Transverse Myelitis

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Risk

- Incidence: 1–8 cases per million per y.
- Age distribution: Bimodal peaks between ages of 10–19 y and 30–39 y.

Perioperative Risks

- Data scarce
- Autonomic disturbances (hypertension, hypotension, arrhythmias)
- Delayed gastric empting
- Anesthetic induced worsening unclear; causative role described

Worry About

- Risk of aspiration due to gastroparesis
- Autonomic dysfunction:
  - Acute: Spinal shock (hypotension)
  - Chronic: Autonomic dysreflexia (hypertension, bradycardia)
- Potential worsening of neurologic symptoms
- Hyperkalemia from succinylcholine
- Prolonged NM blockade
- Effects of steroid and immunomodulation therapy in pts on prolonged treatment

Overview

- Inflammatory demyelination disorder of spinal cord characterized by acute or subacute motor, sensory, and autonomic dysfunction.
- Motor paralysis/paresis, sensory (pain, numbness, paresthesia), and autonomic (bowel bladder/ sexual) dysfunction.
- Symptoms onset over h to d; stabilize over 2–3 wk, followed by resolution.
- May be preceded by nonspecific febrile illness or immunization within 1 mo.
- CSF pleocytosis, elevated IgG index, and MRI gadolinium enhancement.
- Cord enlargement and focal increase in signal intensity in T2-weighted MRI.
- Recovery with minimal sequelae in one-third of pts, moderate disability in one-third, and severe disability in one-third.
- Interleukin-6 level in CSF is highly predictive of disability and may predict recurrence.
- Rapid progression, spinal shock, back pain, and EMG evidence of muscle denervation, and 14-3-3 protein in CSF predict poor prognosis.

Etiology

- Idiopathic
- Disease associated:
  - Infectious: CNS infection (viral, bacterial, parasitic)
  - Noninfectious: Connective tissue disease (SLE, Sjögren, sarcoidosis, Behcet), demyelinating disease (MS, NMO), post vaccination

Usual Treatment

- High-dose steroids (methylprednisolone, dexamethasone) and immunoglobulin antibodies
- Plasma exchange: Possibly effective in pts not responding to steroids; good response with early treatment (<20 d of symptom onset), male sex, and clinically incomplete lesion.
- Immunosuppressants (mitoxantrone, rituximab, azathioprine, cyclophosphamide)
- Combination therapy with axonoprotective agents (erythropoietin, neurotrophin-3, neuroimmunophilin ligands)
- Other modalities of treatment: Stem cell transplantation and CSF filtration
- Nonpharmacologic management: Occupational and physical therapies, neural prostheses under trial
- Recurrent TM: Chronic immunomodulatory therapy
- Chronic pain: Spinal cord stimulation

Assessment Points

System	Effect	Assessment by Hx	PE	Test
HEENT	Eyes (in MS, NMO)	Pain in eye, loss in clear vision	Decreased visual acuity, Visual field defects	Ophthalmoscopy Visual EPs
CV	Acute: Decreased BP, tachycardia or bradycardia Chronic: Increased BP, bradycardia	Syncope Headache, flushing, sweating	BP changes Flushed skin above the lesion Blanched skin below the lesion	Test for autonomic dysfunction Remove stimuli below lesion
RESP	Neurogenic respiratory failure (in upper cervical cord lesion) Pulm embolism	Dyspnea, Respiratory distress	Tachypnea, cyanosis, altered consciousness DVT, Homans sign	ABG analysis CXR V/Q scan
GI	Gastric atony Bowel dysfunction	Hiccups, N/V, dyspepsia, early satiety Constipation or bowel incontinences	Percussion (tympanic note)	
CNS	Brain demyelination (in MS) Spinal cord inflammation and demyelination	Depression Encephalitis Sensory, motor, autonomic dysfunction	Mental status changes Sensory loss, reduced or absent motor power, flaccidity or spasticity, diminished or exaggerated tendon reflexes	MRI (brain) MRI (spine) LP
RENAL	Bladder atony (acute) Bladder spasticity (chronic)	Retention Increased frequency	Palpation, percussion (dull note)	Urine analysis, US, residual urine volumes

Key References: Scott TF, Frohman EM, De Seze J, et al.: Evidence-based guideline: clinical evaluation and treatment of transverse myelitis: report of the Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology, *Neurology* 77(24):2128–2134, 2011; Balakrishnan IM, Yadav N, Singh GP, et al: Anaesthetic considerations in patients with transverse myelitis, *S Afr J Anaesth Analg* 19:323–324, 2013.

Perioperative Implications

Preoperative Preparation

- Document motor function and sensory and autonomic dysfunction.
- Relieve gastric ileus, treat as full stomach, aspiration prophylaxis.
- Adequate hydration.
- Concomitant steroid therapy and necessity of stress doses should be considered.

Anesthesia Technique

- GA (preferred) or epidural. TM has been reported following all anesthetic techniques.
- Spinal with caution, due to possible toxicity with usual doses; usually avoided.

Monitoring

- Standard monitoring and neuromuscular monitoring.
- Consider invasive monitoring if indicated (hemodynamic instability).

Airway

- RSI; avoid succinylcholine (hyperkalemia).

Induction

- IV or inhalational anesthetic agents.
- May exhibit hypotension; administer fluid to maintain adequate CO.

Maintenance

- Maintain intravascular volume status.
- Avoid NMB agents or use NM monitoring.

Extubation

- After return of airway reflexes. NM blocking action may be prolonged.

Adjuvants

- Sugammadex for reversal of prolonged neuromuscular blockade.
- Severe hypertension and bradycardia reported with dexmedetomidine.

Anticipated Problems/Concerns

- Gastroparesis
- Hemodynamic variability
- Variable response to NMBs
- Postop respiratory depression due to prolonged NM blocking action
- Potential worsening of neurologic functions