Neurogenic Bladder

Updated: April 4, 2016

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**Neurogenic Bladder** - *vesical dysfunction resulting from* ***neurologic disorder*** (**brain** ÷ **spinal cord** ÷ **local nerve** supply to urinary bladder and its outlet). [for anatomy → see p. 2432 >>](file:///D:\Viktoro\Neuroscience\USMLE%202\Urogenital%20system%20(2401-2700)\2432.jpg)

* bladder activity can be *hypotonic* (flaccid) or *spastic* (contracted).

Etiopathophysiology

\*presence or absence, respectively, of *bulbocavernosus* and *anal* *wink* reflexes.

**upper motor neuron type** (s. **reflex**\*) neurogenic bladder:

1. Lesions of *medial frontal region* (only voluntary control loss) → uninhibited bladder with **intact detrusor-sphincter synergy** (**detrusor hyperreflexia without outlet obstruction**) → urinary incontinence without retention (incontinentia urinae intermittens).

H: external urinary collection devices; no risk of UTI.

1. Lesions of *spinal cord* (interrupt reticulospinal pathway from pontine micturition center):

*spinal shock* stage - areflexic hypotonic bladder (retention and ischuria paradoxa)

↓

*spinal automatism* stage (begins within several days of spinal cord injury) - automatic (spastic) bladder with **detrusor-sphincter dyssynergia** (**detrusor hyperreflexia with outlet obstruction**) - rather than relaxing when bladder contracts, outlet contracts → incontinence with urgency and frequency (spastic bladder reflexively contracts at lower volumes), urinary retention → UTI, vesicoureteral reflux (→ hydronephrosis → renal failure), autonomic dysreflexia. [see also p. Spin1 >>](file:///D:\Viktoro\Neuroscience\Spin.%20Spinal%20Disorders\Spin1.%20GENERAL%20-%20Spinal%20Syndromes.doc#Bladder_Dysfunction)

**lower motor neuron type** (s. **nonreflex**\*) neurogenic bladder:

1. Lesions of L1-2 (internal sphincter paralysis) → incontinentia urinae vera.
2. Lesions of S2-4 / *cauda equina* / *peripheral nerves* (detrusor paralysis) → atonic (flaccid) bladder (***detrusor areflexia*** / ***poor bladder contractility***) - incomplete bladder emptying, urinary retention, overflow incontinence = ischuria paradoxa (painless, flaccid, distended, constantly leaking bladder).

Clinical Features

Various types of urinary incontinence. [see p. 2590 >>](file:///D:\Viktoro\Neuroscience\USMLE%202\Urogenital%20system%20(2401-2700)\2590.%20Urinary%20Incontinence.doc)

Diagnosis

1. **Neurologic examination** – sensory and motor status below lumbar level, anal sphincter tone, anal wink, cremaster, bulbospongiosus reflexes.
2. **Serial cystometrography** with sphincter EMG.
3. **Serial imaging** (IVU, ultrasonography, cystography, urethrography).

N.B. underlying pathophysiology correlates poorly with specific symptoms experienced by patient, so periodic urodynamic evaluation is required to assess detrusor and sphincter function!

Treatment

[see p. 2590 >>](file:///D:\Viktoro\Neuroscience\USMLE%202\Urogenital%20system%20(2401-2700)\2590.%20Urinary%20Incontinence.doc) Total recovery is uncommon!

Complications

Bladder dysfunction predisposes to **urinary calculi** and **urinary tract infection**.

* bacteriuria due to asymptomatic colonization is extremely common and is generally not treated.
* UTI may present only as *foul-smelling urine* or *change in voiding pattern*; development of *high fever* or other systemic signs often indicates pyelonephritis.
* **prophylaxis** with antiseptics or antibiotics is of little value.

N.B. significant **post-void residual urine** → increased risk for **UTI**; UTIs may be secondary to urinary calculi (immobilization → urinary Ca excretion↑ and urinary stasis → calculi → UTI).

Complications of detrusor-sphincter dyssynergia:

* + 1. severe bladder trabeculation, diverticula, "Christmas tree" bladder deformation → **detrusor decompensation** → *overflow incontinence*.
    2. **vesicoureteral reflux** → renal damage (*hydronephrosis*).

N.B. intravesical **pressures > 40 cm H2O** → **damage to upper urinary tract**.

Bibliography for ch. “Urology & Nephrology, Gynecology & Obstetrics” → follow this [link >>](file:///D:\Viktoro\Neuroscience\USMLE%202\Urogenital%20system%20(2401-2700)\UG.%20Bibliography.doc)

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