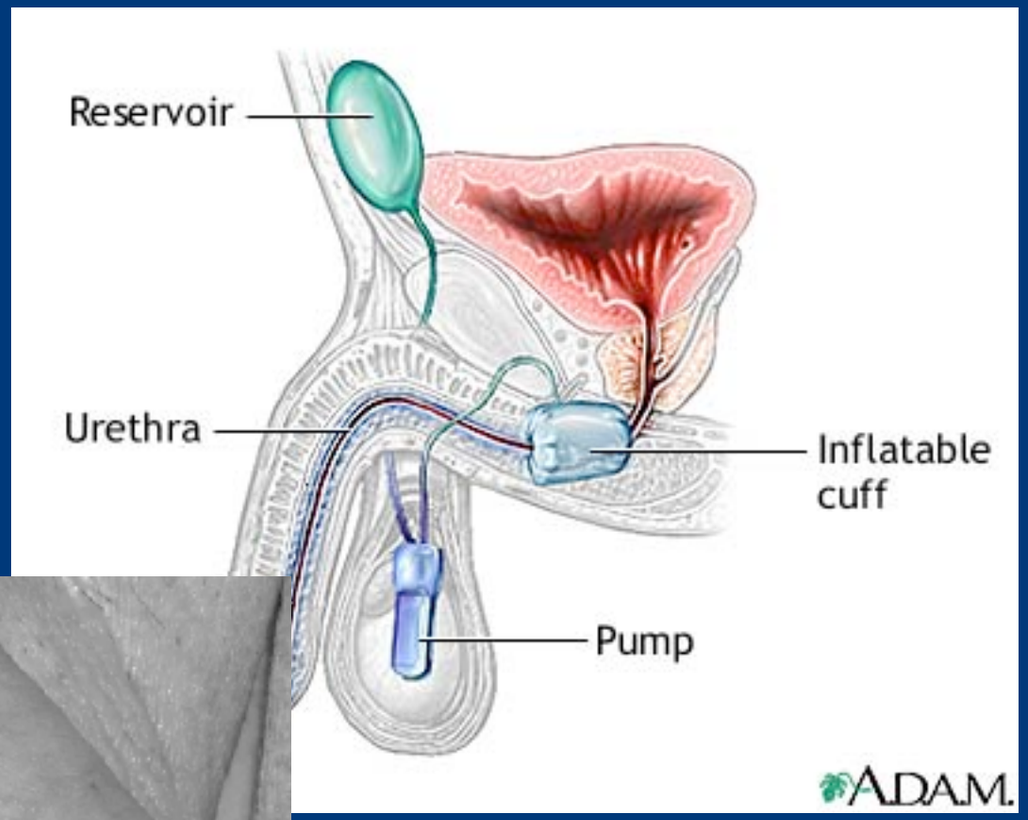




AdVance Sling

- Easy to place in OR
  - Best for mild to moderate incontinence
- Concern about polypropylene mesh
  - Removal can be difficult
- Published success between 50-90%
- Patients with prior radiation have higher risk

Artificial Urinary Sphincter



Artificial Urinary Sphincter

- Placed in OR with overnight hospital stay
- Longest experience (introduced in early 1970s)
- Works with any level of incontinence
- With time urethra tends to atrophy
- Radiated patients have higher complication rate

Outcomes and Complication Rates of Surgical Therapy for Male Sphincteric Urinary Incontinence

	OUTCOMES (%)				
DEVICE	Cured or Improved	Cured	Improved	Failed	Infection/ Erosion
AUS	88-89	73-76*	13-16	18-25	11-41
Bone-anchored sling	67-92	37-67†	12-37	8-33	2-15
Transobturator sling	70-84	40-55	27-30	16-30	11

