LOWER URINARY TRACT

Bladder has two functions:
STORAGE
EMPTYING

These require: Intact neural system
Intact detrusor muscle
Intact outlet
Compliance

Neural system 1. Sensory/motor pelvic nerves- from sacral segments of cord
2. Reflex center in cord to organize sustained bladder contraction with simultaneous opening of outlet (bladder neck + striated)
3.Brain/brain stem to facilitate/inhibit reflex center

Detrusor muscle Parasympathetic cholinergic control for fundus

Outlet Sympathetic adrenergic for VN smooth muscle (internal sphincter)
Striated voluntary muscle (external sphincter)
Stable suburethral support

Compliance Elasticity/muscle relaxation to allow increase in volume without increase in pressure

STORAGE SYMPTOMS ("irritative")	**EMPTYING SYMPTOMS** ("obstructive")
Frequency	Hesitancy
Urgency	Decreased stream
Nocturia	Interruption of stream
Dysuria	Straining
Incontinence	Dribbling
	Retention

Disorders of storage and emptying usually related to one or more of the fdollowing:

1. Detrusor contracts when it should be relaxed	Irritative symptoms, urge incontinence
2. Detrusor relaxes when it should contract	Obstructive symptoms, retention
3. Outlet closed when it should be open	Obstructive symptoms, retention
4. Outlet open when it should be closed	Incontinence, esp stress

STORAGE PROBLEMS

Involuntary Contractions (Detrusor contracts when it should relax)

1. Neurological	Lesion above reflex center (CVA, Parkinson's, upper spinal cord)
	Multiple sclerosis
2. Inflamation	Bacterial infection
	Other inflamation (interstitial cystitis, radiation, (cyclophosphamide)
3.Other "local" problems	Cancer (esp. ca-in-situ), including invasive from without
	Foreign body
	Cystocele

4. Stress incontinence
5. Outlet obstruction
6. Aging
7. Idiopathic

Impaired compliance and hypersensitivity can lead to same symptoms and can co-exist.

Treatment: 1. **Anticholinergics**

2. Tricyclic antidepressants
3. Correction of any underlying problem if possible
4. Sacral Neuromodulation (Interstim)

Decreased Outlet Resistance **(Outlet open when should be closed)**

Stress incontinence a) Pelvic relaxation with hypermobility Rx= bladder neck suspension
b) Loss of coaptation, elasticity, & suburethral support
(Intrinsic sphincter deficiency)
Rx= pubovaginal sling (suburethral support)
Topical estrogens

EMPTYING PROBLEMS

EMPTYING PROBLEMS

Impaired contractions **(Detrusor relaxes when it should contract)**

1. Neurological	Cord lesion at or below reflex center
	Multiple sclerosis
	Peripheral neuropathy (diabetes, tabes, PA)
	Nerve injury (extensive pelvic surgery)
2. Pharmacologic	Anticholinergics
	Drugs with anticholinergic side effects
3.Prolonged overdistension	
	Obstruction
	Learned voiding dysfunction

Obstruction **(Outlet closed when it should be open)**

1. Prostate	BPH
	Prostatitis
	Carcinoma (late)
2. Urethral stricture	
3. Pharmacologic	Alpha agonists
4. Fecal impaction	
5. Neurological	Detrusor/sphincter dysynergia (MS, quadriplegia)

Tools available beyond H&P and routine lab

1. Bladder diary	I&O, sx associated with voiding, incontinence episodes
2.Flow rate	
3. Postvoid residual urine	Ultrasound or catheter
4.Cystoscopy	
5. Urodynamics	Involuntary contractions
	Incontinence- stress and urgency
	Leak point pressure- hypermobility vs ISD
	Voiding pressure
	Flow rate
	Postvoid residual (indirectly)

STORAGE PROBLEMS