Female Sexual Dysfunction

Anne P. Cameron MD FRCSC URPS
James Montie Legacy Chair of Urology
University of Michigan

American Urological Association
Education & Research, Inc.

MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

1

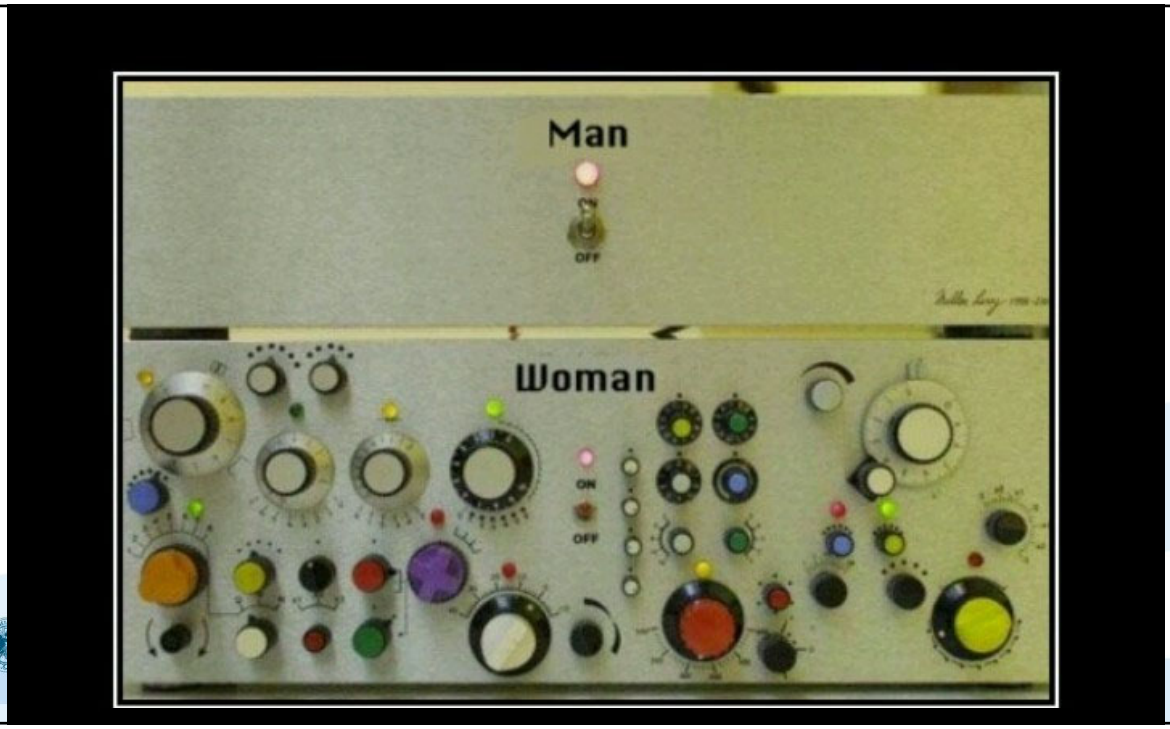
Disclosures

- AUA NGLUTD/OAB Guideline
- SUFU BOD
- SWIU BOD
- NIH funding- LURN
- NIDDR funding-gentamicin RCT

American Urological Association
Education & Research, Inc.

MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

2



3

Female sexual dysfunction

- 25-63% of women
- More common than in men

- Risk factors:
  - Increasing age
  - Medical illness (DM, vascular, neurogenic, psychogenic, autoimmune)
  - Malignancy
  - Being unmarried
  - Medication: OCP, HTN, antidepressants, antipsychotic, chemo, narcotics

American Urological Association
Education & Research, Inc.

4

More complex than ED…..

- American Foundation of Urological disease: persistent or recurrent-
  - Hypoactive sexual **desire** disorder (lack of fantasy/thoughts/receptivity)
  - Sexual **arousal** disorder (inability to maintain sexual excitement)
  - **Orgasmic** disorder (delay or absence with sufficient stimulation)
  - Sexual **pain** disorder:
    - Dyspareunia- genital pain with intercourse
    - Vaginismus-involuntary muscle spasms of outermost third of vagina
    - Other-genital pain caused by non-coital sexual stimulation

American Urological Association
Education & Research, Inc.

5

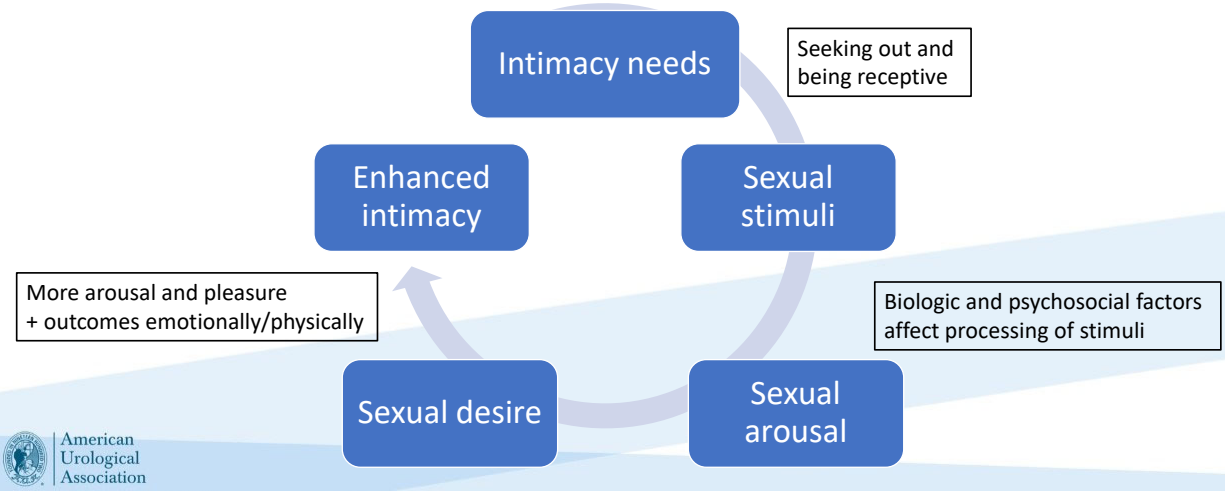
Pelvic floor disorders highly related

- Incontinence (penetrative=SUI) (orgasmic= UUI) or fecal
- Cystocele/rectocele/enterocele/vault/uterine prolapse (obstructive)
- IC/PBS
- Recurrent UTI (avoidance)

American Urological Association
Education & Research, Inc.

6

Intimacy model Basson 2001



American Urological Association Education & Research, Inc.

7

Hormonal

- Testosterone drives sexual behavior (all genders)
- Decreased with illness, steroids, age, oophorectomy, oral contraceptives, estrogen HRT
- Estrogen: neurological and vascular systems affected
- HRT improves clitoral and vaginal sensation (vasodilator/increases blood flow)

- Low E= vaginal thinning, atrophy of wall and muscle, increase in pH
- Increased vaginal infection, UTI, pain, dryness (transudate)

American Urological Association Education & Research, Inc.

8

Vaginal estrogen is a urological Rx and your friend

- Minimal serum levels after first few weeks **(= to women on no HRT**)
- Cream, Estring, tablet
- Daily x 2 weeks then 3x a week
- Very very low to 0 risk of BrCa, BrCa recurrence, DVT, uterine cancer
- not drinking alcohol and maintaining a healthy BMI have more impact on risk for these
- Other options that also work: dehydroepiandrosterone (DHEA) vaginally or ospemifene (oral)
- No monitoring needed for any of these on these products
- Vaginal moisturizers and lubricants (water/oil/silicone based) are great!

American Urological Association Education & Research, Inc.

9

Summary

- Urologists can have a huge impact on pain conditions
- … and should refer to GYN and/or sexual counselling for those issues not familiar to you
- Increasing research on testosterone in women – topical and vaginal
- Female Viagra is not a real thing nor are herbal remedies

American Urological Association Education & Research, Inc.

10

NGLUTD

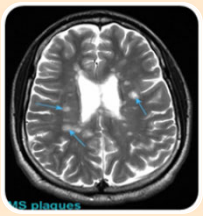
Anne P. Cameron MD FRCSC FPMRS
James Montie Legacy Chair of Urology
University of Michigan

American Urological Association
Education & Research, Inc.

MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

11

Neurogenic Lower Urinary Tract Dysfunction Prevalence



SCI

~100% some bladder symptom

80% cannot void

MS

80% bladder symptoms 96% after 10 y

Spina Bifida

90% bladder symptoms

American Urological Association
Education & Research, Inc.

Cameron 2010, Shaer 2007, Litwiller 1999

12

Mortality in SCI over time

1950-1977	Post 1977
Renal	Respiratory
Cardiac	Sepsis
Respiratory	Cancer
	Cardiac
	Renal
	Suicide

American Urological Association Education & Research, Inc.

Hackler 1977, Frankel 1998, Soden 2000

13

Life expectancy:

- In developed nations **10 year** mortality:
  - USA 16%
  - Canada 11%
  - Australia 14%
  - Western Europe 15%
- Developing *Countries* **1 year** mortality:
  - Sierra Leone 83% (28 months)
  - Nigeria 34%
  - South Africa 13%
  - Zimbabwe 49%
  - Latin America 21%

Largely due to pressure ulcers and/or renal complications

American Urological Association Education & Research, Inc.

Cripps 2011

14

Why Worry about NGLUTD?

- Severe consequences
  - Upper tract deterioration
    - High storage P
    - DSD
    - Stones
    - Pyelonephritis
  - Incontinence
    - High storage P
    - DO
    - SUI
    - Overflow/retention
  - Sepsis/UTI
  - Skin/urethra breakdown

Most of these are not found on history or physical exam

American Urological Association Education & Research, Inc.

15

Ultimate goals of bladder management

#1 **Prevent upper tract deterioration**
keep bladder pressure low

#2 **Maintain continence**
keep bladder pressure low, and empty

Patient can empty bladder by voiding
#3 **make it easier for them**

American Urological Association Education &

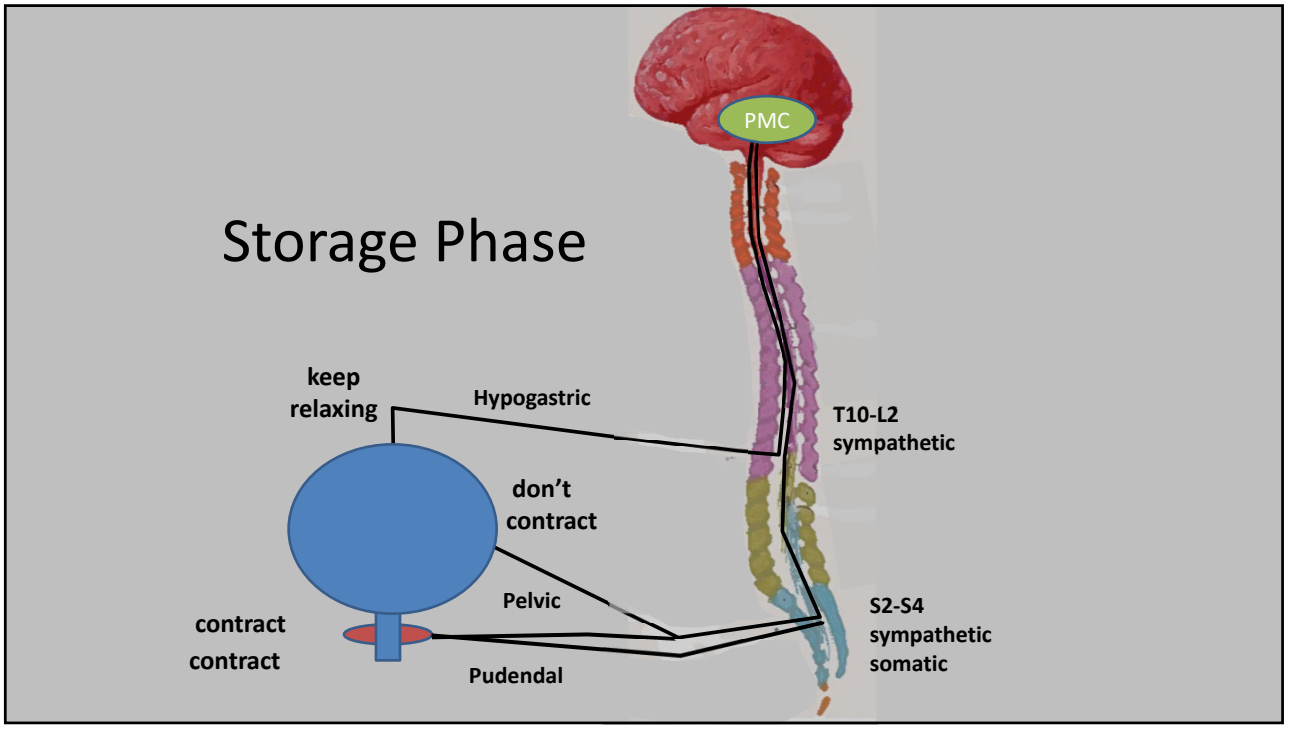
16

Normal Lower Urinary Tract Function

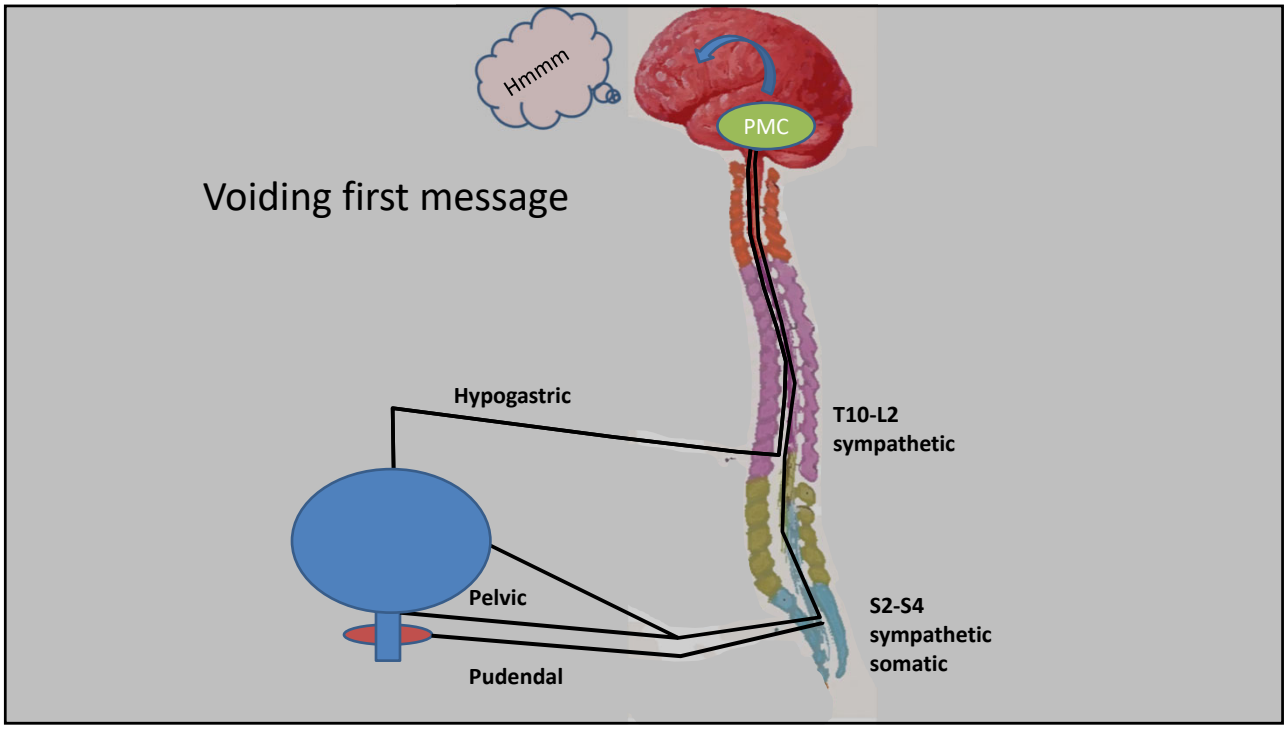
- Storage Phase
  - Urine stored low pressure
  - Normal sensations
  - Outlet remains closed
- Emptying Phase
  - Volitional control
  - Relax of sphincter-first
  - Detrusor contraction of adequate duration/strength
- Requires Neurologically Intact
  - Autonomic-Both sympathetic & parasympathetic
  - Somatic system
  - CNS-Brain, Pons
    - voluntary control
    - governs synergy

American Urological Association
Education & Research, Inc.

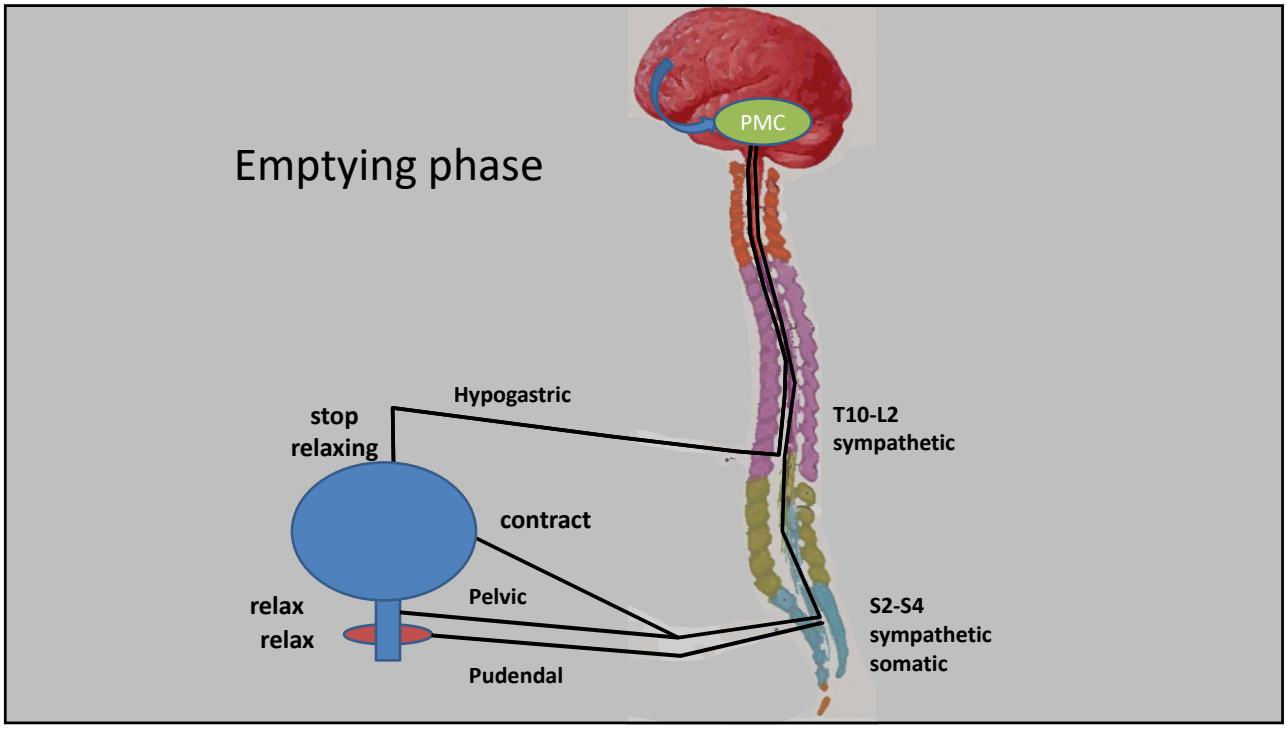
17



18

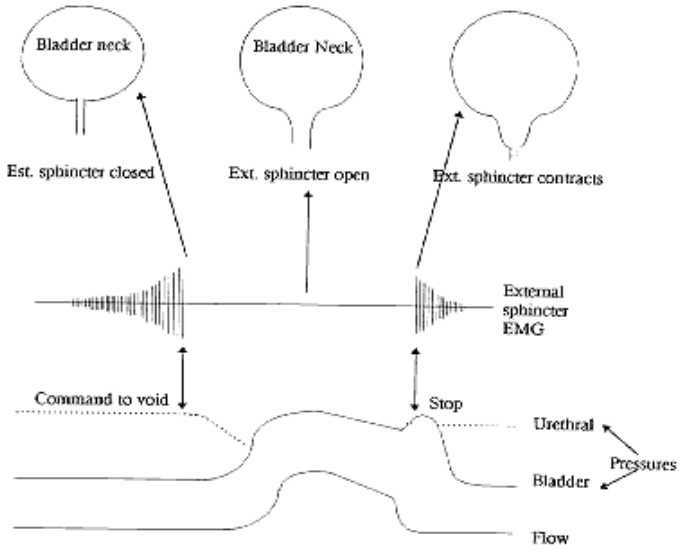


19



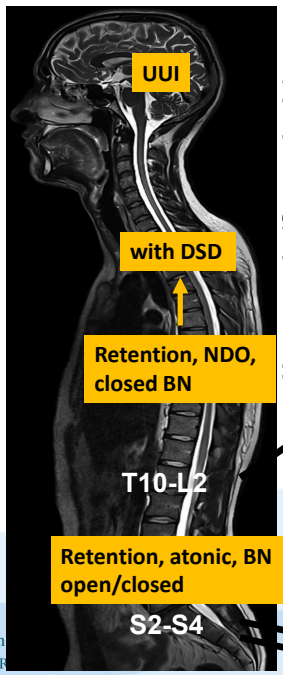
20

Normal Voiding

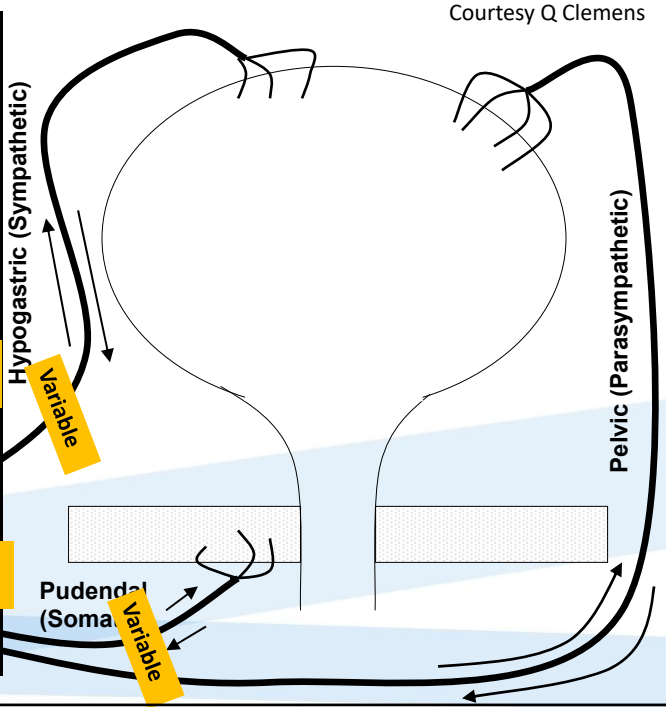


American Urological Association
Education & Research, Inc.

