

Neurogenic Bladder

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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 >>

- 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:

- A. 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.

- B. Lesions of *spinal cord* (interrupt reticulospinal pathway from PONTINE MICTURITION CENTER):

SPINAL SHOCK stage - **AREFLEXIC HYPOTONIC BLADDER** (retention and ischuria paradoxa)

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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 >>

LOWER MOTOR NEURON type (s. NONREFLEX*) neurogenic bladder:

- A. Lesions of *L1-2* (INTERNAL SPHINCTER paralysis) → incontinentia urinae vera.
- B. 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 >>

DIAGNOSIS

- Neurologic examination** – sensory and motor status below lumbar level, anal sphincter tone, anal wink, cremaster, bulbospongiosus reflexes.
- Serial cystometrography** with sphincter EMG.
- 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 >> 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:

- severe bladder trabeculation, diverticula, "Christmas tree" bladder deformation → **detrusor decompensation** → **OVERFLOW INCONTINENCE**.
- 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](#) >>