Critical Illness Polyneuropathy

Critical Illness Myopathy

**Spectrum of Neuromuscular Problems in the Critically Ill**

- **Peripheral neuropathy**
  - Critical illness polyneuropathy
  - Acute motor neuropathy

- **Neuromuscular junction dysfunction**
  - Transient neuromuscular blockade (pharmacologic)

- **Myopathy**
  - Disuse / Type II muscle fiber atrophy
  - Thick-filament myopathy
  - Necrotizing myopathy
**Critical illness polyneuropathy**

**Synonyms:**
- Neuropathy of critical illness
- Intensive care (ICU) neuropathy
- Intensive care polyneuropathy

**Criteria for CIP diagnosis:**
- Presence of sepsis, multi-organ failure, respiratory failure, or septic inflammatory response syndrome (SIRS).
- Difficulty weaning from ventilator or limb weakness
- Decreased amplitudes of compound muscle and sensory action potentials
- Widespread denervation potentials in muscle
- Normal or mildly increased levels of blood CPK
Differential diagnosis:
- Spinal cord dysfunction
- Critical illness myopathy
- Guillain-Barre syndrome
- Motor neuron disease
- Porphyria
- Pre-existing neuropathy
- Myasthenia

Other tidbits:
- Recovery is weeks to months (i.e., faster than Guillain-Barre)
- No medication therapy, only conservative management
- Occurs in up to 70% of septic patients, but not all are significantly symptomatic.
- Neuropathy is primarily distal
- 50% have complete recovery
**Critical illness myopathy**

**Synonyms:**
- Myopathy of critical illness
- ICU (intensive care) myopathy
- Acute quadriplegic myopathy
- Acute necrotizing myopathy

**Features:**
- Low or normal compound muscle action potentials on EMG
- Sensory nerve action potentials normal (unless abnormal from pre-existing neuropathy)
- Muscles unexcitable from direct stimulation
Critical illness myopathy

Features:
• Muscle biopsy may be abnormal, varying from Type II fiber atrophy to necrosis.
• Possible contribution from neuromuscular blockers, steroids, sepsis, or prolonged immobility.
• Severe necrotizing neuropathy may never recover.

CIP/CIM Testing

May include:
• MRI C-spine
• EMG/NCS
• Repetitive stimulation
• Phrenic nerve studies
• Creatinine phosphokinase and/or aldolase
• Muscle biopsy
**Systemic Inflammatory Response Syndrome**

Postulates:
- Altered microcirculation
- Pro-inflammatory cytokines released causing increased microvascular permeability
- Axonal degeneration due to glucose-induced phosphate depletion
- Damage from parenteral lipids
- Impaired transport of axonal proteins
- Endoneural edema and/or hypoxia

**Systemic Inflammatory Response Syndrome**

Only direct markers:
- Increased duration of ICU stay
- Increased serum glucose
- Decreased serum albumin
Infection or trauma

Multiple or single organ failure

Septic encephalopathy

CIP

Acute motor neuropathy

SIRS

Neuromuscular blocking agents

Steroids

038.9 ?

TABULAR MODIFICATIONS

357  Inflammatory and toxic neuropathy
     357.8  Other
             Chronic inflammatory demyelinating polyneuritis
     New code  357.81  Chronic inflammatory demyelinating Polyneuritis
     New code  357.82  Critical illness polyneuropathy
     New code  357.89  Other inflammatory and toxic neuropathy

359  Muscular dystrophies and other myopathies
     359.8  Other myopathies
     New code  359.81  Critical illness myopathy
     359.89  Other myopathies
<table>
<thead>
<tr>
<th>Syndrome</th>
<th>Systemic inflammatory response (038.9)</th>
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