21



Courtesy Q Clemens

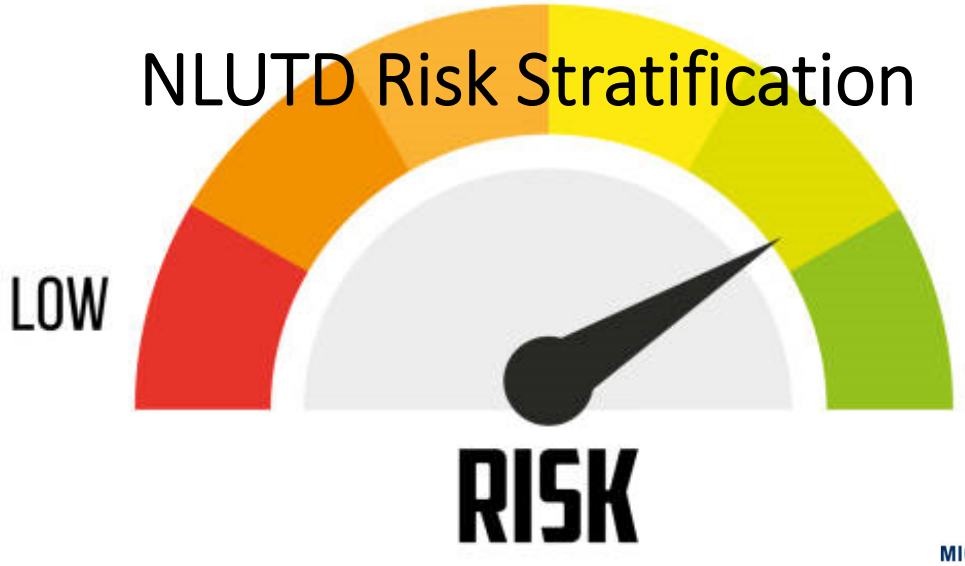


American Urological Association
Education & R

22

MODERATE

NLUTD Risk Stratification



MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

23

Disclosure/references

The AUA/SUFU Guideline on Adult Neurogenic Lower Urinary Tract Dysfunction

Panel Members: David A. Ginsberg, MD; Timothy B. Boone, MD PhD; Anne P. Cameron, MD; Angelo Gousse, MD; Melissa R. Kaufman, MD; Erick Keays; Michael J. Kennelly, MD; Gary E. Lemack, MD; Eric S. Rovner, MD, Lesley H. Souter, PhD; Claire C. Yang, MD; Stephen R. Kraus, MD

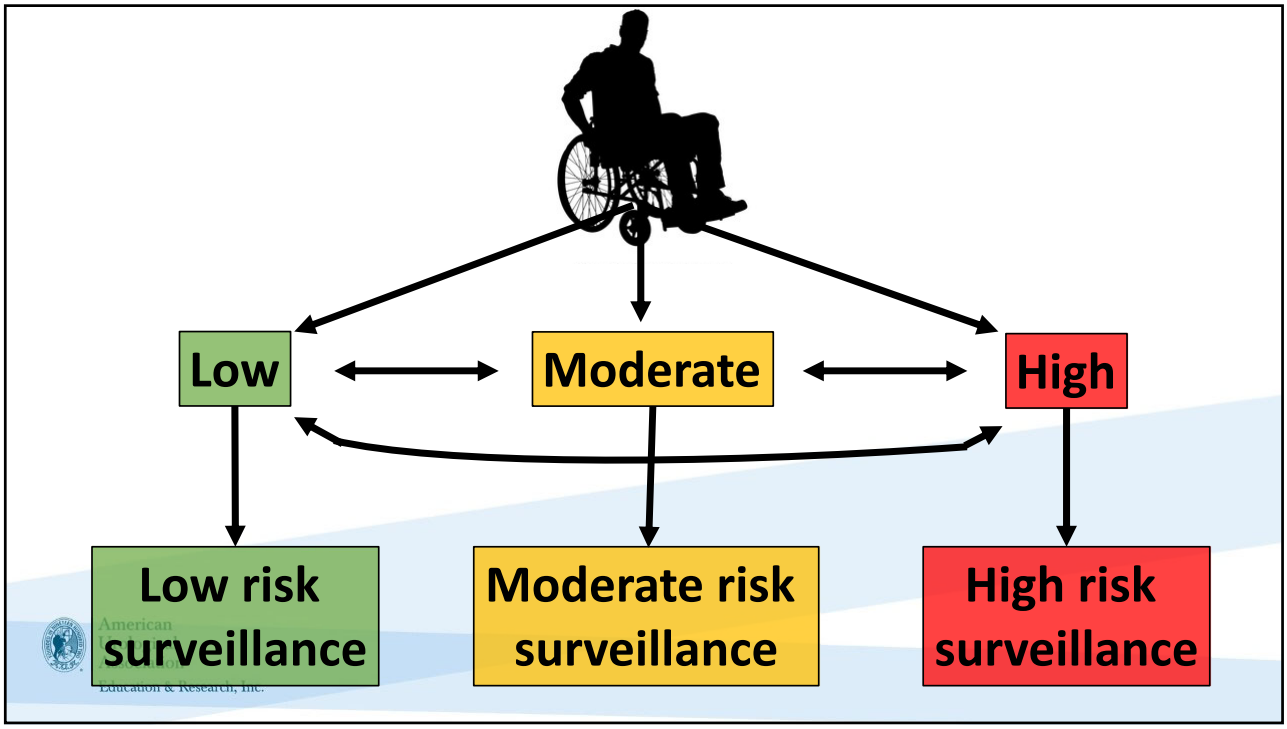
- Not representing AUA guidelines- views are my own
- There are 60 statements 91 pages…..

American Urological Association
Education & Research, Inc.

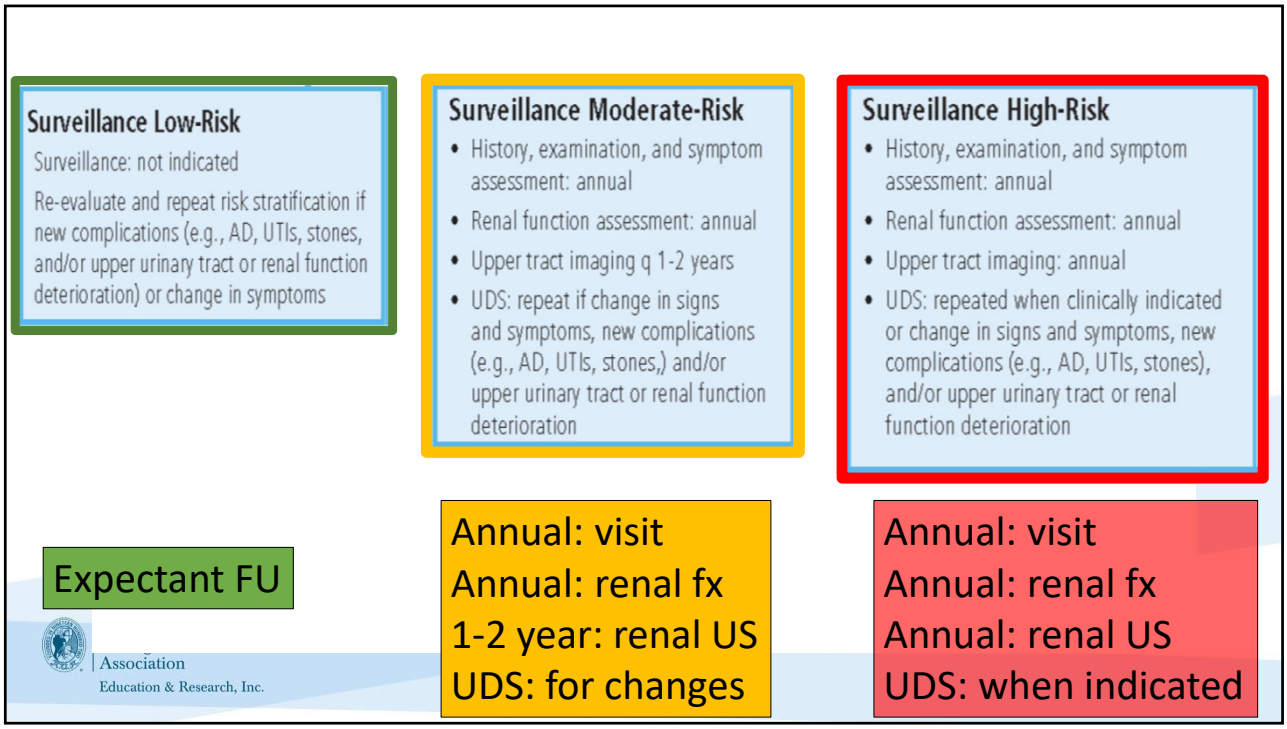
MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

24

25



26



27

History elements

- **Characterization of the neurological condition** resulting in NLUTD: time of onset, severity, progression, prognosis, potential for recovery, disability, presence of ventriculoperitoneal shunt
- **Lower urinary tract management**: voluntary voiding, CIC, indwelling catheter
- **LUTS:** frequency, urgency, hesitancy, straining, nocturia, nocturnal enuresis, pad use/diapers, pain
- **Catheterization use**: type, frequency, size, pain
- **Incontinence**: stress, urge, insensate
- **Sexual** function and desire
- **Fertility** function and desire (gynecologic/reproductive history)
- **Bowel** function and regimen (if appropriate)
- **Skin** integrity: decubitus ulcers
- **AD**: presence, triggers, and typical symptoms

American Urological Association
Education & Research, Inc.

28

History

- Renal function tests and imaging
- Current and prior assessments and management related to urinary, sexual, infertility, and bowel issues:
  - Behavioral, medical, and surgical
  - Efficacy: success, failure, limitations
  - Adverse events (AE) and complications
- Complications: stones, UTIs, catheter issues (e.g., encrustations, catheter clogging), skin breakdown
- Functional limitations: lifestyle, mobility, hand function
- Socio-economic situation and/or support (home) environment
- Assessment of goals of evaluation and therapy in the context of the neurological condition (e.g., SCI versus dementia)
- Co-existent genitourinary (GU) conditions, prior GU surgery (e.g., benign prostatic hyperplasia (BPH), urethral stricture, fistula, SUI)

American Urological Association
Education & Research, Inc.

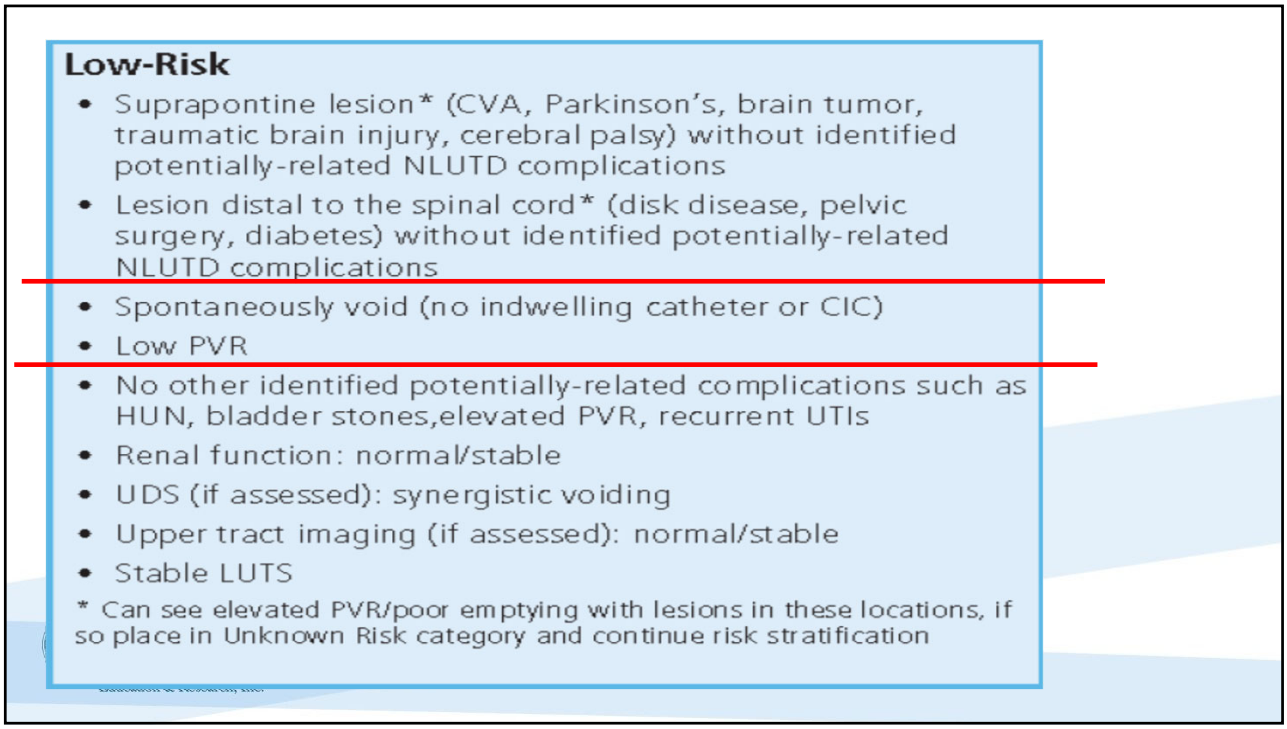
29

Physical Exam

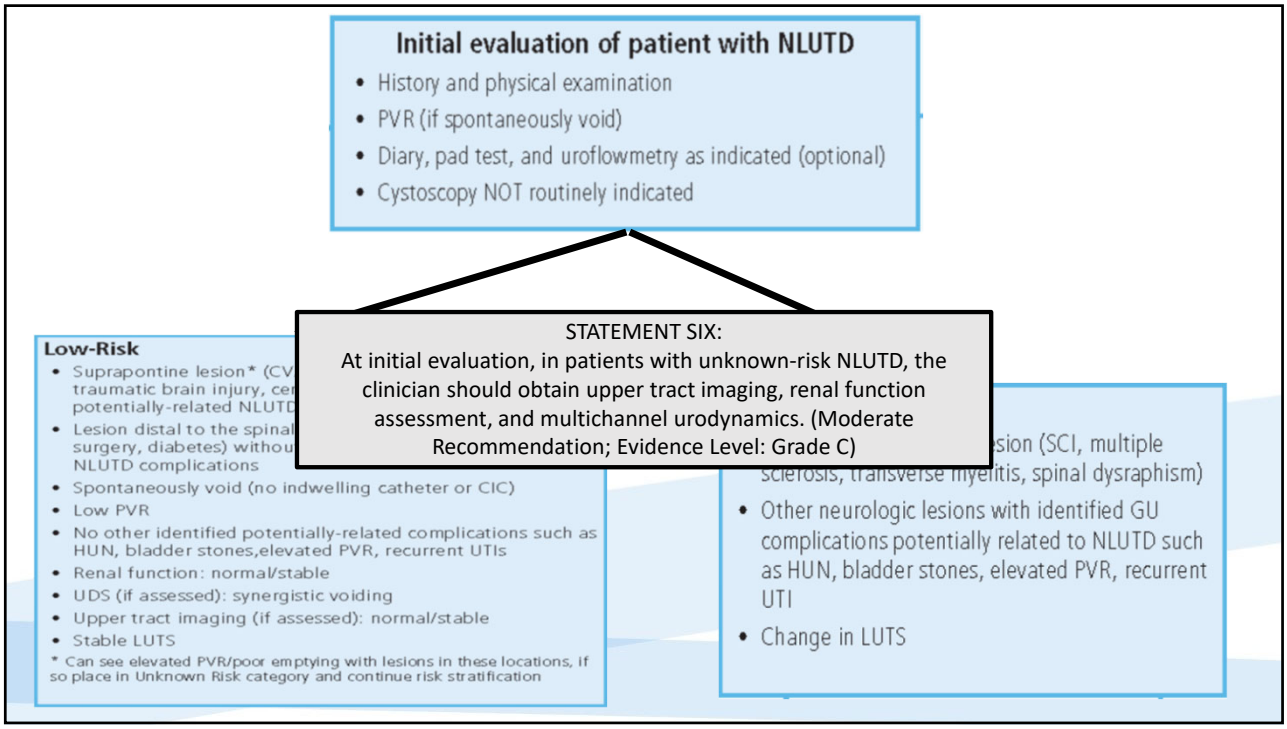
- General mental status, cognition
- Assessment of mobility and upper extremity function
- Abdominal and flank exam
- Pelvic and vaginal examination in females
- Genital examination and digital rectal exam
- Rectal: tone, masses, reflexes, prostate asessment (in males)
- Skin integrity of pelvis, perineum, buttocks, lower back, and lower extremities
- Directed neurological assessment: sensory, motor, spasticity, etc.
- Evaluation of bulbocavernosus, anal, and cremasteric reflexes
- Tone of anal sphincter and voluntary con-traction of the anal sphincter and pelvic floor muscles
- UA

American Urological Association
Education & Research, Inc.

30



31



32

28 y/o man SCI 9 months ago

- MVC with T7 SCI and liver laceration (out of spinal shock
- Foley first now CIC
- Leaking between caths so started on oxybutynin 10mg, still leaks
- UTIs while in hospital but none recently
- Cath 4 x a day
- Physical exam as expected
- Cr 0.5

American Urological Association
Education & Research, Inc.

