Maintenance
- Inhalational anesthesia has benefit of bronchodilation.
- Maintain protective lung ventilation strategy intraop (i.e., tidal volume of 6–8 mL/kg ideal body weight, PEEP ≥5 cm H_2O, maintain plateau pressure <30 cm H_2O)
- Limit intraop IV fluids.

Extubation
- Intubated preop VAP pt; low threshold for ongoing mechanical ventilation.
- If considering extubation:
  - Rapid shallow breathing index <75 breaths/tidal volume (L) per min
  - Vital capacity >15 mL/kg ideal body weight
  - If arterial line available, PaO_2 >80 mm Hg on an FiO_2 <40%

Adjuvants
- Bronchodilator (albuterol).
- Inhaled nitric oxide.
- Inhaled epoprostenol.
- Maintain scheduled antibiotic dosing in addition to periop antibiotics.

Postoperative Period
- If intraop mechanical ventilation settings do not require high levels of PEEP, transport pt with oxygen and ambu bag with PEEP valve.
- If intraop mechanical ventilation settings are complex, transport pt with ICU ventilator.
- If ICU ventilator was utilized intraop, transport pt with ICU ventilator.

Anticipated Problems/Concerns
- Impaired oxygenation secondary to shunt
- Hemodynamic instability
- Impaired RV function in the setting of high PEEP or increased PVR

Poliomyelitis

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Risk
- Acute disease eradicated in USA and most of Europe owing to effective vaccination (last USA case reported in 1979 and last case in the western hemisphere in Peru in 1991).
- Small parts of Africa and Asia still have areas of endemic wild-type poliovirus with less than 200 cases reported globally in 2014.
- Hundreds of thousands of survivors still live in USA with varying degrees of deficit.
- Postpolio syndrome is a constellation of signs and symptoms that constitute a synergy between normal aging and the decreased neuromuscular reserve and musculoskeletal effects of polio itself.

Perioperative Risks
- Potential predisposition to respiratory complications (such as aspiration and postop respiratory failure), chronic pain syndromes, altered sensitivity to muscle relaxants and anesthetics, and positioning challenges.
- Hyperkalemia with succinylcholine is a risk if there is significant muscle denervation.

Worry About
- Weakness of the pulmonary or swallowing muscles, which are believed to be at greatest risk for postsurgical complications.
- Polio survivors often underestimate or minimize their degree of weakness.
- Postpolio syndrome may predispose pts to respiratory difficulties, sleep apnea, swallowing impairment, and impaired ability to deal with temperature changes.

Overview
- Caused by the poliovirus, a subtype of the human enterovirus C group.
- The virus is transmitted most commonly via fecal-oral contamination but can also be transmitted by pharyngeal spread during outbreaks.
- Most infected individuals are asymptomatic (primary or "minor" viremia) but a small percentage (<10%) will go on to develop a "major" viremia characterized by the typical viral symptoms ranging from malaise to fever and nausea/vomiting. A fraction of these individuals (<1%) will develop selective destruction of motor neurons, leading to weakness (paralytic polio).
- Weakness is often asymmetric and varies from one muscle group to another.
- The virus can also affect other neurons, including the brain stem, which can lead to respiratory insufficiency and bulbar dysfunction.
- Bulbar involvement can include dysphagia, dysarthria, and difficulty controlling secretions.

Etiology
- Spread of poliovirus to the CNS is not well understood. It can spread laterally to other neighboring motor neurons and/or via transneuronal spread through the axon.

Usual Treatment
- Treatment is supportive, ranging from mechanical ventilation for respiratory failure to pain management and physical therapy.
- Many pts deal with long-term sequelae, from chronic weakness and pain to potential development of postpolio syndrome later in life, for which treatment is again supportive.

Assessment Points

System	Effect	Assessment by Hx	PE	Test
HEENT	OSA	Snoring Daytime somnolence	Neck circumference Htn	Sleep study
RESP	Respiratory failure Aspiration risk	Dyspnea Pneumonia	Tachypnea	CXR, PFTs ABG
CNS	Muscle denervation Bulbar weakness Opioid tolerance	Difficulty swallowing	Weakness	EMG Swallow study
MS	Weakness Disability Chronic pain	Gait Mobility aids	Joint contractures ROM	Radiographs

Key References: Jubelt B: Polio and infectious diseases of the anterior horn. In Shefner JM, editor. Waltham, MA, 2016, *UpToDate*. www.uptodate.com/contents/polio-and-infectious-diseases-of-the-anterior-horn. (Accessed 01.06.16.); Van Alstine LW, Gunn PW, Schroeder DR, et al.: Anesthesia and poliomyelitis: a matched cohort study, *Anesth Analg* 122(6):1894–1900, 2016.

Perioperative Implications

Preoperative Preparation
- Thorough preop physical and exam looking for signs/symptoms of respiratory insufficiency, bulbar dysfunction, OSA, chronic pain, or neurologic deficits.
- Consider PFTs if respiratory insufficiency is known preop.

Monitoring
- As appropriate for planned procedure.
- Consider postop oximetry.

Airway
- Evaluate for neurologic deficits, which can limit airway options if there is cervical involvement.
- Potential for unrecognized difficult airway due to bulbar dysfunction and/or OSA.

Preinduction/Induction
- May need special positioning if neurologic deficits or contractures are present.
- Avoid succinylcholine if pt has significant muscle denervation.

Maintenance
- Individualized; no specific technique identified as safer than any other for these pts.

Extubation
- Be mindful of bulbar dysfunction, which can lead to postextubation difficulties.
- OSA may be present; close monitoring postop is recommended.

Adjuvants
- Many of these pts deal with chronic pain and may have a tolerance to opioids; this subgroup may benefit from procedure-specific regional anesthesia.

Anticipated Problems/Concerns
- Respiratory: Pulm insufficiency and/or OSA, which are often unrecognized or not diagnosed.
- Neurologic: These pts commonly have long-standing neurologic deficits and/or contractures.
- Pain: Chronic pain common; pt may have opioid tolerance.