Conclusion

Therapy	Complexity of Surgery	Degree of leakage its used for	Success rate	Risks
Surveillance/ Pelvic floor PT/ Biofeedback	Office	low to Severe	Depends	Rash, discomfort
Bulking Agents	30 min Office	Very Mild	Low	Infection
AdVance Sling	45 min Hospital	Mild	Moderate	Infection, concern about Mesh
Artificial Sphincter	2-3 hours Hospital	Mild to complete	High	20-50% reoperation rate

Urinary Problems after Radiation Therapy

Introduction

- 37% of CaP in the US treated with RT
  - 26% EBRT and 15% brachytherapy[1]
- Acute complications rate up to 70%[2]
- There can be a flair at 12 months after XRT
- Complications are underreported in our opinion

1. Elliot SP, Malaeb BS World J Urol (2011) 29:35-41
2. Zelefsky et al Cancer 1999 June 1;85(11)

Urinary Problems from Radiation

- Prostatic Obstruction
- Radiation Cystitis or Prostatitis (inflammation)
- Scar tissue (Stricture or bladder neck contracture)
- Low Bladder Compliance (“Stiff” bladder)
- Detrusor Overactivity (overactive bladder)
- Sensory Urgency (abnormal sensation)
- Bladder Cancer
- Other e.g stones, recurrent cancer

Risk of Retention

Table 2
Urinary retention rates following implant alone or implants with EBRT

Study	Number	Treatment	Retention Rate (%)
Blasko et al[45]	196	^{125}I	7
Vijverberg et al[46]	46	^{125}I	22
Wallner et al[47]	92	^{125}I	11
Storey et al[48]	206	^{125}I	11
Mabjeesh et al[49]	665	^{125}I	3.2
Elshaikh et al[50]	402	^{125}I	10.9
Terk et al[51]	251	^{125}I/Pd103	5
Kaye et al[52]	76	EBRT/^{125}I	5
Dattoli et al[53]	73	EBRT+PD103	7
Ragde & Korb[54]	73	EBRT/^{125}I/Pd013	10
Merrick et al[55]	170	EBRT/^{125}I/Pd013	6
Benoit et al[56]	1409	EBRT/^{125}I/Pd013	14.5
Zeitlin et al[57]	212	EBRT/^{125}I/Pd013	1.5

Stock, et al Urol Clin N Am 37 (2010): 83-96

Radiation Cystitis

- Inflammation of the bladder caused by radiation
- Can cause urinary urgency, frequency, blood in the urine, pain
- Resistant to easy treatment

Other Urinary Symptoms

Table 3
Effect of prostate brachytherapy on mean IPSS

Study	Number	Treatment	Initial IPSS	IPSS at 1 Month	IPSS at 1 Year
Lee et al[91]	31	^{125}I	8.3	18.4	10.2
Desai et al[60]	117	^{125}I	6	14	8
Merrick et al[55a]	170	EBRT/^{125}I/^{103}Pd	5.7	12	4.6
Tanaka et al[61]	110	EBRT/^{125}I	9	14.2	10.3
Matzkin et al[63bc]	300	^{125}I	8.6/7.8	17/18	8.5/11
Keyes et al[62c]	712	^{125}I	5	15	5
Niehaus et al[64c]	976	EBRT/^{125}I/^{103}Pd	5	10	4.5

[a] All patients treated with α blockers.
[b] Preplan/intraoperative planning.
[c] Data extrapolated from graph.

Risk of Incontinence

Table 5
Urinary incontinence following brachytherapy

Study	Number	Procedures	Incontinence (%)
Blasko et al[69]	184	Implant	0
Talcott et al[73]	105	Implant	15
Nag et al[74]	32	Implant	19
Gelbum et al[67]	693	Implant	0.7
Wallner et al[71]	92	Implant	6
Storey et al[48]	206	Implant	10
Benoit et al[56]	2124	Implant	6.6
Zeitlin et al[57]	212	Implant	3.8
Kaye et al[52]	57	Implant	11
Stone & Stock[72]	301	Implant	0
Beyer & Priestley[70]	499	Implant	1
Anderson et al[76]	351	Implant	0.9
Talcott et al[73]	13	TURP + implant	85
Ragde & Korb[54]	48	TURP + implant	12.5
Stone & Stock[75]	43	TURP + implant	0
Kaye et al[52]	19	TURP + implant	22
Terk et al[51]	6	Implant + TURP	0
Gelbum et al[67]	28	Implant + TURP	17
Stone & Stock[75]	33	Implant + TURP	6.1
Kollmeier et al[77]	38	Implant + TURP	18