33

Initial evaluation of patient with NLUTD

- History and physical examination
- PVR (if spontaneously void)
- Diary, pad test, and uroflowmetry as indicated (optional)
- Cystoscopy NOT routinely indicated

Low-Risk

- Supraspontine lesion* (CVA, Parkinson's, brain tumor, traumatic brain injury, cerebral palsy) without identified potentially-related NLUTD complications
- Lesion distal to the spinal cord* (disk disease, pelvic surgery, diabetes) without identified potentially-related NLUTD complications
- Spontaneously void (no indwelling catheter or CIC)
- Low PVR
- No other identified potentially-related complications such as HUN, bladder stones,elevated PVR, recurrent UTIs
- Renal function: normal/stable
- UDS (if assessed): synergistic voiding
- Upper tract imaging (if assessed): normal/stable
- Stable LUTS

* Can see elevated PVR/poor emptying with lesions in these locations, if so place in Unknown Risk category and continue risk stratification

Unknown-Risk

- Suprasacral spinal cord lesion (SCI, multiple sclerosis, transverse myelitis, spinal dysraphism)
- Other neurologic lesions with identified GU complications potentially related to NLUTD such as HUN, bladder stones, elevated PVR, recurrent UTI
- Change in LUTS

34

- We already have a N physical and Cr 0.5
- What other testing do we need to figure this out ?
  - CT abdomen
  - Cystoscopy
  - Renal US
  - UDS
  - Renal scan
- What is his risk strata?

US: 3 mm non obstructing stone
UDS: capacity 350, normal compliance, but DO with leak no DSD

American Urological Association
Education & Research, Inc.

35

	Low-Risk	Moderate-Risk	High-Risk
Renal Function	Normal/stable	Normal/stable	Abnormal/unstable
PVR (voiding patients):	Low	Elevated	N/A
Urinary Tract Imaging	Normal/stable (if assessed)	Normal findings	Hydronephrosis, new renal scaring, loss of renal parenchyma, or staghorn/ large stone burden
Urodynamics	Synergetic voiding (if assessed)	Neurogenic retention DO with incomplete emptying	Poor compliance VUR (if UDS done with fluoroscopy) High storage pressures with DO and DSD

American Urological Association
Education & Research, Inc.

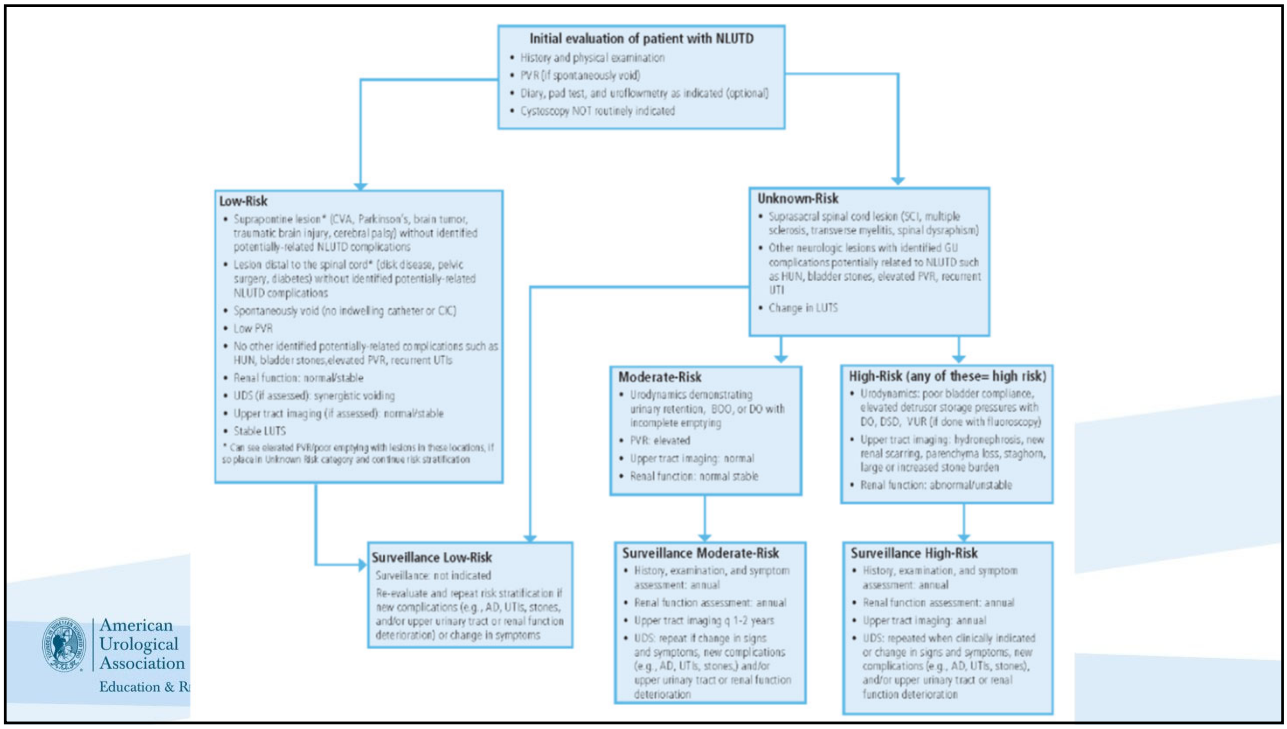
36

Surveillance Moderate-Risk

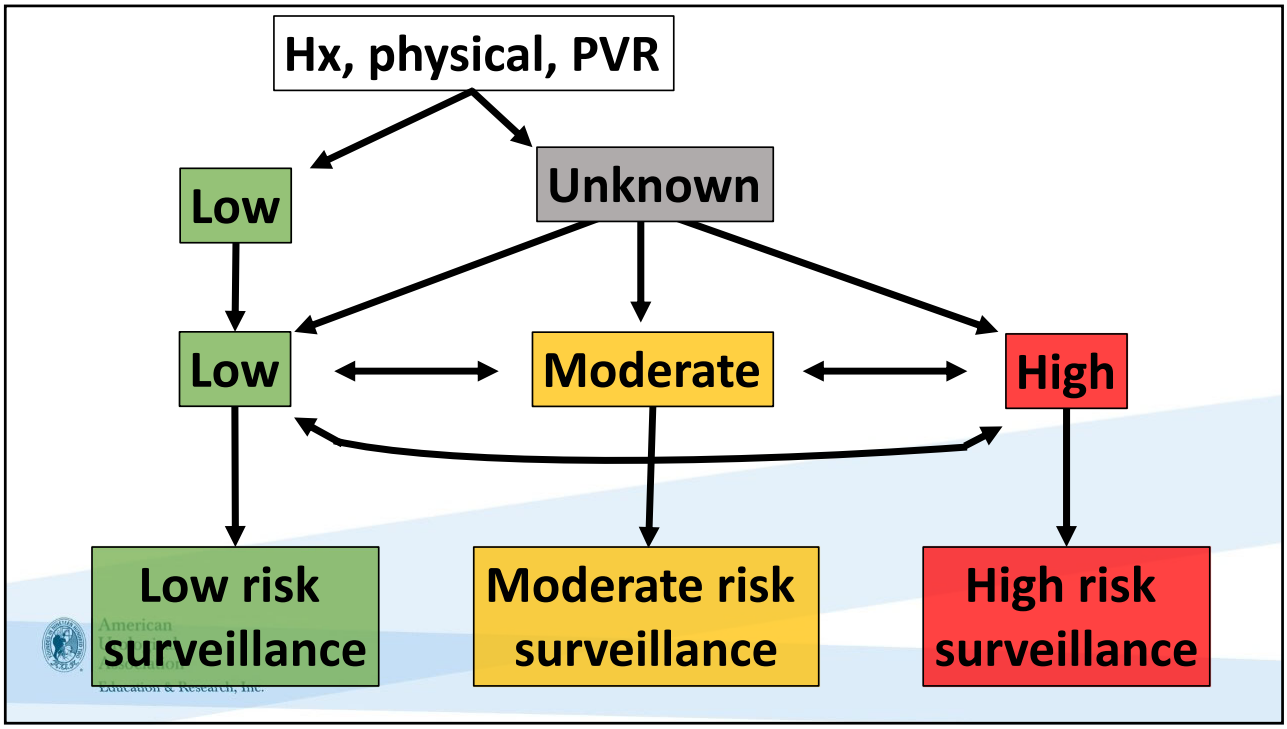
- History, examination, and symptom assessment: annual
- Renal function assessment: annual
- Upper tract imaging q 1-2 years
- UDS: repeat if change in signs and symptoms, new complications (e.g., AD, UTIs, stones,) and/or upper urinary tract or renal function deterioration

American Urological Association
Education & Research, Inc.

37



38



39

case 2

- 75 year old man who is 6 months post CVA
- He presents with new urgency, and UUI after his stroke
- Prior to his stroke he had nocturia x1 and slow stream mana tamsulosin (helped), but now having nocturia x3
- Coffee and beer make it worse
- Still doing PT for mild hemiplegia and had retention in hospital that resolved. Now using a scooter.
- Lives with his wife, not sexually active, going to Florida this fall and wants to ditch the diapers
- BP 140/95 DRE 50g no nodules

American Urological Association Education & Research, Inc.

40

Low-Risk

- Suprapontine lesion* (CVA, Parkinson's, brain tumor, traumatic brain injury, cerebral palsy) without identified potentially-related NLUTD complications
- Lesion distal to the spinal cord* (disk disease, pelvic surgery, diabetes) without identified potentially-related NLUTD complications
- Spontaneously void (no indwelling catheter or CIC)
- Low PVR
- No other identified potentially-related complications such as HUN, bladder stones,elevated PVR, recurrent UTIs
- Renal function: normal/stable
- UDS (if assessed): synergistic voiding
- Upper tract imaging (if assessed): normal/stable
- Stable LUTS

* Can see elevated PVR/poor emptying with lesions in these locations, if so place in Unknown Risk category and continue risk stratification

American Urological Association
Education & Research, Inc.

41

His stratification workup

- PVR 65
- UA clean
- Cr while in hospital recently 1.2 (easy to find)
- Also a CT angiogram while in house showed 2 normal renal units (helpful but don't order it)

American Urological Association
Education & Research, Inc.

42

His stratification workup

STATEMENT SEVEN:
In the patient with an acute neurological event resulting in NLUTD, the clinician should perform risk stratification once the neurological condition has stabilized. (Clinical Principle)

- PVR 65
- UA clean
- Cr while in hospital recently 1.2 (easy to find)
- Also a CT angiogram while in house showed 2 normal renal units (helpful but don't order it)

American Urological Association
Education & Research, Inc.

43

Any other testing or information would you find helpful now?

- Voiding diary

American Urological Association
Education & Research, Inc.

44

Initial evaluation of patient with NLUTD

- History and physical examination
- PVR (if spontaneously void)
- Diary, pad test, and uroflowmetry as indicated (optional)
- Cystoscopy NOT routinely indicated

AUASI and incontinence measure

American Urological Association
Education & Research, Inc.

45

	Low-Risk	Moderate-Risk	High-Risk
Renal Function	Normal/stable	Normal/stable	Abnormal/unstable
PVR (voiding patients):	Low	Elevated	N/A
Urinary Tract Imaging	Normal/stable (if assessed)	Normal findings	Hydronephrosis, new renal scaring, loss of renal parenchyma, or staghorn/ large stone burden
Urodynamics	Synergetic voiding (if assessed)	Neurogenic retention DO with incomplete emptying	Poor compliance VUR (if UDS done with fluoroscopy) High storage pressures with DO and DSD

Urological Association
Education & Research, Inc.

46

6 week RV- timed voids+ alpha blocker+B3

- He is getting up 2x a night (more from insomnia)
- Incontinence is better if he sticks to timed voids
- BP unchanged
- No new issues
- PVR unchanged ~50

American Urological Association
Education & Research, Inc.

47

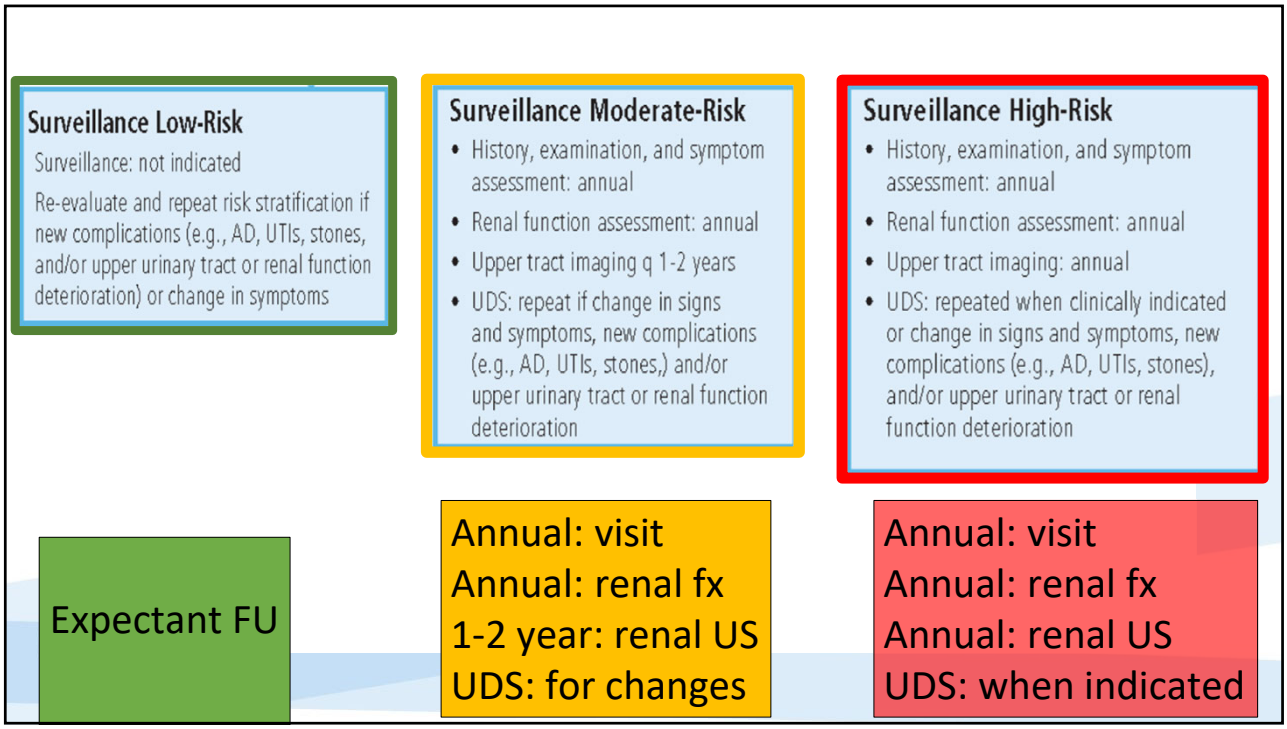
Surveillance Low-Risk

Surveillance: not indicated

Re-evaluate and repeat risk stratification if new complications (e.g., AD, UTIs, stones, and/or upper urinary tract or renal function deterioration) or change in symptoms

American Urological Association
Education & Research, Inc.

48



49

When do you do a cystoscopy on NGLUTD patients?

8: Clinicians should not perform routine cystoscopy in the initial evaluation of the NLUTD patient. (Clinical Principle)

19. In NLUTD patients, clinicians should not perform screening/surveillance cystoscopy. (*Strong Recommendation; Evidence Level: Grade B)*

20. In NLUTD patients with a chronic indwelling catheter, clinicians should not perform screening/surveillance cystoscopy. (*Strong Recommendation; Evidence Level: Grade B)*

60. In NLUTD patients who have undergone lower urinary tract reconstruction utilizing bowel, and who also develop gross hematuria or symptomatic recurrent urinary tract infection, clinicians should perform cystoscopy. (*Moderate Recommendation; Evidence Level: Grade C*)

American Urological Association
Education & Research, Inc.

50

20 y/o woman with myelomeningocele

- Transitioning from pediatrics
- CIC 6x a day with leaking between caths
- Oxybutinin 15mg
- 7-8 UTI last year (one admission)
- Renal US stable scars
- UDS: 300cc capacity with compliance loss (Pdet 45 cmH2O)

What is her risk strata?

American Urological Association
Education & Research, Inc.

51

	Low-Risk	Moderate-Risk	High-Risk
Renal Function	Normal/stable	Normal/stable	Abnormal/unstable
PVR (voiding patients):	Low	Elevated	N/A
Urinary Tract Imaging	Normal/stable (if assessed)	Normal findings	Hydronephrosis, new renal scaring, loss of renal parenchyma, or staghorn/ large stone burden
Urodynamics	Synergetic voiding (if assessed)	Neurogenic retention DO with incomplete emptying	Poor compliance VUR (if UDS done with fluoroscopy) High storage pressures with DO and DSD

American Urological Association
Education & Research, Inc.

52

Surveillance High-Risk

- History, examination, and symptom assessment: annual
- Renal function assessment: annual
- Upper tract imaging: annual
- UDS: repeated when clinically indicated or change in signs and symptoms, new complications (e.g., AD, UTIs, stones), and/or upper urinary tract or renal function deterioration

- Botulinum toxin 200U
- Daily oral prophylaxis
- Repeat UDS and visit 6 weeks later:
  - Not leaking
  - No UTIs
  - MCC 600 Pdet 10cmH2O

Now is moderate risk

American Urological Association
Education & Research, Inc.

53

Upper tract assessment

CT scan=renal bladder US> KUB for stones

Lowest risk/cost effective: renal bladder US

Serum Cr screening and renal scan or 24 h urine only useful if imaging abnormal

American Urological Association
Education & Research, Inc.

54

Why do UDS?

- Baseline functional assessment of LUT and monitoring
- Identify NGLUTD with risk of complications & that might need early intervention
  - High fill pressure/poor compliance
  - DESD
- Assist in developing treatment plan
- Assess changes in symptoms/complications

American Urological Association
Education & Research, Inc.

