

**Etiology**

- Autoimmune disease of the NM junction mediated by reduction in number of acetylcholine receptors at the NM junction.

**Usual Treatment**

- Anticholinesterase medications (pyridostigmine, Mestinon)
- Immunosuppression: Steroids, azathioprine

- Plasmapheresis
- IVIG
- Thymectomy

**Assessment Points**

System	Effect	Assessment by Hx	PE	Test
NM	Peripheral muscle weakness	Easy fatigability	Arm adduction times <1 min	Repetitive nerve stimulation
RESP				
(Airway)	Bulbar weakness	Difficulty swallowing	Head lift <5 s	Formal swallowing evaluation
(Ventilation)	Inspiratory muscle weakness	Orthopnea, breathlessness	Paradoxical insp motion	NIF <30 cm H <sub>2</sub> O FVC <1000 mL
(Ventilatory drive secretion clearance)	CO <sub>2</sub> retention Weak cough	Morning headache Recurrent pneumonia	Reduced ventilation of bases	ABG CXR

**Key References:** Borel CO, Hanley DF: Muscular paralysis—myasthenia gravis and polyneuritis. In Parrillo JE, Bone RC (eds): *Critical care medicine: principles of diagnosis and management*. Philadelphia, 1994, Mosby Year Book, pp 1193–1215; Sungur Z, Sentürk M: Anaesthesia for thymectomy in adult and juvenile myasthenic patients, *Curr Opin Anaesthesiol* 29(1):14–19, 2016.

**Perioperative Implications****Preoperative Preparation**

- Anticholinesterase medications:
  - Hold 2–4 h preop
  - Postop: IV neostigmine may be used to replace pyridostigmine, PO 1 mg IV/60 mg PO or start IV neostigmine 1 h before emergence at 1/30–1/60 the daily pyridostigmine dose infused over 24 h.
- Steroid maintenance.

**Monitoring**

- Routine.
- TOF twitch monitor if short-acting nondepolarizers are used.

- NM recovery at the adductor pollicis muscle may not reflect the recovery of all muscles.

**Induction/Intubation**

- Consider inhalational anesthetic breathe-down techniques
- Consider intubation without muscle relaxation using propofol/remifentanyl maintenance.
- Minimize or avoid the use of muscle relaxants.
- Total IV analgesia or inhalational anesthesia.

**Extubation**

- Consider sugammadex if muscle relaxants are given.
- Check NIF (>30 cm H<sub>2</sub>O), head lift, cough, gag reflex; ensure full return of twitch.

**Adjuvants**

- Avoid or minimize use of nondepolarizing muscle relaxants.
- Depolarizing relaxants may have increased or decreased efficacy.
- Consider epidural analgesic, particularly for thymectomy.

**Anticipated Problems/Concerns**

- Postop ventilatory failure, pneumonia, aspiration
- Cholinergic crisis if excess anticholinesterase medications are given

**Mycoplasma pneumoniae Infection**

Carlos A. Puyo

**Risk**

- Endemic/pandemic worldwide every 3–5 y.
  - Outbreaks likely during summer and early fall.
  - Affects persons of all ages.
  - Long incubation periods of 1–3 wk.
  - Transmitted person to person via aerosols.
  - Frequent in closed and semiclosed communities.
- Common cause of upper and lower respiratory infections.
  - Up to 40% of community-acquired pneumonias, “walking pneumonia.”
  - Up to 5% of bronchiolitis in children.
  - 3–10% of adults may develop bronchopneumonia.
  - Clinical manifestations similar to *Chlamydia pneumoniae*, *Streptococcus pneumoniae*, and respiratory viruses.
  - Fulminant pneumonia may occur in children with sickle cell disease (functional asplenia), Down syndrome, and immunosuppressive conditions.
- Extrapulmonary complications in 25% of pts infected with *Mycoplasma pneumoniae*.

**Perioperative Risks**

- No periop risk data; hemolytic anemia, DIC, and cross-reacting cold agglutinins are of concern, especially if CPB is required.
- Hyper-reactive airway disease.

**Worry About**

- Multisystem organ dysfunction

**Overview**

- Clinical manifestations of respiratory involvement are mediated by activity of cytoadherence on the airway epithelium and include
  - Sore throat, hoarseness, fever, cough (pertussis-like).
  - May play a role in asthma, COPD.
  - Conjunctivitis, headache, chills, coryza, myalgias, earache, and generalized malaise are common.
- Extrapulmonary manifestations are the result of direct invasion or immune reactivity.
- Dx:
  - Hx and clinical manifestations: Unspecific upper respiratory symptoms.

- CXR: Diffuse reticular infiltrates in perihilar and lower lobe regions; bilateral in 20% of cases.
- Pathology: Ulceration, edema, ciliary loss, bronchioalveolar inflammatory cell infiltration.
- Culture: Incubation period of several wk; sensitivity around 60%; not practical for routine diagnosis.
- Serology: Current or recent infection likely if antibody titer increase  $\geq$ fourfold.
- Cold agglutinins: IgM within 1–2 wk after initial infection; titers  $\geq$ 1:32 correlate with severity of lung involvement.
- PCR: RNA-amplification techniques are highly sensitive and indicate viable bacterium.