However,

Grade	CTCAE	RTOG—Acute	RTOG—Chronic
0	No change	No change	No change
1	Asymptomatic or mild symptoms; clinical or diagnostic observations only; intervention not indicated		Slight epithelial atrophy, mild telangiectasia (microscopic hematuria)
2	Moderate, local or noninvasive intervention indicated; limiting instrumental activities of daily living (ADL)	Frequency of urination or nocturia less frequent than every hour, dysuria, urgency bladder spasm requiring local anesthetic (for example phenazopyridine hydrochloride)	Moderate frequency, generalized telangiectasia, intermittent macroscopic hematuria
3	Severe or medically significant but not immediately life-threatening; hospitalization or prolongation of existing hospitalization indicated; disabling; limiting self-care ADL	Frequency with urgency and nocturia hourly or more frequently, dysuria, pelvic pain or bladder spasm requiring regular, frequent narcotic, gross hematuria with or without clot passage	Severe frequency and dysuria, severe generalized telangiectasia (often with petechiae). Frequent hematuria, reduction in bladder capacity (<150 cc)
4	Life-threatening consequences; urgent intervention indicated	Hematuria requiring transfusion, acute bladder obstruction not secondary to clot passage, ulceration or necrosis	Necrosis, contracted bladder capacity (<1,000 cc), severe hemorrhagic cystitis
5	Death	Death	

Late grade 2 toxicity 10%,

Late grade 3 toxicity 3% [1]

1. Coen et al, Int J Radiat Oncol Biol Phys. 2011 Nov 15;81(4):1005-9

Evaluation

- Focused H&P & Exam
  - Pre-RT urinary symptoms
- Flow rate and post-void residual
- 24 hour Bladder diary/pad test
- Urine culture
- Possible Cytoscopy/Urodynamics
- Possible kidney imaging

General Principles

- Radiation irreversible
- Wait out acute symptoms
    - Antiinflammatories and symptomatic treatment
- Hematuria (blood in the urine) should be evaluated:
    - Bladder cancer more common and aggressive than you think (1.7 x more likely, more likely non-urothelial and higher mortality)[1]
- Urinary infections (UTIs) are sometimes missed

1. Abern et al, Urol Oncol. 2012 May 8

General Principles

- Late symptoms wax and wane but often don't completely resolve
- Empiric treatment an option but sx severity dictates this
- Sequential treatments for different diagnoses
- Similar treatment options as post-surgical incontinence
  - except hyperbaric oxygen
  - lower success rates

Treat specific problem caused by radiation

Diagnosis

- *Prostatic obstruction*

Medical Tx

- *Surveillance*
- *α Blockers*
- *5-α reductase inhibitor*
- anticholinergics
- other meds e.g. pyridium, NSAID, steroid
- *CIC*
- Behavioral Modification
- Hyperbaric oxygen

Surgical Tx

- *TURP*
- Artificial Urinary Sphincter
- Male sling
- Urethrotomy/dilation
- reconstructive surgery for stricture
- ***Urinary diversion***

Treat specific problem caused by radiation

Diagnosis

- Prostatic obstruction
- *Radiation cystitis or prostatitis*

Medical Tx

- *Surveillance*
- *α Blockers*
- 5-α reductase inhibitor
- *anticholinergics*
- *other meds e.g. pyridium, NSAID, steroid*
- CIC
- *Behavioral Modification*
- *Hyperbaric oxygen*