55

Urodynamic Patterns of NGB

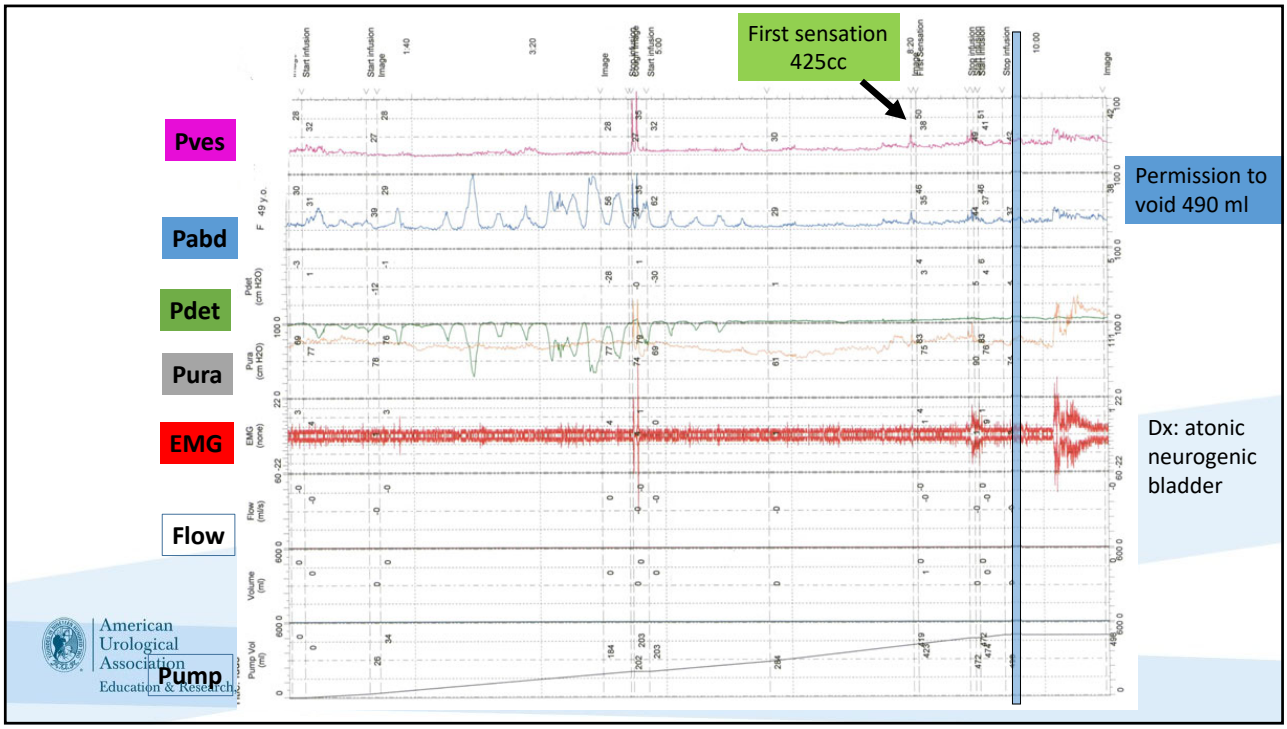
Moderate risk

- Detrusor Areflexia (acontractile, atonic)
- Neurogenic retention
- Detrusor Overactivity with low P
- DSD with low P

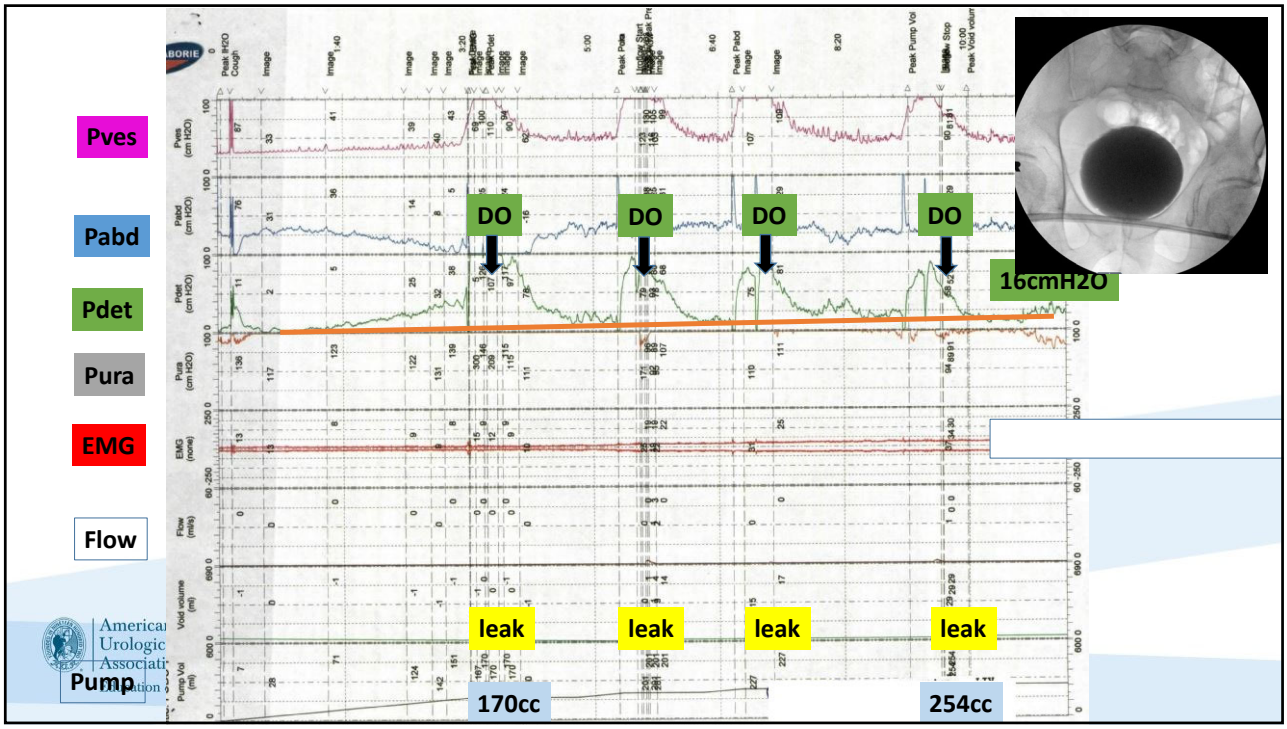
High risk

- DSD with high storage P
- DO with high storage P
- VUR
- Poor compliance

56



57



58

DESD

Courtesy S Kraus

59

Detrusor Sphincter Dyssynergia

- Defined: involuntary contraction of the sphincter during an involuntary detrusor contraction
- Typically occurs with supra-sacral lesion and is uncommon with lower cord lesions
  - Usually: Peri-urethral striated muscles
  - Possible: Smooth muscle of bladder neck
- Increased risk of elevated intravesical pressures and urologic complications
  - >50% (UTI, reflux, hydro, renal failure)

Courtesy S Kraus

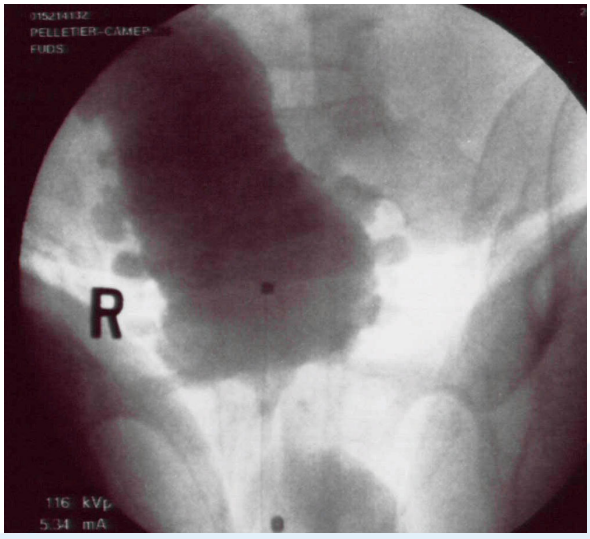
Blavias et al, Journal of Urology 1981
Abrams et al, Neurourology & Urodynamics 2002
Hackler, Journal of Urology 1977

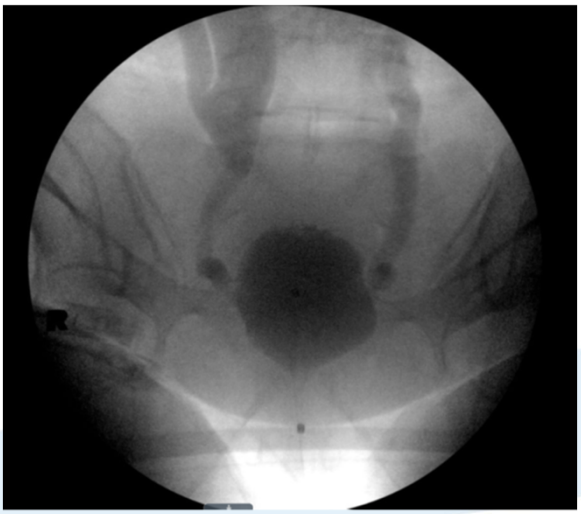
60

Compliance

American Urological Association
Education & Research, Inc.

61





American Urological Association
Education & Research, Inc.

62

Compliance:

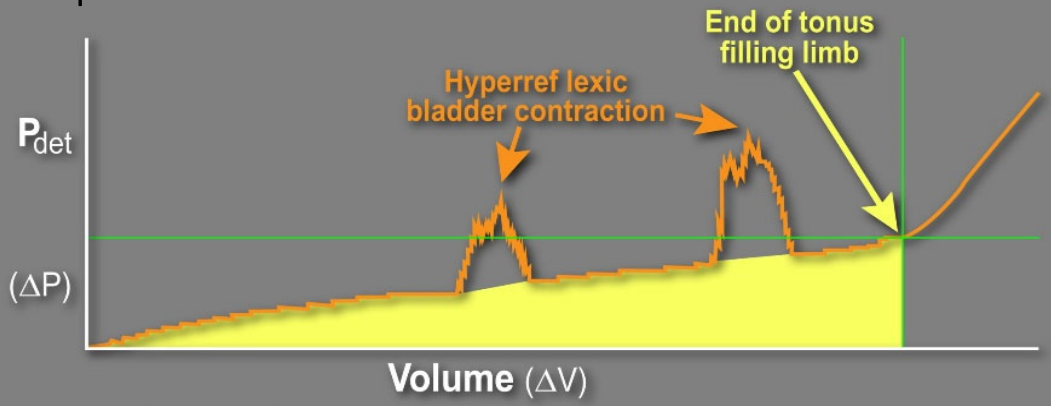


FIGURE 1: Solid yellow represents best fit pressure-volume relationship used for compliance calculation P_{det} detrusor pressure ΔV, change in volume (ml.) ΔP, change in pressure (cm. water).

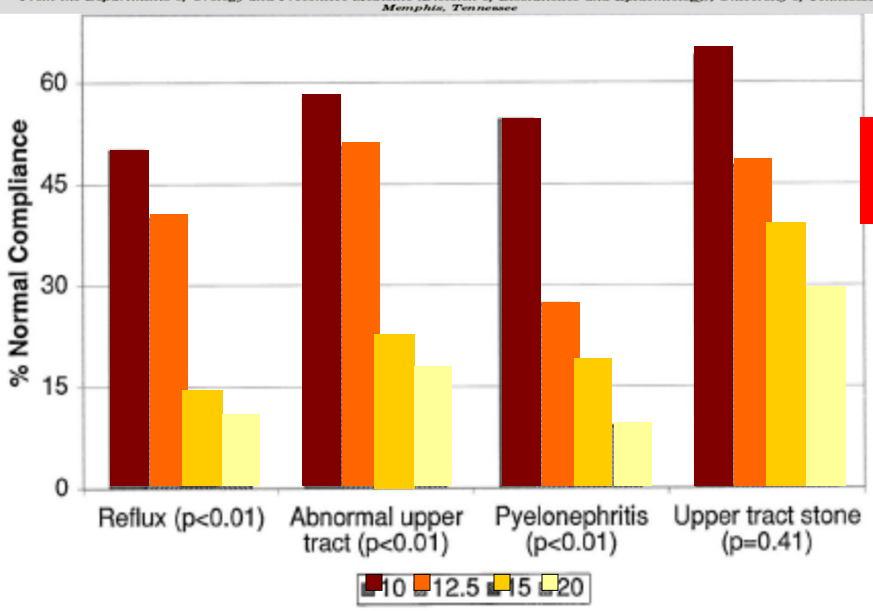
Abrams et al, Neurourology & Urodynamics 2002
McGuire et al, Journal Of Urology, 1983

63

THE JOURNAL OF UROLOGY®
Copyright © 2000 by AMERICAN UROLOGICAL ASSOCIATION, INC.®
Vol. 163, 1228–1233, April 2000
Printed in U.S.A.

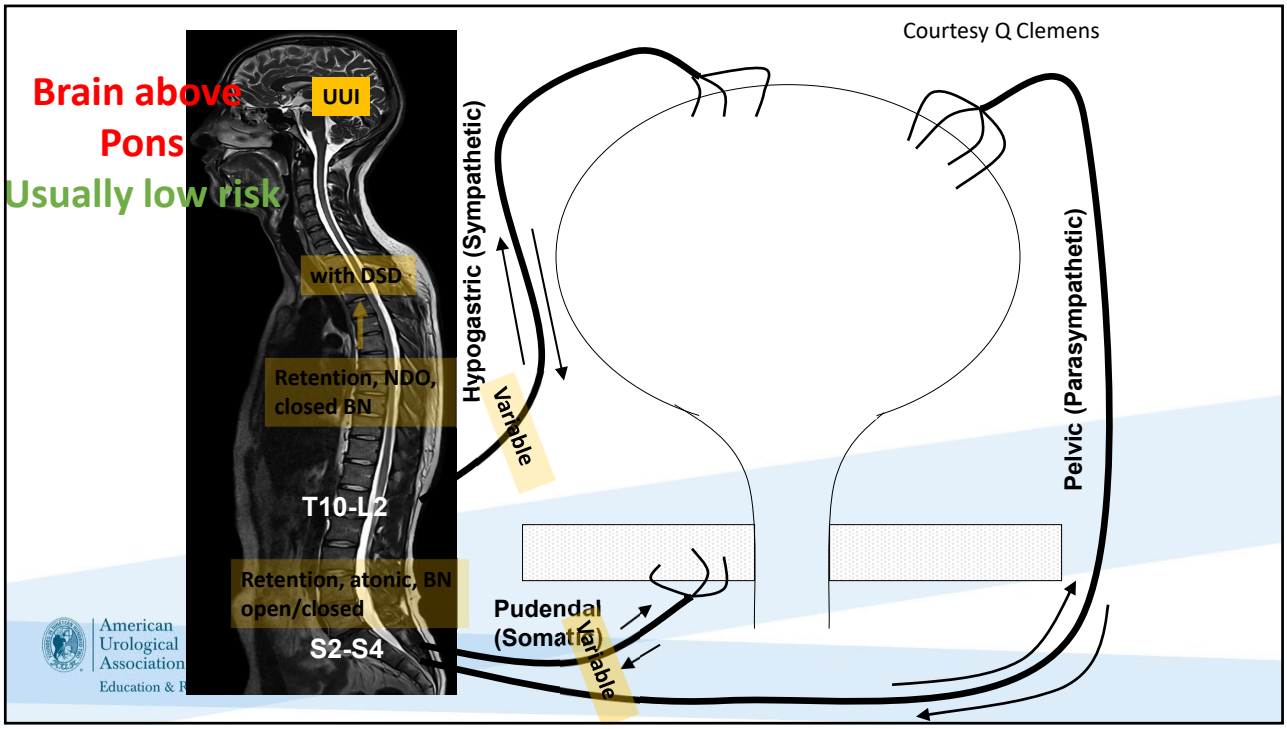
DIFFERENCES IN BLADDER COMPLIANCE WITH TIME AND ASSOCIATIONS OF BLADDER MANAGEMENT WITH COMPLIANCE IN SPINAL CORD INJURED PATIENTS

KYLE J. WELD, MARSHALL J. GRANEY AND ROGER R. DMOCHOWSKI*
From the Departments of Urology and Preventive Medicine (Division of Biostatistics and Epidemiology), University of Tennessee, Memphis, Tennessee



Pdet >40 or compliance <15 DANGEROUS!!!

64



65

CVA & TBI

- Usually lose **inhibitory** control over voiding reflex
  - Incontinence rate as high as 51%
  - Neurogenic Detrusor overactivity - most common
  - Detrusor Hyperactivity with impaired contractility possible
  - Although variable, sensation usually intact
  - Initial retention is common (temporary detrusor areflexia- wait until acute event over)
- Sphincter should function normal
  - IF PVR OK they are **low risk**

STATEMENT SEVEN:
In the patient with an acute neurological event resulting in NLUTD, the clinician should perform risk stratification once the neurological condition has stabilized. (Clinical Principle)

Courtesy S Kraus

Burney et al, Journal of Urology, 1996
Tsuchida et al, Urology, 1983
Krimchansky et al, Brain Injury 1999
Oostra et al, Brain Injury, 1995

66

LUT Dysfunction & Parkinson's

- Pseudodyssynergia - oft misdiagnosed
- IF PVR normal- they are **low risk**
- Bradykinesia: impaired relaxation of EUS may cause hesitancy
- Incidence of urodynamic abnormalities increase with disease severity.
  - Detrusor overactivity (67%)
  - DO with impaired contractility common
  - Detrusor hyporeflexia or areflexia (12%)
  - Normal function (20%).
- Symptom scores increased with disease severity
  - Nocturia most common

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Staskin et al, Journal of Urology 1988
Araki et al Journal of Urology 2000
Ragab et al Neurourology and Urodynamics 2011

67

Multiple System Atrophy

- Variant Shy Drager syndrome
  - atrophy of cerebellum, brainstem, peripheral autonomic ganglia & spinal cord sympathetic neurons
  - Leads to autonomic failure
- Clinical Manifestations (Parkinson's like)
  - Bradykinesia, shuffling gait, orthostatic hypotension, anhydrosis
- Urinary Symptoms:
  - Frequency, urgency, urge incontinence, retention, ED- occur before other autonomic sx
- Elevated residual prompts full workup
- Urodynamic findings
  - Areflexia: 67%
  - DO: 33%
  - Impaired compliance: 45%
  - Incompetent outlet: ALL------- **do not do a TURP**
  - EMG: consistent with "lower motor neuron lesion"

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Polinsky RJ. Neurologic Clinics 1984
Berger, Neurourology & Urodynamics 1990

68

Brain Tumor

- Both primary and metastatic tumors may cause voiding dysfunction
- Area and level of brain affected determines pattern of dysfunction
- Like CVA, lesions cause “loss of inhibition” of the pontine micturition center
- Detrusor overactivity with sphincter synergy is common
- **PVR low=low risk**

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Sakakibara et al, Int Urogynecol J, 1999

69

Dementia

- Incontinence approaches 90% in literature
- Atrophy of both white and gray matter
- Although detrusor overactivity may be found, not always the case
- 2/3 with or without cognitive impairment with incontinence were found to have detrusor overactivity (instability)
- **Low PVR=low risk**

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Skelly et al, Journal of American Geriatric Society 1995

70

Cerebral Palsy

STATEMENT SIXTEEN: In patients with low-risk NLUTD who present with new onset signs and symptoms, new complications (e.g., autonomic dysreflexia, urinary tract infections, stones), and/or upper tract or renal function deterioration, the clinician should re-evaluate and repeat risk stratification. *(Clinical Principle)*

- In childhood 33% have DO and urinary incontinence- worse with increasing disability
- Adults present with new retention, decreased voiding frequency, inability to void on command- need UDS/imaging new risk stratification
- UDS: DSD 15%, DO 30%, very high bladder capacity and DA in 6%
- Progressive retention with areflexic bladder common in adulthood in both genders
- CIC poorly tolerated- reserve for prolonged retention >12 h

American Urological Association
Education & Research, Inc.

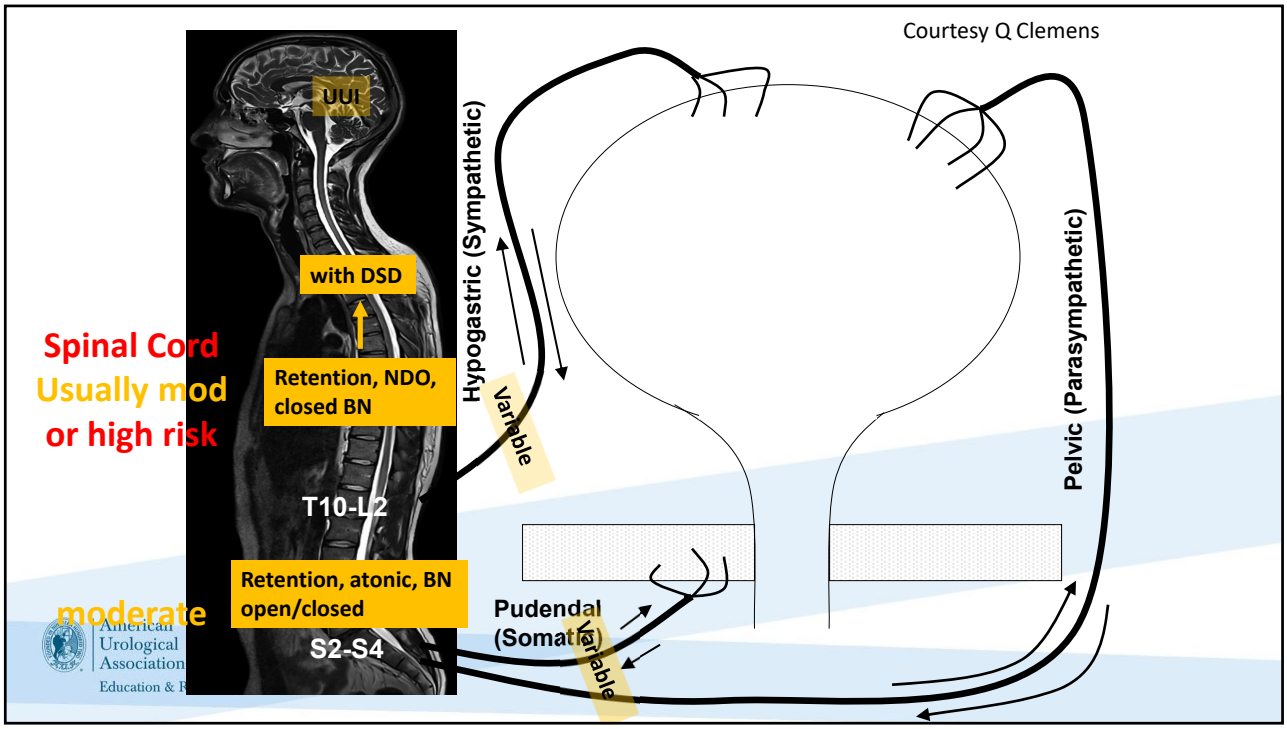
Goldfarb & Elliot 2016,Cotter & Elliott 2016

71

Don't ignore pathology present before disease onset

American Urological Association
Education & Research, Inc.