**Etiology**

- M. pneumoniae*: Slow-growing bacterium; requires human host for survival

**Usual Treatment**

- Antibiotic treatment will shorten respiratory symptoms.
- Macrolides, tetracyclines, and fluoroquinolones. Macrolide resistance has been reported.

Assessment Points				
System	Effect	Assessment by Hx	PE	Test
HEENT	Otitis Retinitis Conjunctivitis	Ear symptoms may affect 30%	Mucosal congestion	
RESP	Tracheobronchitis Pneumonia Asthma	Failure to respond to treatment with sulfonamide or penicillin	Persistent cough Expiratory wheezes	CXR Sputum
CV	Pericarditis Pericardial effusion Cardiac tamponade Myocarditis	Incidence 1–8.5%  Approximately 50% will develop cardiac symptoms within 16 mo of <i>M. pneumonia</i> infection	Distant heart sounds S <sub>3</sub> , JVD  Pericardial rub	ECG, ECHO  Tap effusion
CNS	Aseptic meningitis Meningoencephalitis Transverse myelitis Guillain-Barré Peripheral neuropathy Cerebellar syndrome	Incidence 7% Children more likely to die or have severe neurologic deficits	Focal or general neuro symptoms, diplopia, coma	CSF Elevated cytokines IL-6, IL-8 MRI Serology
HEME	Hemolytic anemia Cold agglutinins DIC	More common in children Likely due to cross reactive antibodies	Peripheral cyanosis	IgG Free Hgb Coombs
DERM	Maculopapular Vesicular rash Stevens-Johnson syndrome	May affect up to 25%	Rash, but needs to rule out rash due to antibiotics	<i>M. pneumonia</i> has been detected in cutaneous lesions
RENAL	Glomerulonephritis Tubulointerstitial nephritis IgA nephropathy Paroxysmal cold Hemoglobinuria	Brisk hemolytic anemia		UA Renal biopsy IgG, IgM, IgA

**Key Reference:** Waites KB, Balish MF, Atkinson TP: New insights into the pathogenesis and detection of *Mycoplasma pneumonia* infections. *Future Microbiol* 3(6):635–648, 2008.

### Perioperative Implications

#### Preoperative Preparation

- Routine physical examination: Emphasis on respiratory, CNS, CV, and HEME systems
- Respiratory: Increased minute ventilation, low saturation; prolonged ventilation may be required.
- CNS: Document preexistent neuropathy.
- CV: JVD; rule out tamponade physiology.
- HEME: Hemolysis and anemia. If cold agglutinins are suspected, determine temperature range and titers.

- If surgery is nonurgent, consider postponing it until active issues resolved.

#### Monitoring

- Invasive monitoring necessary if respiratory and CV concerns

#### Airway

- Desaturation is possible due to decreased FRC
- High incidence of hyper-reactive airway disease

#### Maintenance

- Normothermia is essential to avoid cold agglutinins. Warm all fluids and humidify airway.
- If hemolysis develops: Optimized UO, alkalized urine, and use diuretics.

#### Extubation

- Clear mental status, good respiratory mechanics, able to clear secretions

#### Anticipated Problems/Concerns

- Respiratory distress secondary to asthma, COPD, high O<sub>2</sub> requirements may result in prolonged intubation.
- Neurologic deficit may delay extubation.
- CPB/cold agglutinins may result in circuit obstruction and impair myocardial protection.

## Myelomeningocele

Marla B. Ferschl | Mark D. Rollins

### Risk

- Incidence in USA: 1.7–10:10,000 live births.
- 70,000–100,000 individuals with myelomeningocele living in USA.
- Central Asian and Latin American countries have the highest incidence.
- Risk of myelomeningocele is 20 times higher in subsequent pregnancies.
- Reduced dietary folic acid, as well as antiepileptic medication exposure (valproic acid, carbamazepine), in early pregnancy also increases risk.

### Perioperative Risks

- Fetal surgery:
  - Intraop fetal distress/demise.
  - Preterm labor/delivery.
  - Risk of nonobstetric surgery during pregnancy.
  - Maternal hemorrhage.
  - Chorioamnionitis.

- Uterine dehiscence; all future pregnancies require delivery by cesarean.
- Neonatal surgery:
  - Infection.
  - Apnea.
  - Hemorrhage and insensible fluid losses.

### Worry About

- Fetal surgery:
  - Intraop fetal monitoring
  - Fetal stress and movement during repair
  - Intraop fetal distress/demise and need for resuscitation
  - Inadequate uterine relaxation
  - Maternal pulm edema
  - Maternal postop pain control
- Neonatal surgery:
  - Meningitis/sepsis if not closed within 72 h after birth

- Latex exposure
- Apnea, vocal cord paresis, or swallowing difficulties with the Chiari II malformation

### Overview

- Failure of neural tube to close in third to fourth wk of gestation.
- Results in herniation of the nerve roots, meninges, and CSF in a fluid-filled sac.
- Most frequently occurs in lumbar or sacral portion of spinal cord but can occur anywhere along length of cord.
- Pts most often have loss of sensation and motor function below the level of the lesion.
- Bowel and bladder incontinence is common; pts require clean intermittent urinary catheterization to fully evacuate their bladder and avoid chronic renal disease.
- Hydrocephalus is a frequent complication. 85–90% of pts require ventriculoperitoneal shunting; shunts