Surgical Tx

- Artificial Urinary Sphincter
- Male sling
- Urethrotomy/dilation
- reconstructive surgery
- *urinary diversion*

Treat specific problem caused by radiation

Diagnosis

- Prostatic obstruction
- Radiation cystitis or prostatitis
- *Stricture*

Medical Tx

- *Surveillance*
- α Blockers
- 5-α reductase inhibitor
- anticholinergics
- other meds e.g. pyridium, NSAID, steroid
- *CIC*
- Behavioral Modification
- Hyperbaric oxygen

Surgical Tx

- TURP
- Artificial Urinary Sphincter
- Male sling
- *Urethrotomy/dilation*
- *reconstructive surgery*
- *urinary diversion*

Treat specific problem caused by radiation

Diagnosis

- Prostatic obstruction
- Radiation cystitis or prostatitis
- Stricture
- *low bladder compliance*

Medical Tx

- Surveillance
- α Blockers
- 5-α reductase inhibitor
- *anticholinergics*
- other meds e.g. pyridium, NSAID, steroid
- *CIC*
- *Behavioral Modification*
- Hyperbaric oxygen

Surgical Tx

- TURP
- Artificial Urinary Sphincter
- Male sling
- Urethrotomy/dilation
- reconstructive surgery
- *urinary diversion/ augment*

Treat specific problem caused by radiation

Diagnosis

- Prostatic obstruction
- Radiation cystitis or prostatitis
- Stricture
- low bladder compliance
- *Detrusor Overactivity*

Medical Tx

- *Surveillance*
- *α Blockers*
- 5-α reductase inhibitor
- *anticholinergics*
- other meds e.g. pyridium, NSAID, steroid
- CIC
- *Behavioral Modification*
- *Hyperbaric oxygen*

Surgical Tx

- TURP
- Artificial Urinary Sphincter
- Male sling
- Urethrotomy/dilation
- reconstructive surgery for stricture
- *urinary diversion/ Augment*

Treat specific problem caused by radiation

Diagnosis

- Prostatic obstruction
- Radiation cystitis or prostatitis
- Stricture
- low bladder compliance
- Detrusor Overactivity
- *Sensory urgency*

Medical Tx

- *Surveillance*
- α Blockers
- 5-α reductase inhibitor
- *anticholinergics*
- *other meds e.g. pyridium, NSAID, steroid*
- CIC
- *Behavioral Modification*
- Hyperbaric oxygen

Surgical Tx

- TURP
- Artificial Urinary Sphincter
- Male sling
- Urethrotomy/dilation
- reconstructive surgery for stricture
- *urinary diversion*

Treat specific problem caused by radiation

Diagnosis

- Prostatic obstruction
- Radiation cystitis or prostatitis
- Stricture
- low bladder compliance
- Detrusor Overactivity
- Sensory urgency
- *Other e.g stones, recurrent CaP, bladder cancer, Fistula*

Medical Tx

- Surveillance
- α Blockers
- 5-α reductase inhibitor
- anticholinergics
- other meds e.g. pyridium, NSAID, steroid
- CIC
- Behavioral Modification
- Hyperbaric oxygen

Surgical Tx

- TURP
- Artificial Urinary Sphincter
- Male sling
- Urethrotomy/dilation
- reconstructive surgery for stricture
- urinary diversion

Urinary Diversion

- Severe crippling problems usually associated with radiation therapy
- Option of last resort and rarely done
- Major surgery with different options

Conclusion

Conclusion

- Assess urinary risks of cancer treatment prior to deciding on treatment
- Some risk to surveillance also
- Most urinary symptoms improve acutely after treatment but some persist

The Big Picture

- Many treatment options available
- Assess not just the rate of urinary complications but the types and curability
  - Complications of XRT
  - Complications of prostatectomy

Questions?

Rajveer Purohit MD, MPH

445 E. 77th Street

New York, NY 10075

212-772-3900