72



73

Traumatic Spinal Cord Injury

- Lower urinary tract function varies depending on stage of recovery from SCI
- Spinal Shock:
  - Detrusor areflexia and closed bladder neck
  - Flaccid paralysis
  - Reflexes absent below the level of the lesion
  - No need for UDS now
- Recovery: Return reflex detrusor activity

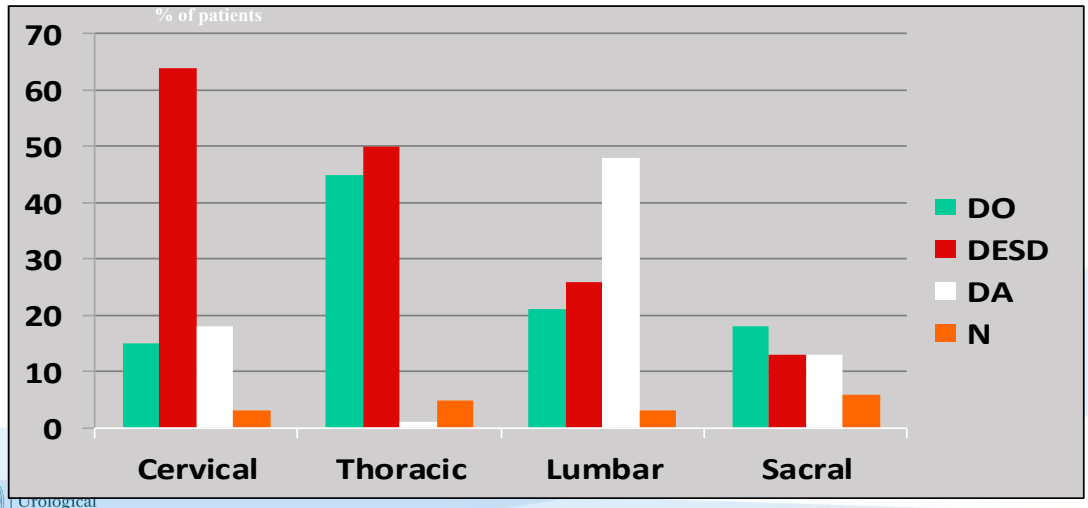
American Urological Association Education & Research, Inc.

Courtesy S Kraus

Gonzalez et al, Neurologic Disorders in Female Urology and Urogyn , 2004

74

UDS Findings and SCI Level



American Urological Association Education & Research, Inc.

Courtesy S Kraus

75

Almost all are moderate or high risk

- Rare low risk patient with synergistic voiding on UDS (usually ASIA D/E)
- Cannot guess UDS pattern or risk based on level- **all need UDS/upper tract workup**

American Urological Association Education & Research, Inc.

76

Multiple Sclerosis

- Inflammatory/demyelinating disease of CNS
- Plaque formation of brain and cord may have autoimmune etiology
- Ages 20-45
- F>M: 2:1
- Voiding dysfunction in 90% of MS patients: frequency, urgency, urge incontinence, hesitancy, intermittency, poor stream
- Can be low risk with low PVR or unknown risk (elevated PVR/UTIs)

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Goldenberg, Pharmacology & Therapeutics, 2012
Litwiller et al, Journal of Urology 1999

77

Multiple Sclerosis

- UDS findings:
- Detrusor overactivity in >67%
- DESD in 25%
- Impaired contractility in 20%
- 55% may change UDS behavior over time

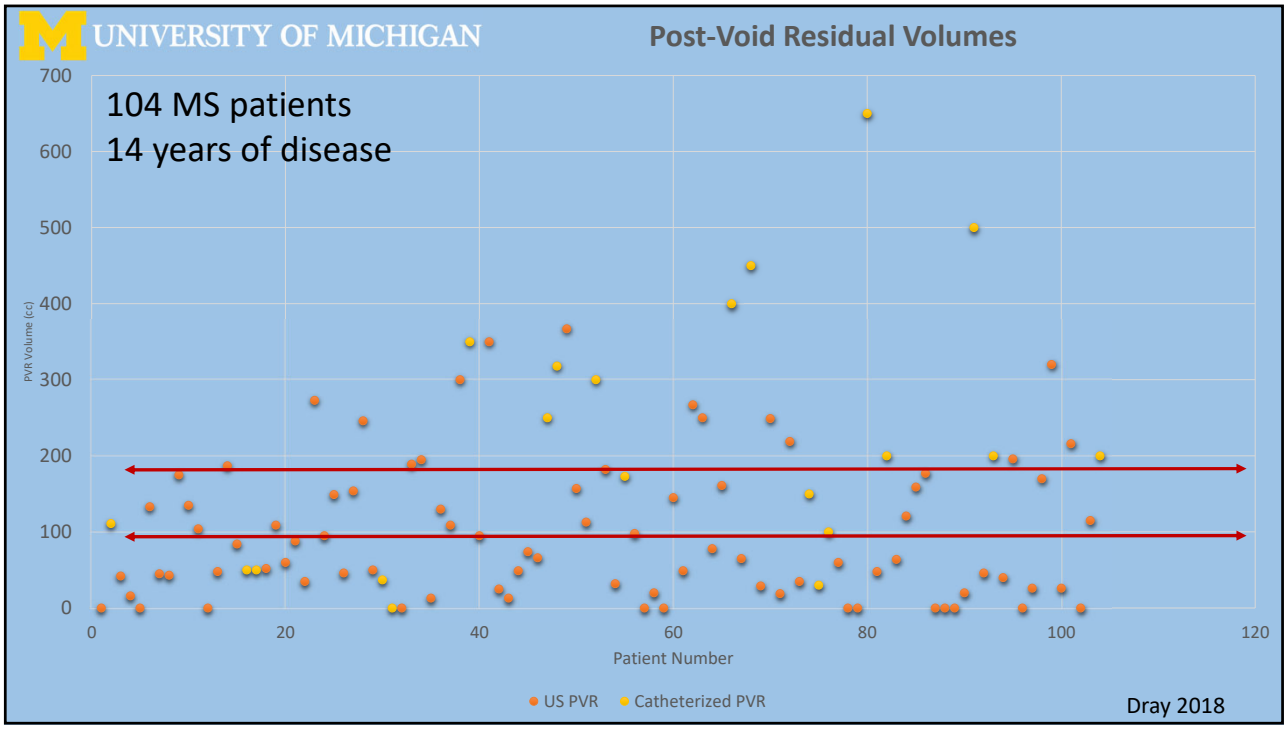
Upper tract deterioration however quite rare

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Kim et al J Urology 1998
Litwiller et al J Urology 1999
Ciancio et al, Urology 2001

78



79

MICHIGAN MEDICINE
UNIVERSITY OF MICHIGAN

Results

Results, Mean (SD)	PVR<50cc	PVR 50cc-150cc	PVR>150cc	P Value
Incontinence Pads Per Day	1.4 (1.4)	1.4 (1.6)	1.4 (1.5)	0.89
Recurrent UTI, No. (%)	9 (23.1)	6 (20.0)	11 (32.4)	0.27

Multivariate Analysis	AUA SS (p-value)	AUA Bother (p-value)	M-ISI SS (p-value)	M-ISI Bother (p-value)
PVR	0.84	0.68	0.18	0.88
Gender	0.56	0.48	0.03	0.35
Race	0.24	0.25	0.25	0.06
Age (>55 v ≤ 55)	0.82	0.31	0.18	0.11
MS Duration (>10 year v ≤ 10 years)	0.79	0.79	0.67	0.63
Type of MS	0.83	0.99	0.89	0.15
DMT	0.24	0.92	0.82	0.19
Anticholinergic Use	0.73	0.64	0.04	0.11
Alpha-blocker Use	0.78	0.99	0.91	0.45

80

Myelomeningocele

- Spinal neural tube defects
  - 3.2 to 4.6 per 10,000 births
  - W>M (1.7:1)
  - 3rd to 4th weeks of gestation
  - Maldevelopment of ectodermal, mesodermal, & neuroectodermal tissues,
  - Nerve roots/spinal cord with meningeal covering protrudes through posterior vertebral bony arch
- Deficit depends on neural structures affected
- Like SCI bladder behavior unpredictable so all need UDS/upper tract workup

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Netto et al, Reviews in Urology 2009

81

Myelomeningocele

- UDS pattern:
  - areflexic
  - compliance poor 50%
  - Bladder neck classically open - incontinent
  - Non-relaxing external sphincter - high storage pressure
- Patients are wet but in danger of renal damage!
- Early UDS evaluation required
  - Elevated intravesical storage pressure mandates early drainage procedure
  - ISD (Low LPP) permits surveillance with U/S screening
  - Augmentation to decrease storage pressure if anticholinergics ineffective

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Bauer, Pediatric Nephrology 2008

82

Sacral Agenesis

- Absence of part or all of 1 or more sacral vertebrae (caudal regression syndrome)
- Nerve roots embedded in dense fibrous tissue
- Increased risk
  - Mothers with IDDM (1%)
  - Genetic mutation-deletion on chromosome 7
- Neurogenic lower urinary tract dysfunction with 2 or more vertebral bodies affected

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Bauer, Pediatric Nephrology 2008

83

Sacral Agenesis

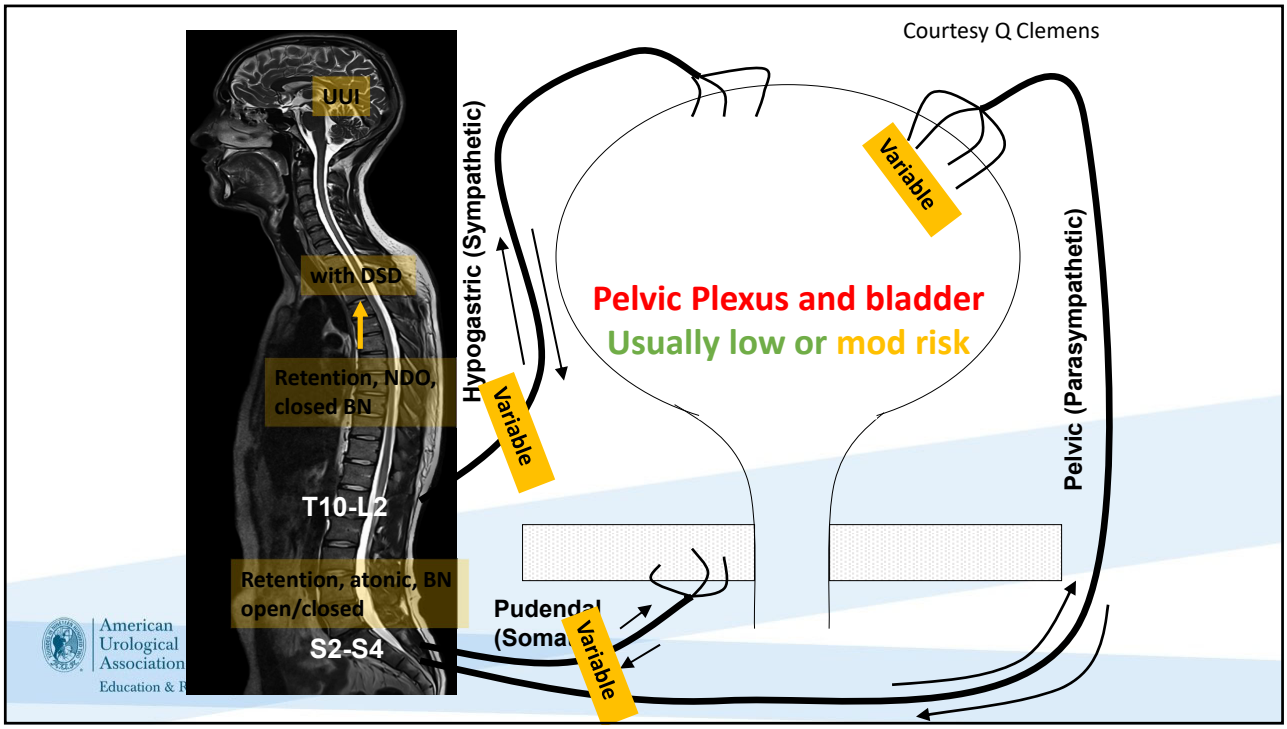
- Bladder dysfunction in >90%
- 50% DO with DESD
  - Present with recurrent UTI, reflux
- 50% Areflexia with denervation of outlet
  - Present with continuous incontinence
- Cannot predict by # of affected vertebrae
- UDS and imaging important for management

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Bauer, Pediatric Nephrology 2008

84



85

Pelvic Plexus Injury

- May occur with any major pelvic surgery
  - 20%-68% after abdominal perineal resection
  - 16% to 80% after radical hysterectomy
  - 10% to 20% after procto-colectomy
  - 20% to 25% after anterior resection
- Pelvic fracture or tumor
  - Up to 11.5% will sustain neurologic injury
    - Transverse sacral fracture-most likely correlated
    - 2/3 will have neurogenic bladder
- Can improve if neuropraxia (retractor related)
- If PVR elevated need workup

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Yoshimura et al, Reviews in Urology 2004
Havenga et al, Seminars in Surgical Oncology 2000

86

Abdominoperineal Resection

- Incomplete emptying (retention) up to 90%
- Pelvic plexus injury impairs contractility
- Treat retention initially with CIC
- Sympathetic defect decreases bladder neck tone, sphincter weakness results in incontinence
- Pudendal nerve damage - external sphincter dysfunction may be permanent
- Beware development of decentralization
- Decentralization=areflexia & loss compliance, risk upper tracts

American Urological Association Education & Research, Inc.

Courtesy S Kraus

87

Diabetes and Bladder Dysfunction

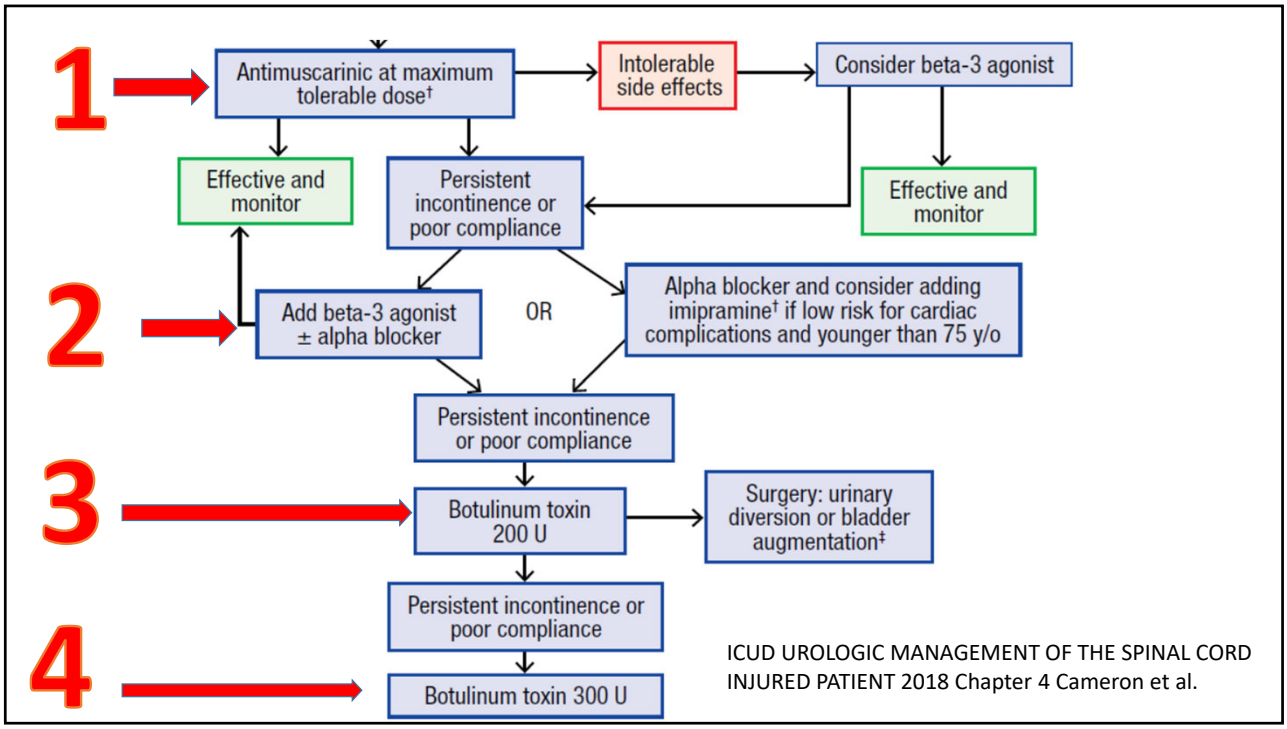
- Voiding symptoms classically after 10 years- correlate with glucose control and peripheral neuropathy
- Segmental demyelinization & axonal degeneration
- Classic understanding:
  - Sensory impairment
  - decreased contractility
  - Distention myopathy worsens voiding dysfunction
- Up to 55% diabetics have detrusor overactivity
- 33% impaired contractility or areflexia= diabetic cystopathy
- Almost always low risk

American Urological Association Education & Research, Inc.

Courtesy S Kraus

Kaplan et al, J Urology,1995

88



ICUD UROLOGIC MANAGEMENT OF THE SPINAL CORD INJURED PATIENT 2018 Chapter 4 Cameron et al.

