Acute Cauda-Equina Syndrome (CES)

Objectives:
- Describe Cauda Equina anatomy
- List symptoms associated with CES
- Discuss CES diagnostic procedures
- Detect “red flags” of CES

Horse’s Tail
Cauda Equina

Cauda Equina:
Group of sensory and motor nerve roots that arise from the end of the spinal cord (conus medullaris) extends inferiorly & intradurally towards coccyx.

Cauda Equina Provides:
- Motor
  - hips, knees, ankles, feet
  - sphincters
- Sensory
  - “saddle region”
- Parasympathetic
  - bladder
  - distal bowel
Parasympathetic Innervation

- S2-4: bladder wall
  - Constriction of muscular wall of bladder
  - Relaxes sphincters

Incidence of CES

- ~3/10,000 low back pain (U.S.)

  Detection
  - History and PE
  - TRAUMA

Pathophysiology of CES

- Nerve roots compression

Pathophysiology of CES

- Proximal nerve roots – relatively hypo-vascularized

Nerve Root Compression

- Tumor
- Trauma
- Spinal EDH
- Infection
- Ruptured vertebral disc

CES & HIVD

- Variable S/S = level of involvement
- Most common: L4-5 (57%)
- Most common: males age 30-40 with prior history of LBP
- Most common sm: LBP >90%
CES & HIVD

Acute CES
- Bilateral sciatica
- Urinary retention
- Saddle anesthesia
- Reduced sphincter tone
- Lower limb weakness

Acute CES
- Immediate referral for MRI or CT
- Neuro-surgical consultation

CES: Motor Weakness
- Can be severe, usually involves more than single nerve root
- May be bilateral, but rarely symmetric
- Untreated motor weakness can become permanent disability
- Can progress to complete paralysis / paraplegia
- Reflexes are HYPO-active
- No long tract signs

CES: Urinary Retention
- The most consistent sign in CES (incidence ~ 90%)
  - Check post-void residual – normal = 50 - 100 mL
    - >200 mL = retention
  - Overflow incontinence can be seen as the bladder fills
**CES: Anal Tone**

- Anal sphincter tone diminished in 50-75%
  - Fecal incontinence
  - Fecal impaction

**CES: “Saddle anesthesia”**

- The most commonly observed sensory deficit in CES (~ 75%)
- Sensory loss seen around the anus, lower genitalia, perineum, buttocks, sometimes even the posterior thighs

**CES: “Red Flag”**

- Saddle anesthesia
- Bilateral radiculopathy (sciatica)
- Bilateral leg weakness
- Urinary retention and overflow incontinence
- Fecal incontinence
- Sexual dysfunction

**Is Acute CES an Emergency?**

- Yes
- OP:
  - Wide laminectomy + extensive decompression
- When to operate?

**Is Acute CES an Emergency?**

- Goal: surgery within 24 hr of presentation / diagnosis if at all possible
  
When to operate?

- Meta-analysis (Johns Hopkins, 2000, total 332 pts)
- CES secondary to lumbar HIVD
- Significant improvement in outcome for patients operated on within 48 hr of onset of symptoms (DeLong et al 2008)

CES Prognosis

- Shapiro, et al:
  - surgery within 48 hrs of sm onset, 95% recovered continence and normal function within 6 m
  - surgery delayed beyond 48 hrs, 63% still required catheterization after 6 m
- Sequence of improvement
  - pain,
  - motor
  - autonomic signs

Sexual & Fertility Issues

- Should seek consultation:
  - Men → urologist
  - Women → obstetrician or gynecologist

Acute CES Summary

- CES is a surgical emergency!
- Compression below L3 sensory & motor nerve roots: HIVD, trauma, tumor, EDH, infection
- LBP, urinary retention, saddle anesthesia, reduced sphincter tone, bilateral sciatica, weakness
- Timely MRI
- Timely NS consultation

CES: keep in mind

- Variable presentation
  - Misdiagnosis
  - Delayed diagnosis

- Medico-legal problems
  - Permanent sequela
  - Young population

Acute CES: “Red flags”

- Sensation
  - LBP, sciatica
  - “saddle anesthesia”
- Strength
  - Paraparesis / paraplegia
- Sphincter
  - Bladder: urine retention / overflow incontinence
  - Bowel: fecal incontinence
- Sexual dysfunction