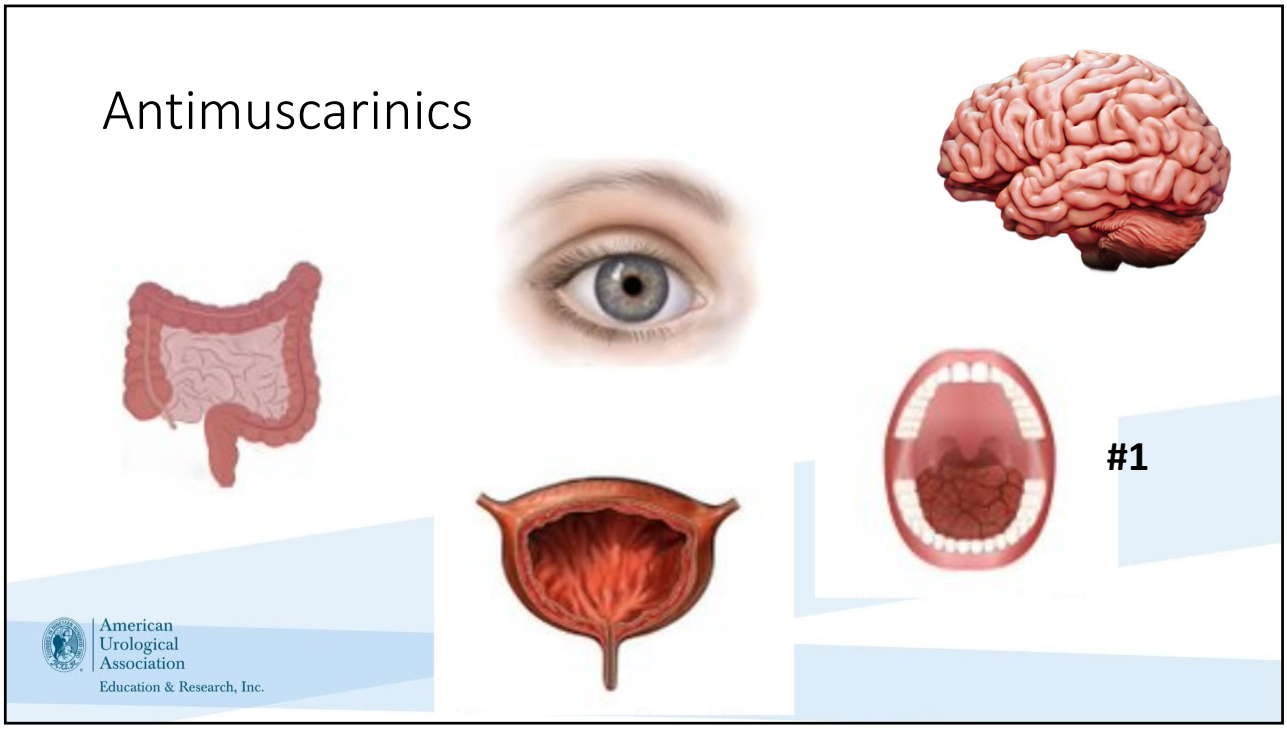
89

33. Clinicians may recommend antimuscarinics or beta-3 adrenergic receptor agonists, or a combination of both, to improve bladder storage parameters in NLUTD patients. (*Conditional Recommendation; Evidence Level: Grade C*) :

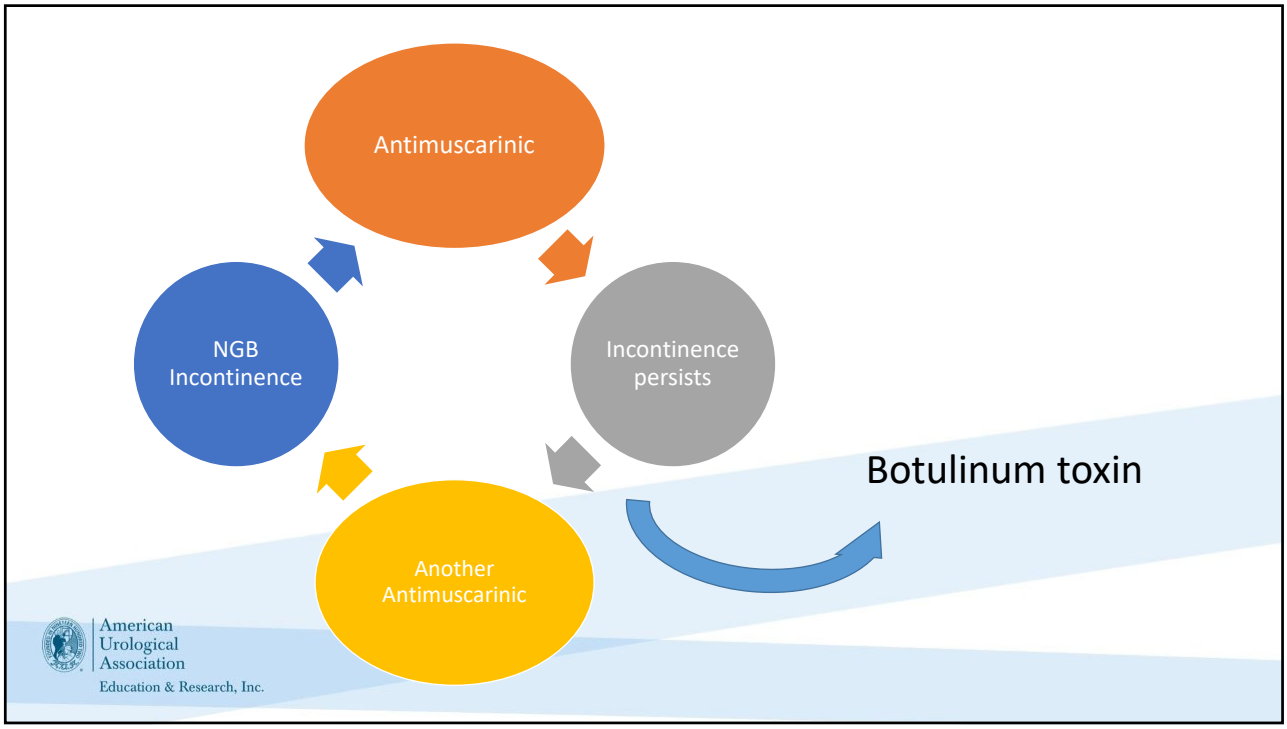
Antimuscarinics

Beta three agonists

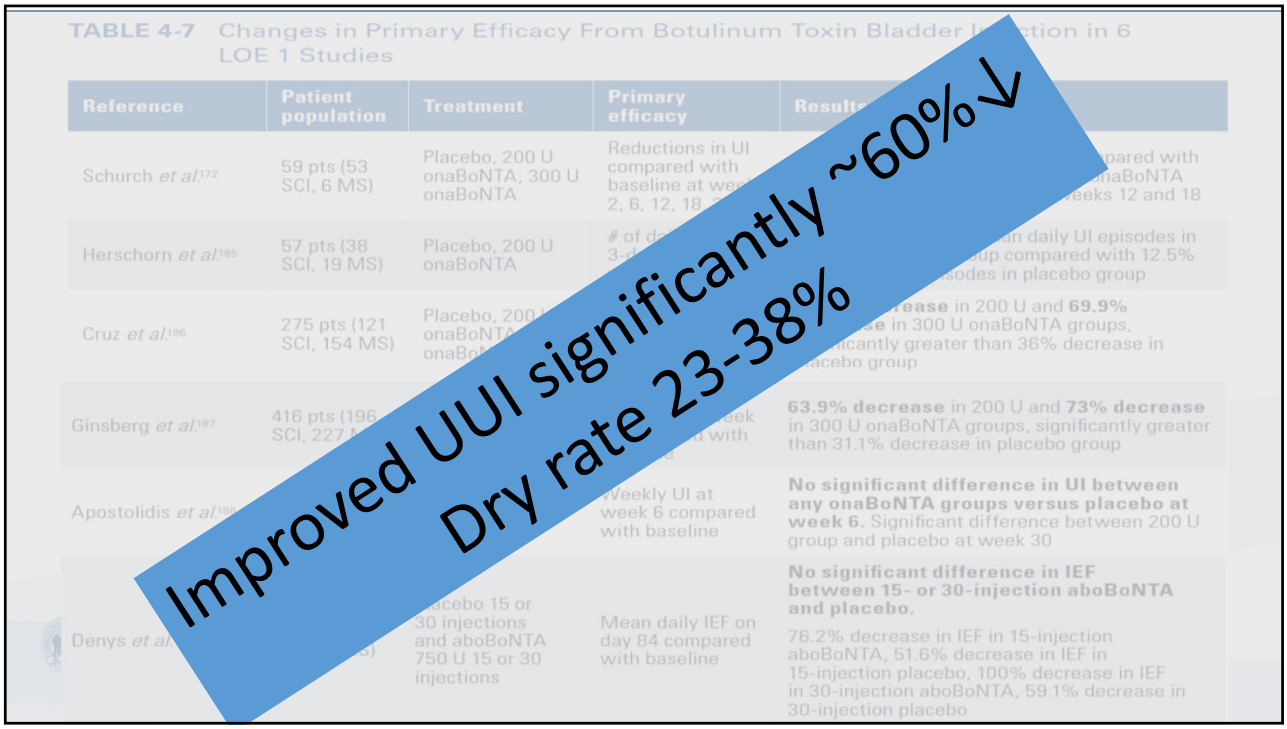
90



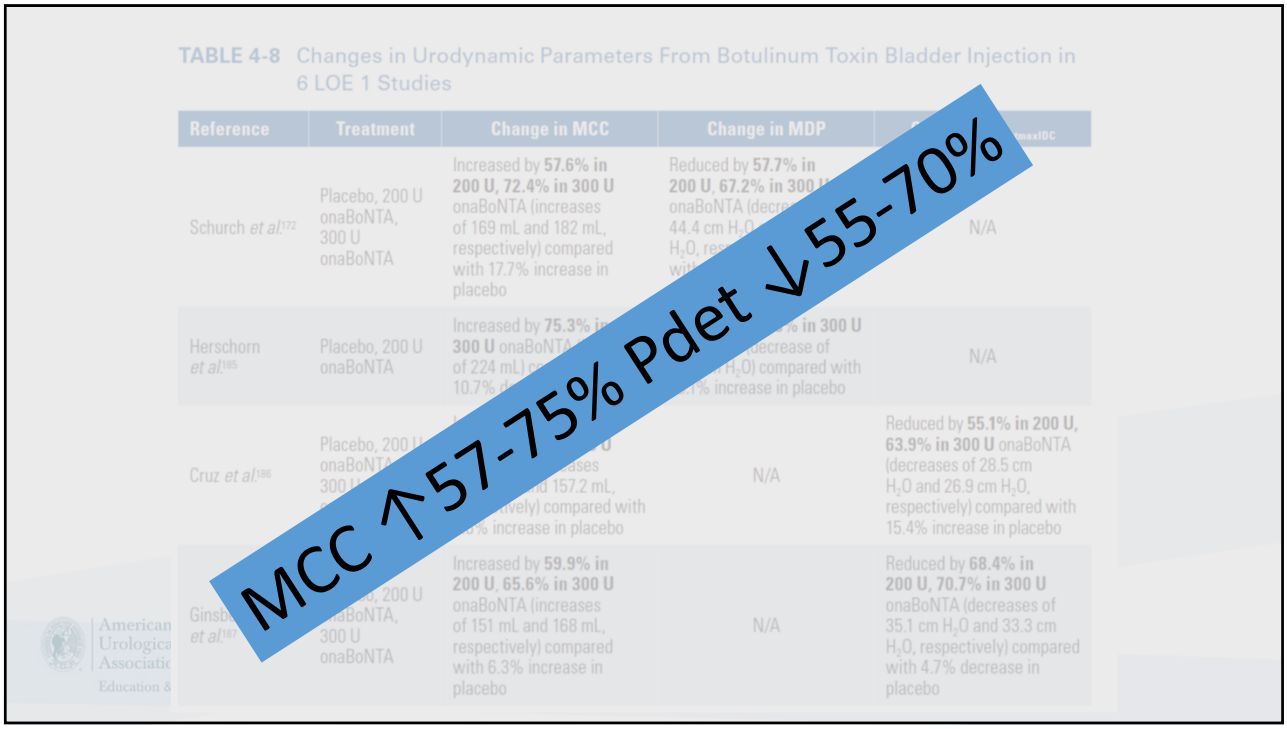
91



92



93



94

Journal of Pediatric Urology (2009) 5, 156–164

ELSEVIER

REVIEW ARTICLE

Botulinum to
injecti in child
detru tiv
blad

Xav Shahi

Do Repeat Intradetrusor Botulinum Toxin Type A Injections Yield Valuable Results? Clinical and Urodynamic Results after Five Injections in Patients with Neurogenic Detrusor Overactivity

André Reitz[a], Pierre Denys[b], Christophe Fermanian[c], Brigitte Schurch[d], Eva Comperat[e], Emmanuel Chartier-Kastler[a,b,*]

Neurourology and Urodynamics 32:1109–1115 (2013)

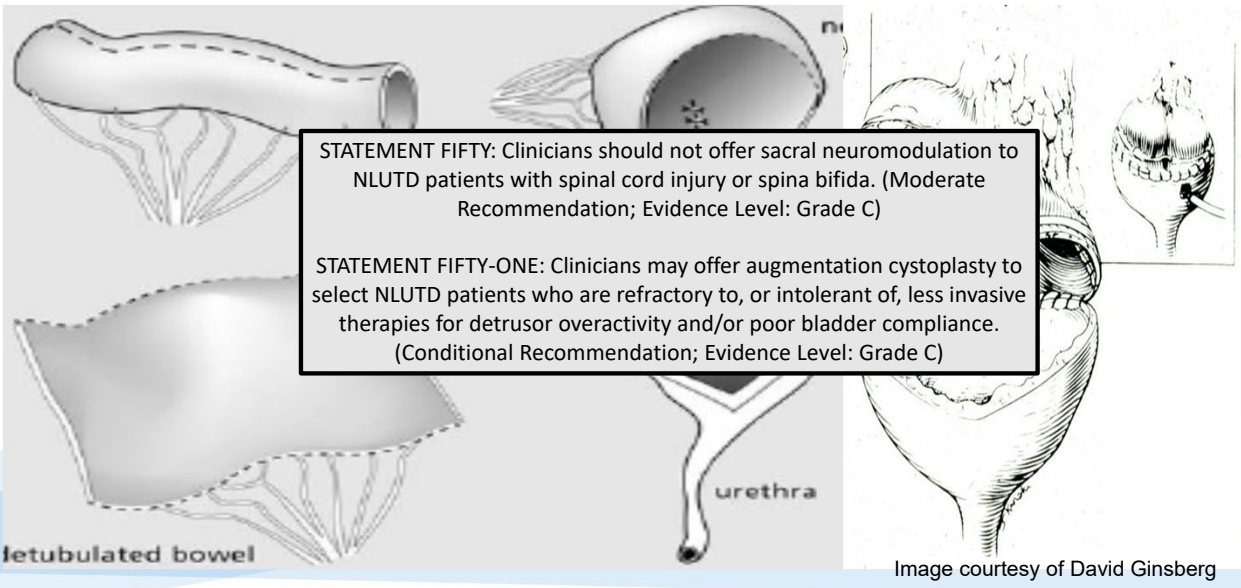
OnabotulinumtoxinA Improves Urodynamic Outcomes in Patients With Neurogenic Detrusor Overactivity

Eric Rovner,[1*] Roger Dmochowski,[2] Christopher Chapple,[3] Catherine Thompson,[4] Wayne Lam,[5] and Cornelia Haag-Molkenteller[5]

botulinum toxin A injection significantly n patients with

95

Augmentation Enterocystoplasty



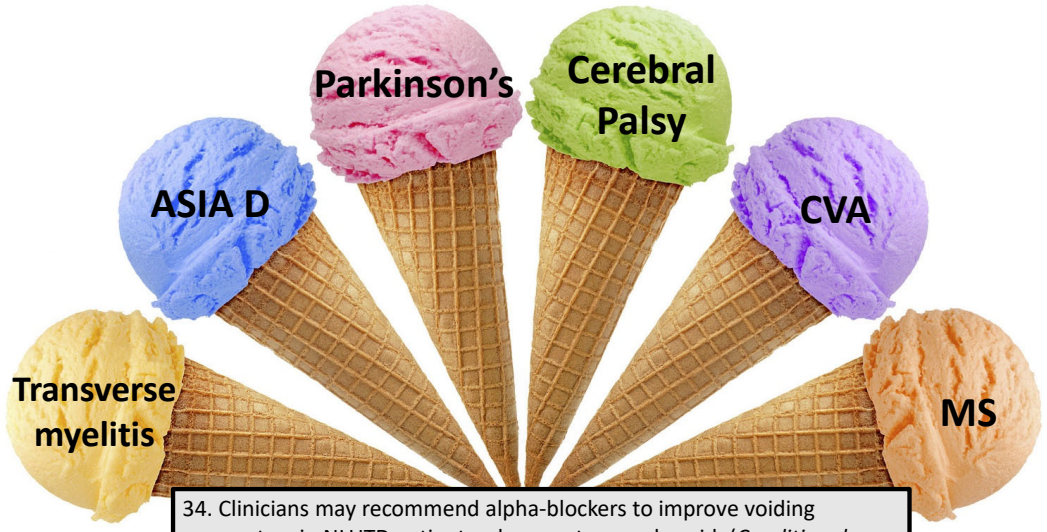
STATEMENT FIFTY: Clinicians should not offer sacral neuromodulation to NLUTD patients with spinal cord injury or spina bifida. (Moderate Recommendation; Evidence Level: Grade C)

STATEMENT FIFTY-ONE: Clinicians may offer augmentation cystoplasty to select NLUTD patients who are refractory to, or intolerant of, less invasive therapies for detrusor overactivity and/or poor bladder compliance. (Conditional Recommendation; Evidence Level: Grade C)

Image courtesy of David Ginsberg

96

Voiding NGLUTD



34. Clinicians may recommend alpha-blockers to improve voiding parameters in NLUTD patients who spontaneously void. (*Conditional Recommendation; Evidence Level: Grade C*)

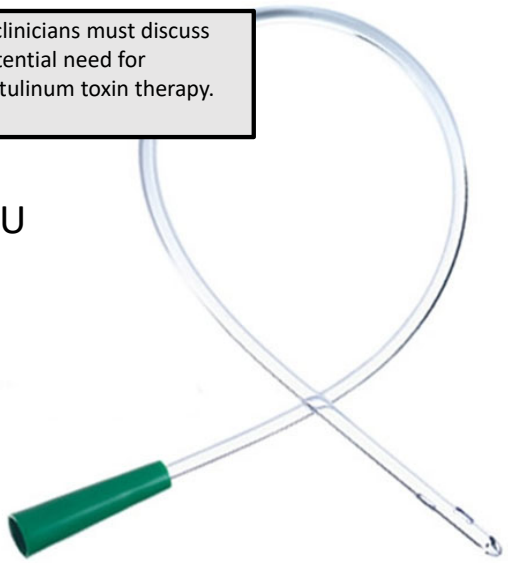
97

42. In NLUTD patients who spontaneously void, clinicians must discuss the specific risks of urinary retention and the potential need for intermittent catheterization prior to selecting botulinum toxin therapy. (*Clinical Principle*)

28-29% new CIC with first 200U

6% and 3% cycle 2 and 3

PD 100U= 12.5%



American Urological Association
Education & Research, Inc.

Cruz 2011, Ginzberg 2012, Kennelly 2017
Vurture 2018

98

Treatment of Retention

- CIC:
  - Reusable
  - Single use prelubricated
  - Single use prelubricated self-contained
- Indwelling:
  - Urethral
  - Suprapubic
- Condom:
  - Requires sphincterotomy

American Urological Association
Education & Research, Inc.

99

Practical issues

Indwelling catheters

- Clogging a major issues
- Intercourse typically not possible
- Can be SP or urethral
- Colonization rate 100% with permanent catheter (5% per day)
- Other than bag emptying little maintenance
- Often placed for incontinence improving Qol but risking urethra

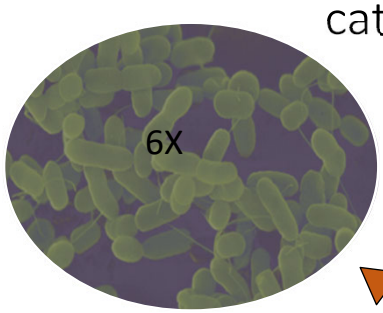
CIC

- Inability to pass catheter major issue
- No problems with sex
- Can be via catheterizable stoma or urethral
- UTI rate 1-2 per year
- Need to be able to cath or have someone willing to do it

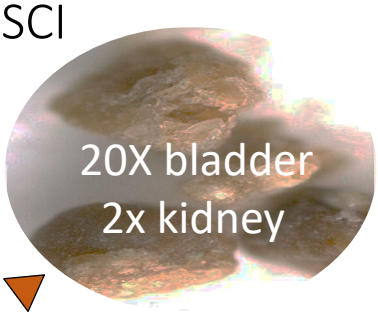
American Urological Association
Education & Research, Inc.

100

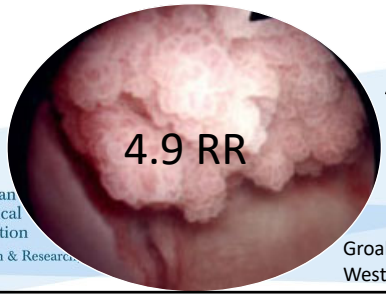
Urologic Complications of indwelling catheters in SCI



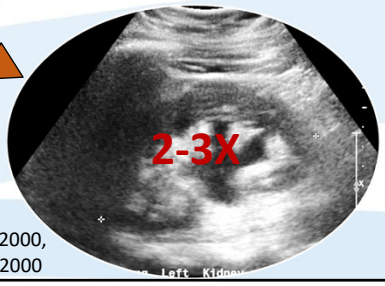
Ryu 2011, De Ruz 2000, Larsen 1997, Weld 2000



Ord 2003, Larsen 1997, Donellan 1999, Weld 2000, Chen 2000



Groah 2002, West 1999



Chen 2000, Weld 2000

American Urological Association Education & Research

101

35. Clinicians should recommend intermittent catheterization rather than indwelling catheters to facilitate bladder emptying in patients with NLUTD. (*Strong Recommendation; Evidence Level: Grade C*)

21. In NLUTD patients with indwelling catheters, clinicians should perform interval physical examination of the catheter and the catheter site (suprapubic or urethral). (*Moderate Recommendation*; *Evidence Level: Grade C)*

American Urological Association Education & Research, Inc.

102

Suprapubic catheters- complication

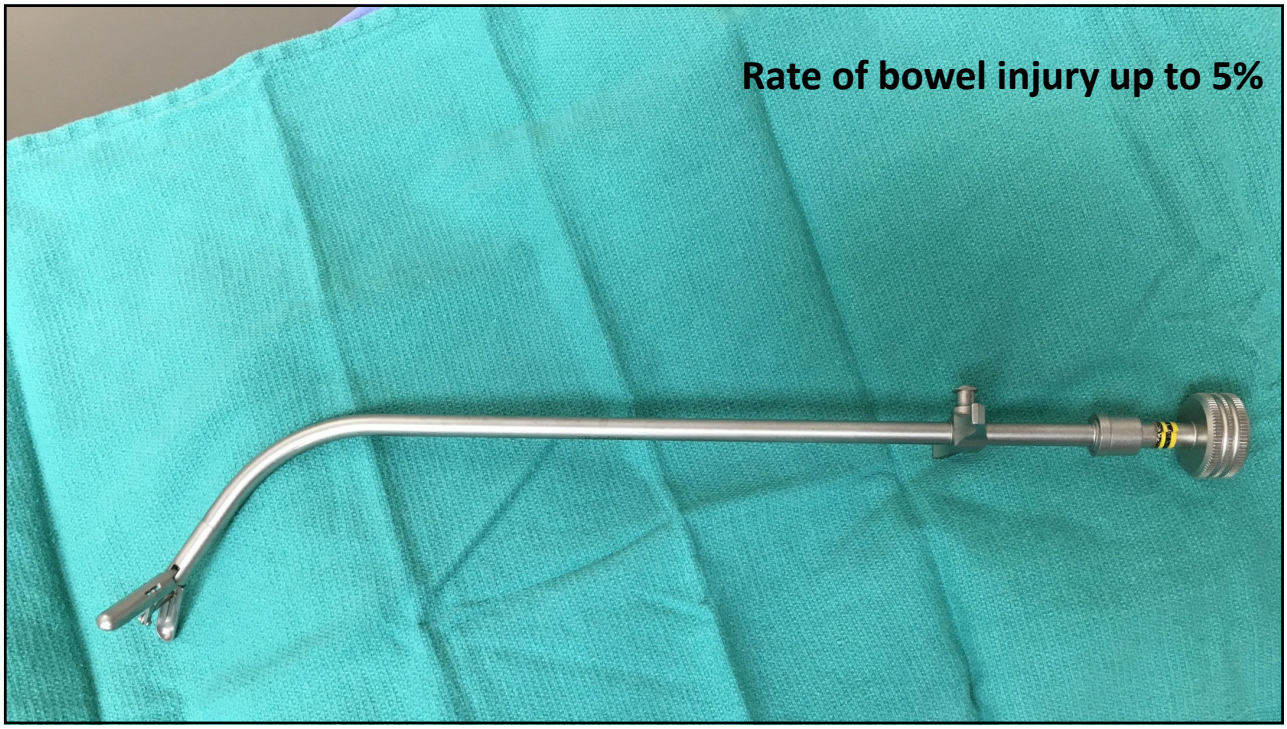
- Bowel injury even placed in OR:
  - bowel injury 2.5-5%
- 43.5% multiple ED visits (cath change because of obstruction, recurrent UTI and exit wound infection)
  Ahluwalia 2006

36. For appropriately selected NLUTD patients who require a chronic indwelling catheter, clinicians should recommend suprapubic catheterization over an indwelling urethral catheter. (*Strong Recommendation; Evidence Level: Grade C*)

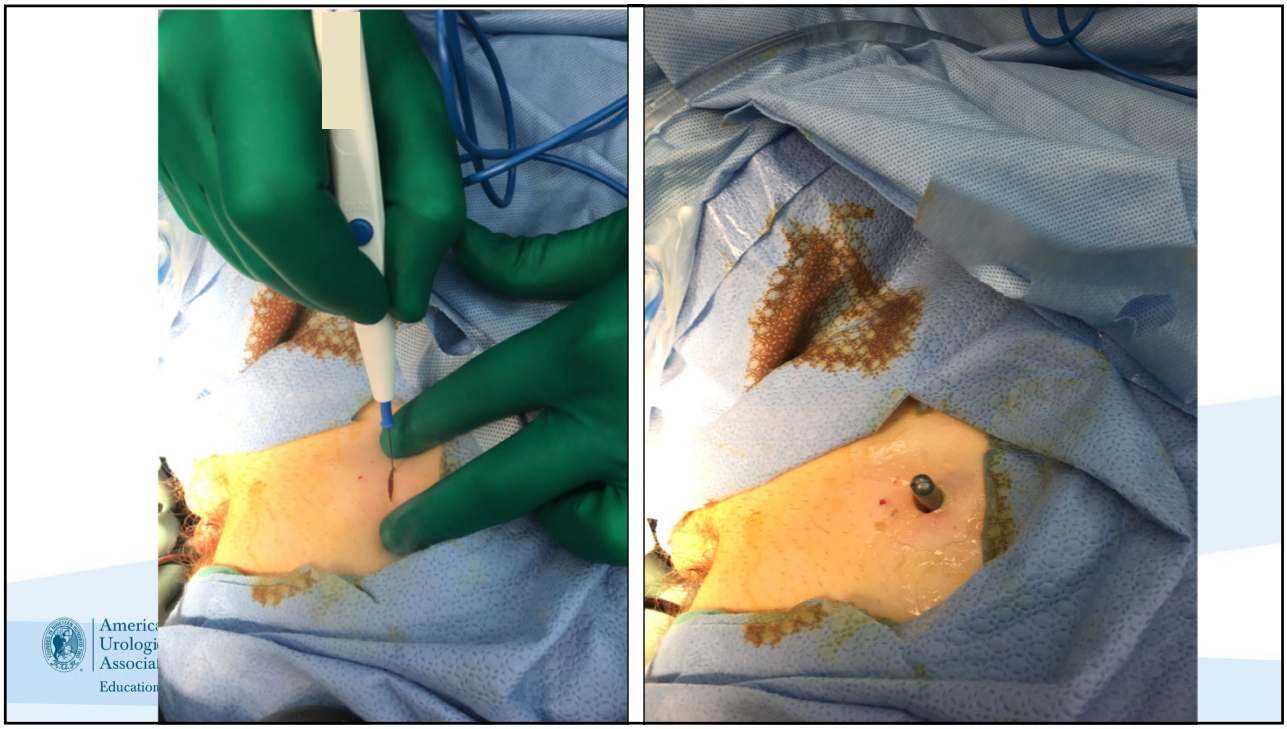
American Urological Association
Education & Research, Inc.

Ahluwalia 2006, Sherrif et al 1998

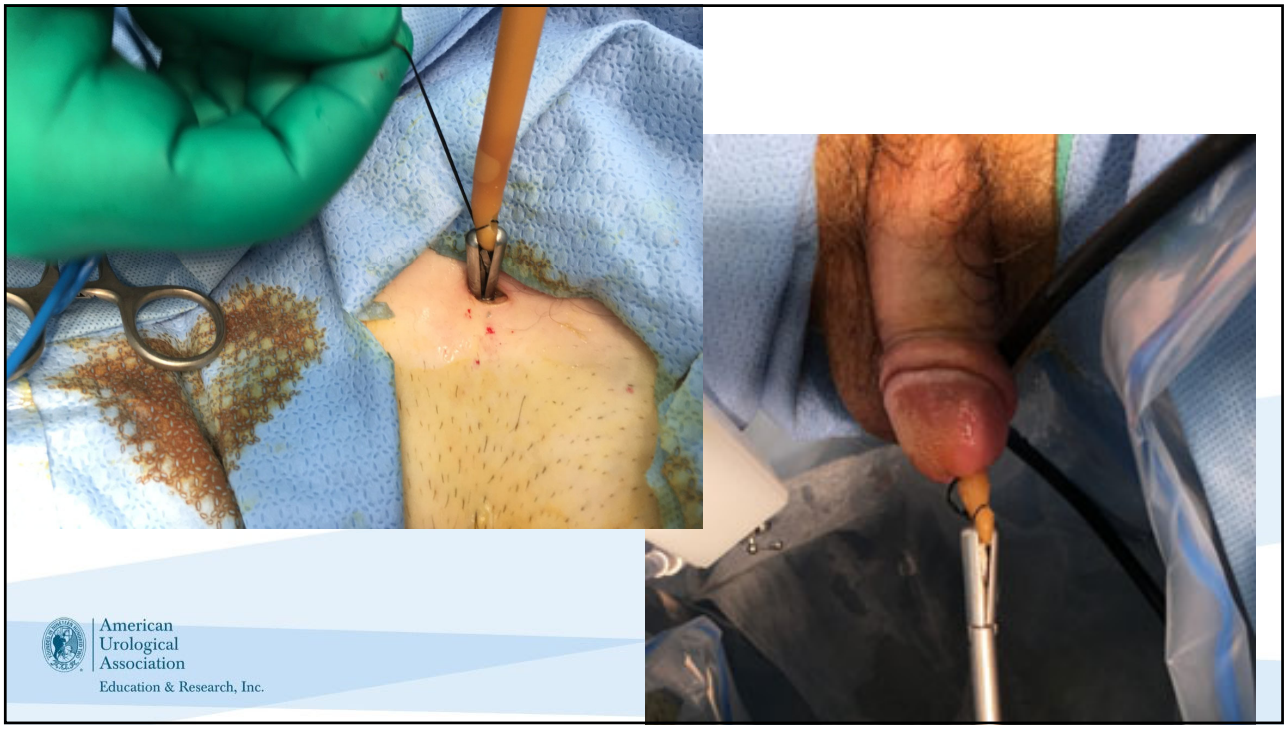
103



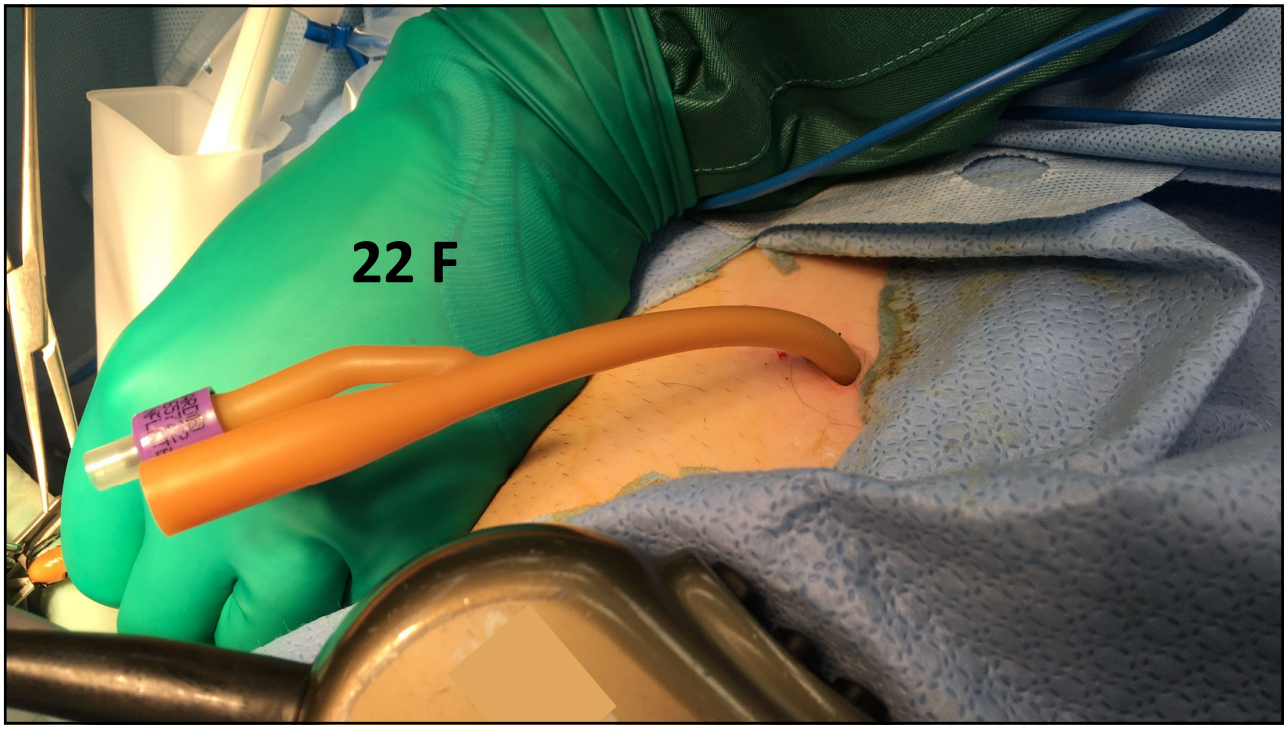
104



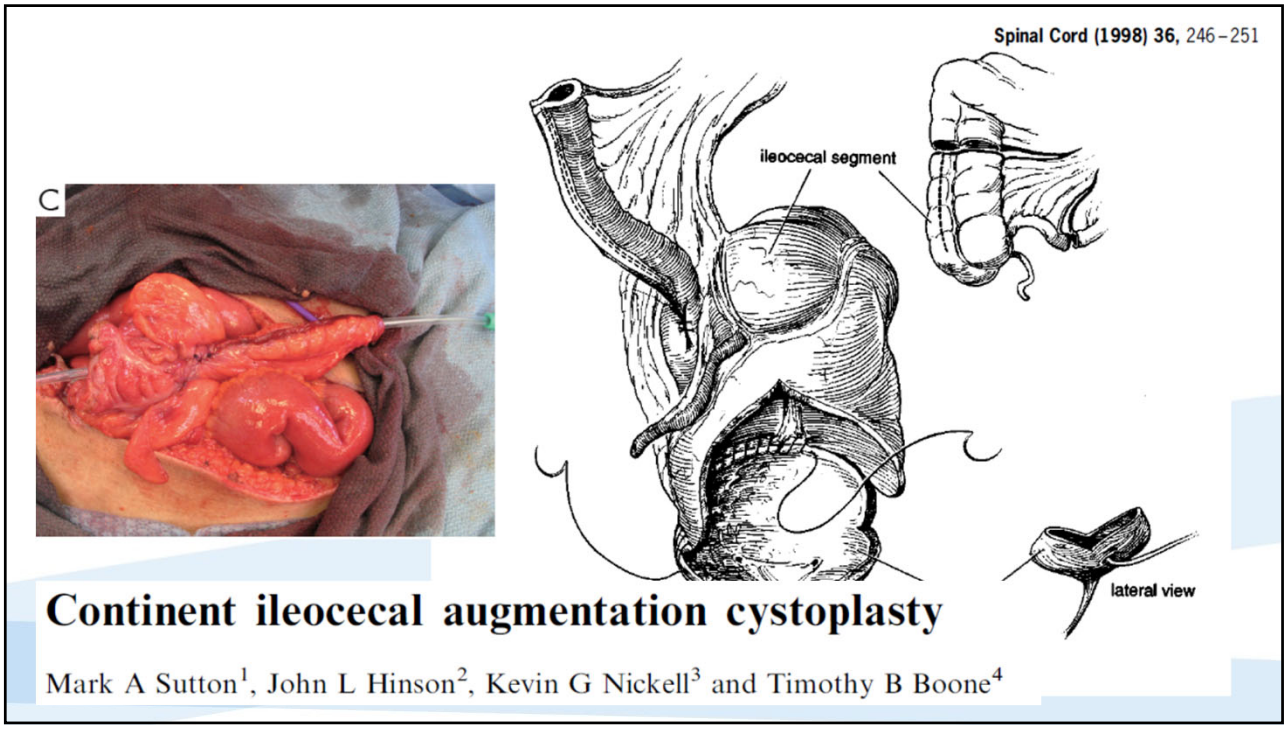
105



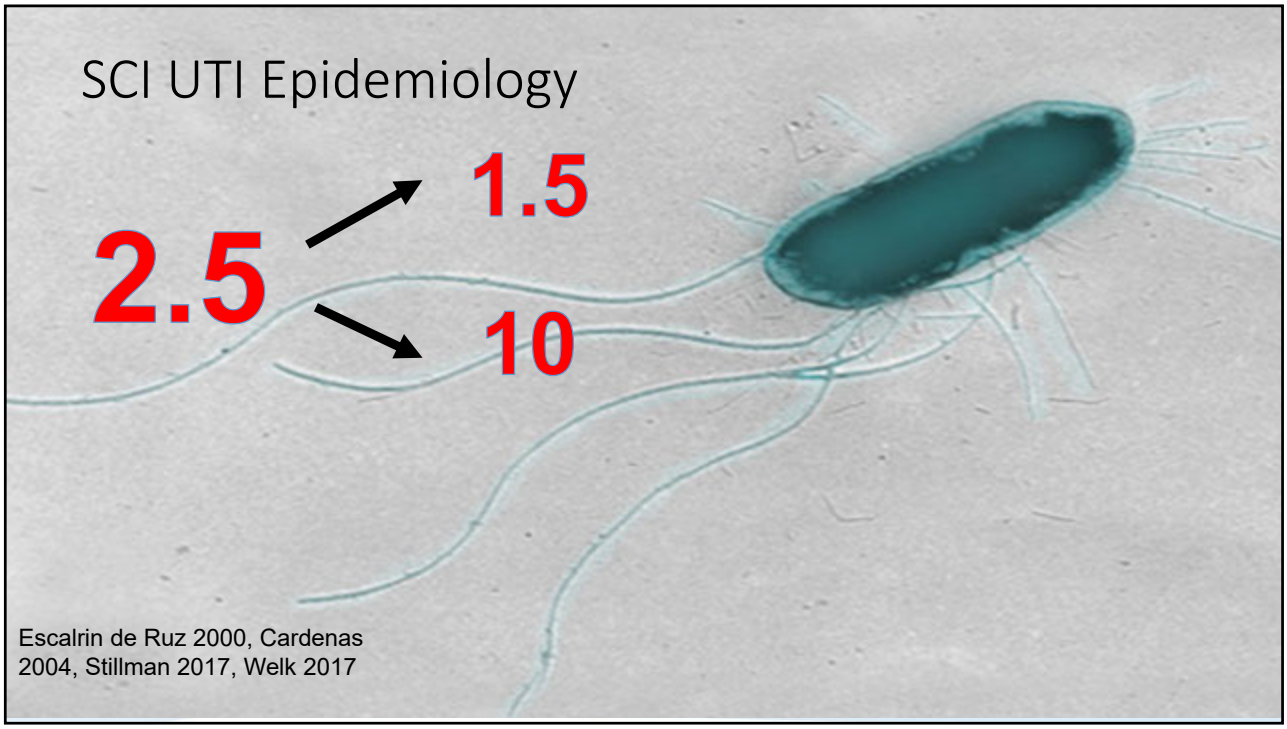
106



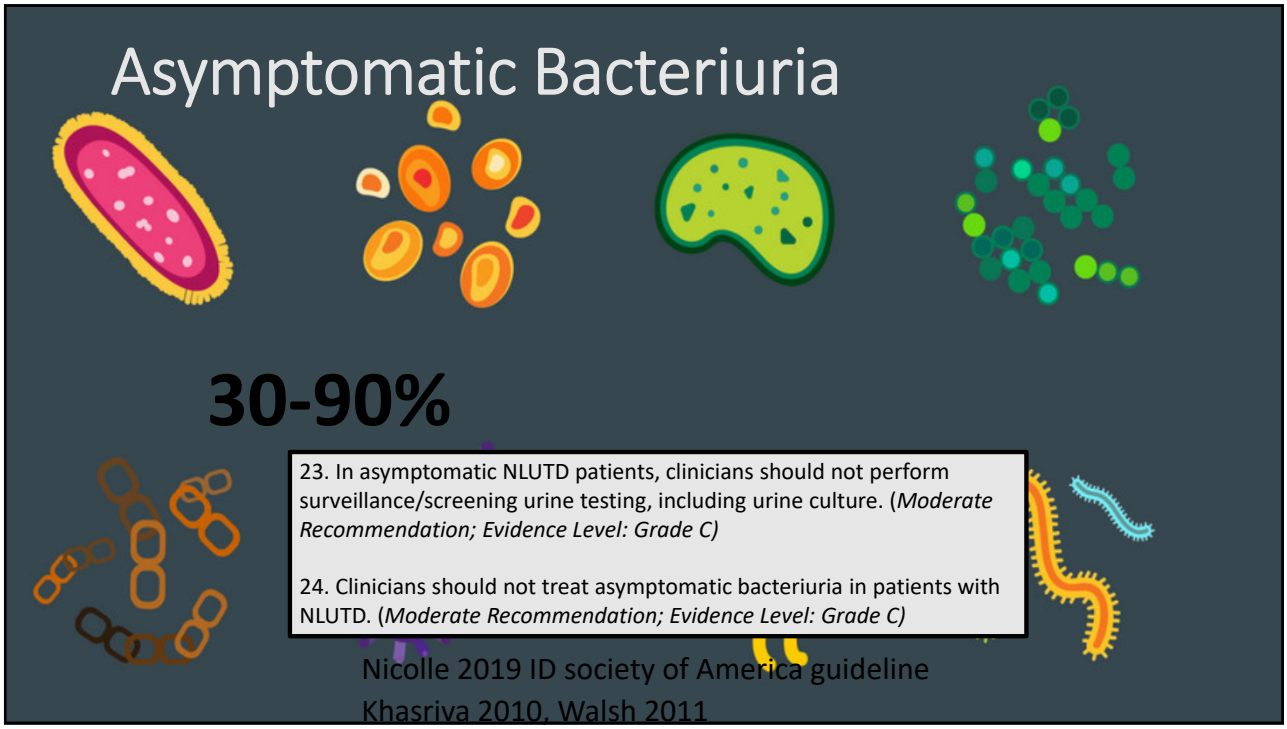
107



108

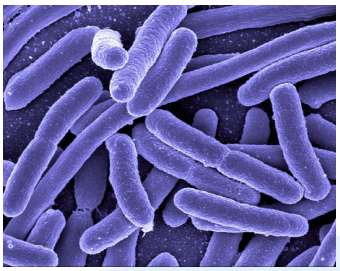


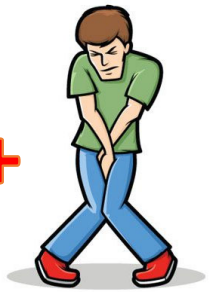
109



110

Bacteriuria vs. UTI





Not:
Smell
Cloudiness
Confusion

Dysuria
New urgency
Hematuria
New leakage
Fever
New bladder pain
Increased spasticity

25. In NLUTD patients with signs and symptoms suggestive of a urinary tract infection, clinicians should obtain a urinalysis and urine culture. (*Moderate Recommendation; Evidence Level: Grade C*)

111

Treatment for acute cystitis

ALL NLUTD

- **Complicated=**
  - 7 days of TMP-SMX DS BID
  - 7 days nitrofurantoin 100mg BID
  - Fosfomycin 3 sachets (q2 days)
  - 7 days Cephalexin 500mg po QID
  - 7 days Ciprofloxacin 500mg po BID

No test for cure unless surgical procedure or pregnancy

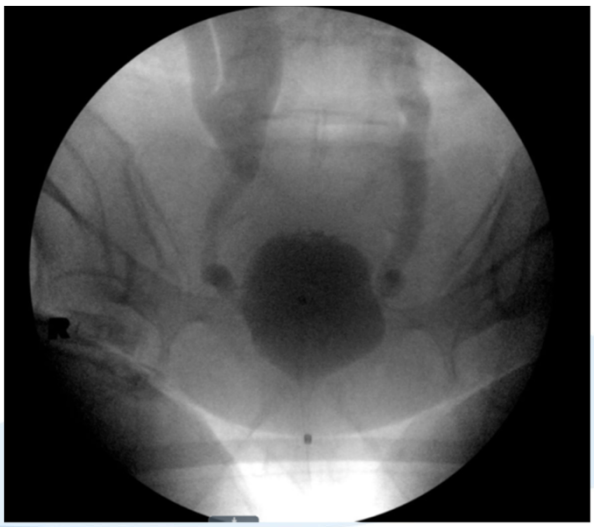
AUA Guideline 2019

112

#1 diagnose and fix anatomical causes

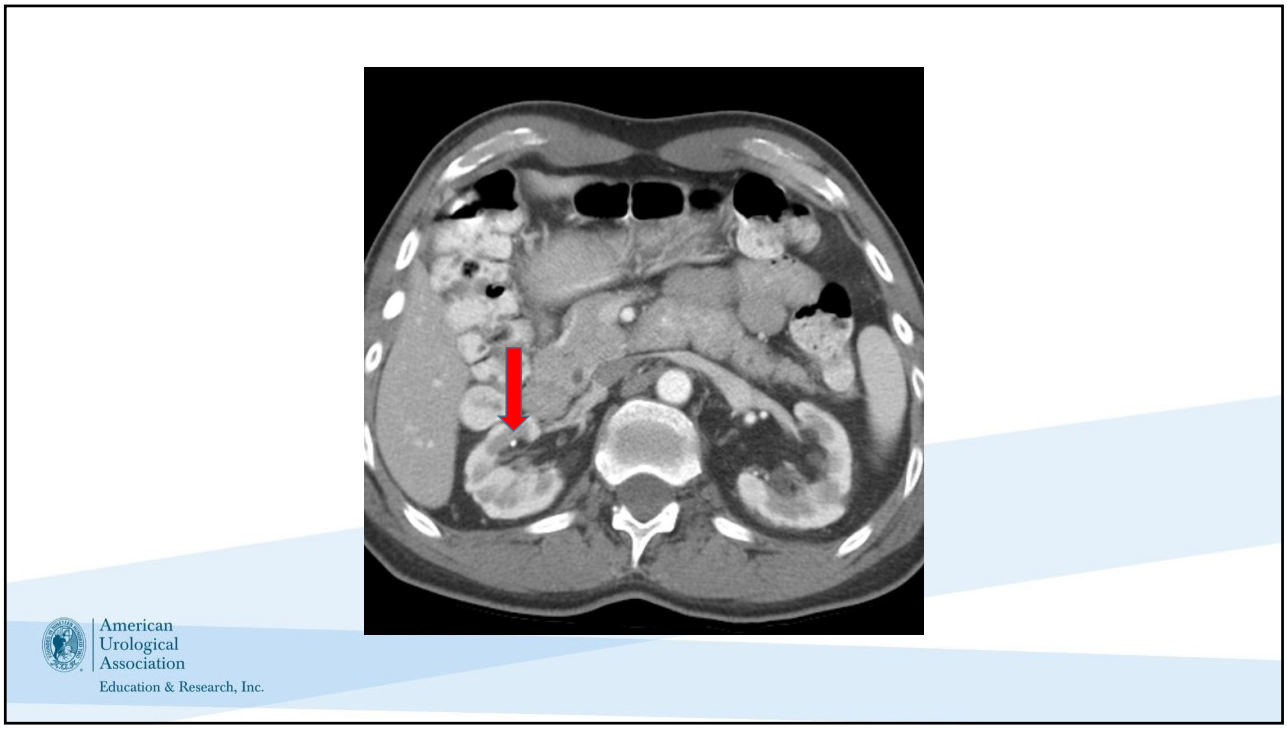
American Urological Association
Education & Research, Inc.

113



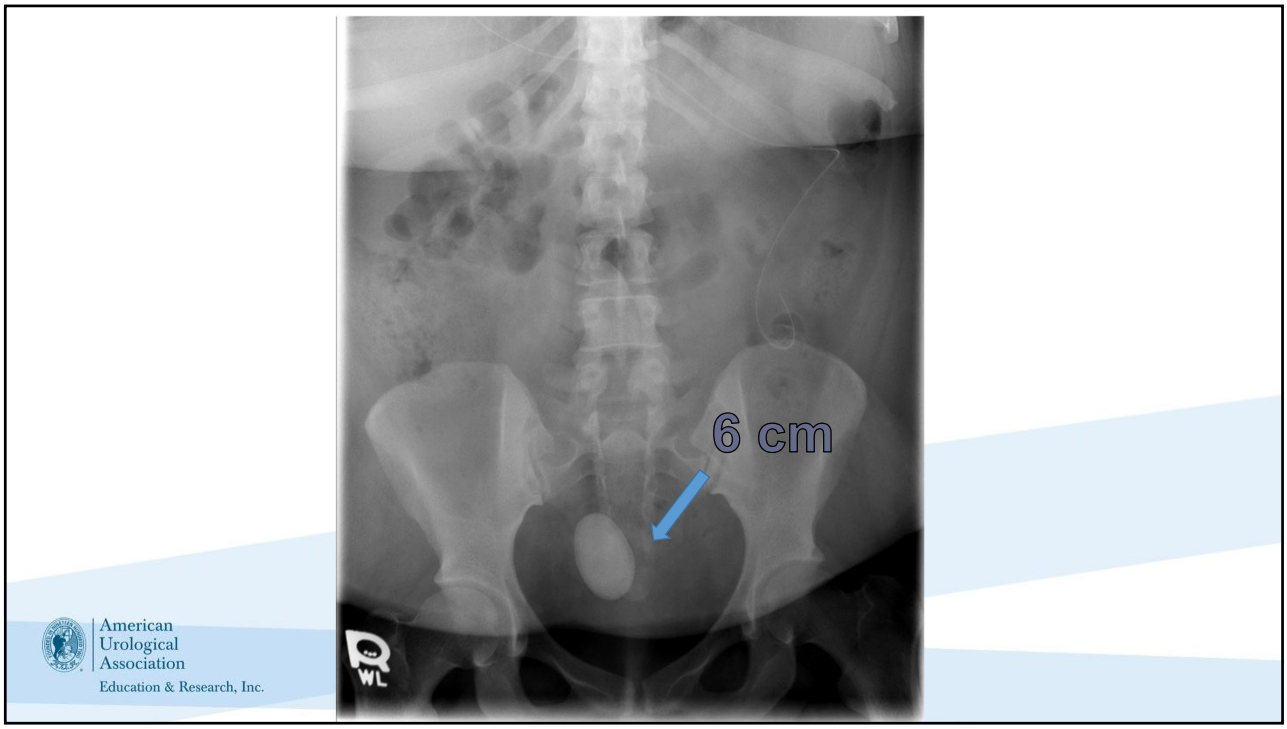
American Urological Association
Education & Research, Inc.

114



115

116

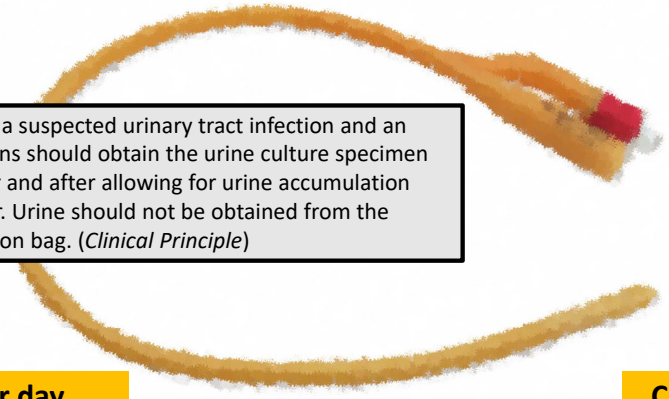


117

30. In NLUTD patients who manage their bladder with an indwelling catheter, clinicians should not use daily antibiotic prophylaxis to prevent urinary tract infection. (*Strong Recommendation; Evidence Level: Grade B*)

Suprapubic vs urethra
Benefit gone at 30d

27. In NLUTD patients with a suspected urinary tract infection and an indwelling catheter, clinicians should obtain the urine culture specimen after changing the catheter and after allowing for urine accumulation while plugging the catheter. Urine should not be obtained from the extension tubing or collection bag. (*Clinical Principle*)



Colonization 5% per day
~98% at 3 months

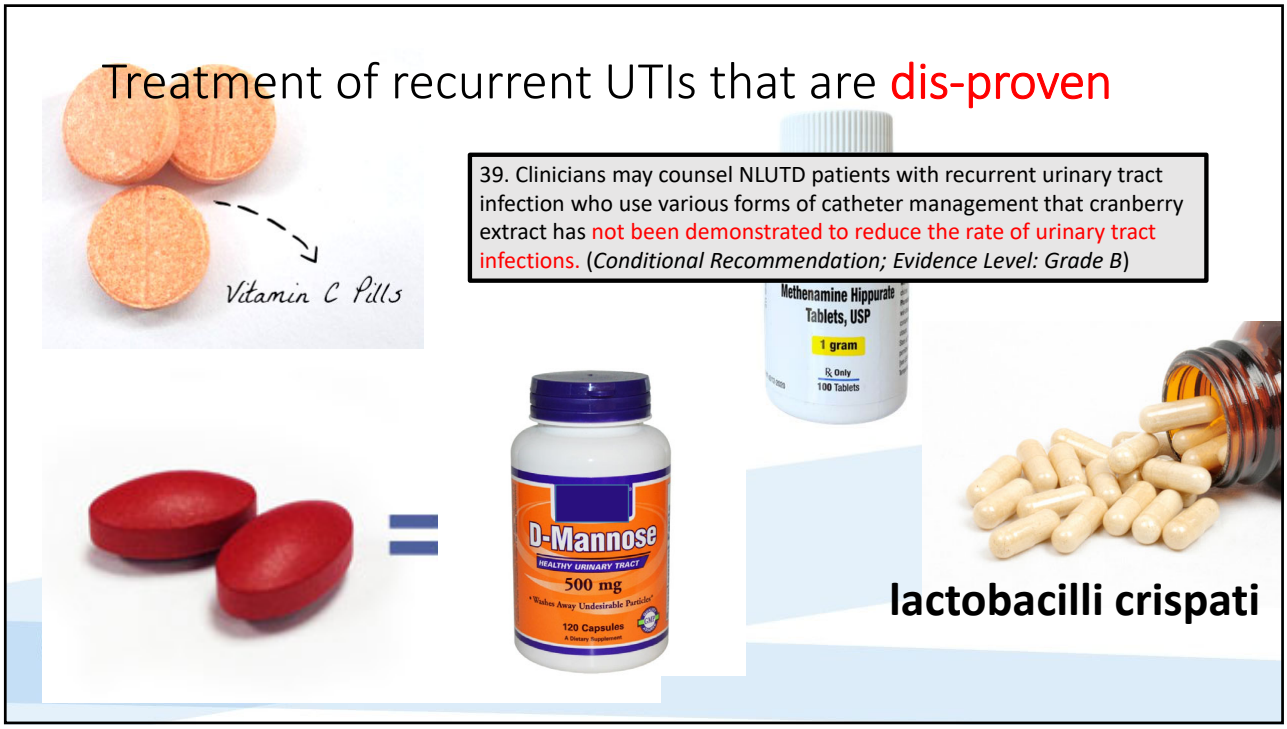
CIC vs. Foley
UTI rate 1:6

Association
Education & Research, Inc.

Ryu 2011, De Ruz 2000, Larsen 1997, Weld 2000

118

119



120

Continuous low-dose antibiotic prophylaxis for adults with repeated urinary tract infections (AnTIC): a randomised, open-la

Holly Fisher, Yemi
James Larcombe,
Katherine Walton,

Long
recur
adult
analy

Haroon Ah
Shantini Pa

48%↓

24%↓

ol ecoli 90%

after 30d

31. In NLUTD patients who manage their bladders with clean intermittent catheterization and do not have recurrent urinary tract infections, clinicians should not use daily antibiotic prophylaxis. (*Moderate Recommendation; Evidence Level: Grade B)*

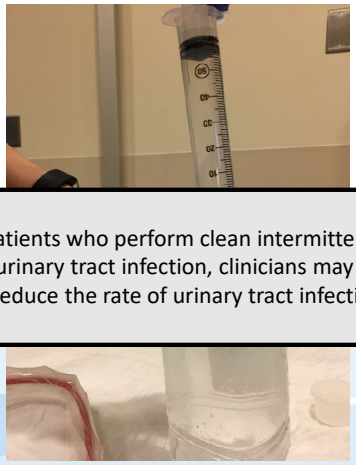
37. In NLUTD patients who perform clean intermittent catheterization with recurrent urinary tract infection, clinicians may offer oral antimicrobial prophylaxis to reduce the rate of urinary tract infections following shared decision-making and discussion regarding increased risk of antibiotic resistance. (*Conditional Recommendation; Evidence Level: Grade C*)

American Urological Association
Education & Research, Inc.

121

Gentamicin Instillations: 480mg in 1L

- Instill 30-60ml once daily
  - 14.4 to 28.8mg total dose



38. In NLUTD patients who perform clean intermittent catheterization with recurrent urinary tract infection, clinicians may offer bladder instillations to reduce the rate of urinary tract infections. (*Expert Opinion*)

American Urological Association
Education & Research, Inc.

122

Conclusions:

- Patients need risk stratification as the first step in management of NGLUTD
- Low risk patients can be followed expectantly, and their symptoms managed
- All others need UDS and upper tract imaging/Cr to diagnose bladder function and upper tract risk
- Ongoing monitoring needed for moderate and high risk: annual visit, Cr and renal US
- Keep bladder pressure low and avoid DO
  - Medical therapy
  - Botulinum toxin
  - Surgical intervention: augment or diversion
- Empty the bladder safely
  - CIC>suprapubic>urethral Foley
  - Can make CIC possible with surgery
- Avoid UTIs but don't treat bacteriuria

American Urological Association
Education & Research, Inc.

123

Q1: Which of the following women should not use vaginal estrogen?

- Women with a history of stroke
- Women with cardiac disease
- Women with a history of ER+ breast cancer
- Women who are not sexually active
- Women who are vegan
- Women with undiagnosed vaginal bleeding

American Urological Association
Education & Research, Inc.

124

Q2: The TOP priority in urologic management of NGLUTD is:

- Continence
- Avoidance of catheters/preserving voiding function
- Prevention of UTIs
- Renal preservation

American Urological Association
Education & Research, Inc.

125

Q3:

- His risk stratification is:
  - Low
  - Moderate
  - High
  - I don't know

American Urological Association
Education & Research, Inc.

126

Q4: Which of the following are needed to risk stratify him? (Pick all that apply)

- Nothing
- PVR
- Urodynamics
- CT abdomen
- Renal US
- cystoscopy

American Urological Association
Education & Research, Inc.

127

Q5: His risk strata is:

- I don’t know yet, need more testing
- Low
- Medium
- High

American Urological Association
Education & Research, Inc.

128

Q6. The following treatments you would recommend now include: (chooses all that apply)

- Botulinum toxin bladder injection 100U
- Beta three agonist
- Long acting anticholinergic
- Pelvic floor PT
- Times voiding and fluid management
- PDE5 inhibitor

American Urological Association
Education & Research, Inc.

129

Q7: His necessary long term urologic surveillance plan is:

- None
- Uroflow and PVR annually
- Renal US and Cr annually
- PVR annually

Association
Education & Research, Inc.

130

Q8:

What NLUTD patients in retention need a cystoscopy as part of their workup?

- A) all do- they are at risk for bladder cancer
- B) those with indwelling catheters over 10 years
- C) smokers
- D) only those with hematuria

Answer D none do routinely- only those with indications such as hematuria or recurrent UTIs

American Urological Association
Education & Research, Inc.

131

Q9:

In a patient with MS and detrusor hypocontractility and no UTIs , the PVR threshold to absolutely need CIC is:

- A) 0ml
- B) 300ml
- C) 500ml
- D) there is no threshold it is dependent on symptom improvement

D it is most appropriate in safe bladder parameters to use CIC for symptom control (UTIs, incontinence, bladder pressure/freqeuncy

American Urological Association
Education & Research, Inc.

132

Q10:

What percent of voiding NLUTD patients develop retention needing CIC after 200U botulinum toxin injection?

- A) 5%
- B) 10%
- C) 30%
- D) 50%

C) With 200U injections 29% of patients need to start CIC

American Urological Association
Education & Research, Inc.

133

Q11:

The following management change that will result in the most substantial decrease in the rate of UTI in a patient with NLUTD is:

- A) daily oral prophylaxis
- B) switching from a foley catheter to CIC
- C) botulinum toxin injection
- D) Bladder irrigation with saline daily

30% reduced in CIC 0% reduced for foley

600% decrease

20% reduction

5-10% reduced

American Urological Association
Education & Research, Inc.

134