Assessment Points

System	Effect	Assessment by Hx	PE	Test
HEENT	Airway edema	Pregnancy	Mallampati class	
CV	Hypovolemia, anemia	Amount of bleeding	Tachycardia, hypotension	Hb/Hct
RESP	Reduced FRC	Pregnancy		
GI	Full stomach, decreased lower esophageal sphincter tone	Reflux symptoms		

Key References: Scavone BM: Antepartum and postpartum hemorrhage. In Chestnut DH, editor: *Obstetric anesthesia: principles and practice*, ed 5, Philadelphia, PA, 2014, Saunders, pp 881–914; Silver RM: Abnormal placentation: placenta previa, vasa previa, and placenta accreta, *Obstet Gynecol* 126(3):654–668, 2015.

Perioperative Implications

Preoperative Preparation

- Anesthetic plan:
  - Stable placenta previa or low-lying placenta without bleeding: neuraxial anesthesia (epidural, spinal, or CSE) for elective C-section.
  - Active hemorrhage: Emergency C-section under general anesthesia.
- Nonparticulate oral antacid premedication.
- Assess volume status.
- Crossmatch blood and consider transfusion if there is active bleeding.
- Two large-gauge IV lines; consider central venous access.

Monitoring

- Standard ASA monitors.
- Consider arterial monitoring if pt is hemodynamically unstable.

Airway

- Airway edema may make intubation more difficult; have appropriate equipment available.
- Full-stomach precautions.

Preinduction/Induction

- Preoxygenate with four vital capacity breaths of O_2.
- Consider awake or rapid-sequence induction.
- Rapid-sequence induction agent plus succinylcholine; induction agent depends on hemodynamic status.
- Low-dose propofol.
- Ketamine (1 mg/kg).
- Etomidate (0.3 mg/kg).

Maintenance

- Low-concentration inhalational agent (0.5–0.75 MAC) ± N_2O (≤50%) before delivery.
- Potent inhalational anesthetics relax the uterus.
- FIO_2 less than 1.0 with use of N_2O results in less dissolved O_2 in maternal blood.
- NO_2 with IV opioid and benzodiazepine after delivery; consider low concentration of potent inhalational anesthetic for additional amnesia.
- Monitor intravascular volume; massive transfusion protocol may be required. One PRBC, one FFP, one plt pheresis pack per 6 U of PRBC/FFP. Protocol comes from trauma literature but not yet studied for obstetrics.

Extubation

- Extubate awake.

Adjuvants

- Oxytocin, methylergonovine, prostaglandin $F_2\alpha$ to enhance uterine contraction and decrease bleeding after delivery

Postoperative Period

- Monitor hemodynamic and volume status.
- Monitor for coagulopathy in pts with hemorrhage and massive transfusion.

Anticipated Problems/Concerns

- Intrapartum and/or postpartum hemorrhage
- Urgent induction of anesthesia
- Fetal distress

Plagiocephaly

Amy O. Soleta

Risk

- Obstetric factors: Primigravidy, assisted delivery, low birth weight, preterm birth
- Infant factors: Limited neck ROM, male sex, larger CSF spaces, preference to sleep with head turned to one side.
- Infant care factors: Spends most time in supine position without variable head positions, firmer mattress, less time in prone position and/or upright, exclusively bottle-fed.
- Observed in 5–48% of healthy newborns.

Perioperative Risks

- Minimal risk if plagiocephaly is isolated and pt is presenting for unrelated surgical procedure
- Increased risk if pt is presenting for cranial vault remodeling due to failed conservative therapy

Worry About

- Association with syndrome and/or other craniofacial abnormalities
- Potential for difficult airway
- Significant blood loss during surgical correction

Overview

- Cranial malformation characterized by asymmetric flattening of a portion of the skull
- May lead to postural torticollis

Etiology

- External pressure on malleable skull leads to plagiocephaly.
- Unilateral body/head positioning of infant during first 6 wk of life.
- Infants aged 2–4 wk have maximally deformable skulls.

Usual Treatment

- Prevention: Parental counseling to alternate head position when placing infant supine to sleep and to vary positions when infant is awake, with time spent upright, lateral, and prone.
- Conservative treatment with repositioning of infant for mild cases.
- Helmeting to reshape skull for more severe cases or if not improved by 6 mo of age.
- Physical therapy to treat associated positional torticollis.
- Most children show dramatic improvement in head shape by age 2–3 y.
- Surgical correction if severe or failed conservative and orthotic treatment by age 12–15 mo.

Assessment Points

System	Effect	Assessment by Hx	PE	Test
HEENT	Abnormal head shape, torticollis	Positioning	Flattened skull, head turned to one side	CT scan
CNS	Elevated ICP, orbital pressure, developmental delay*	Irritability, lethargy Headache, seizures	Papilledema	CT head

*Severe cases only.

Key References: Beretta F, Talamonti G, D'Aliberti G, et al.: Surgical indications and treatment for cranial occipital anomalies. In Villani D, Meravigla MV, editors: *Positional plagiocephaly*. Switzerland, 2014, Springer International Publishing, pp 79–95; Cladis F, Grunwaldt L, Losee J: Anesthesia for plastic surgery. In Davis P, Cladis F, Motoyama E, editors: *Smith's anesthesia for infants and children*, ed 8, Philadelphia, 2011, Elsevier, pp 826–829.

Perioperative Implications for Surgical Correction

Preoperative Preparation
- Thorough history to evaluate for associated syndrome or craniofacial abnormality.
- Type and crossmatch for PRBCs.
- Prepare parents for long surgery, postop swelling of face, potential for continuing intubation postop, and need for blood transfusion.

Monitoring
- Standard monitors
- Arterial line
- UO

Airway
- Potentially difficult if there are additional craniofacial abnormalities or severe torticollis is present

Preinduction/Induction
- Premedication with oral or intranasal anxiolytic as needed
- Standard inhalational induction

Maintenance
- Standard inhalational agents.
- Monitor Hgb/Hct.
- Consider use of antifibrinolytic agent and cell saver.

Extubation
- Long duration of procedure and large volume fluid and blood administration can lead to postop airway edema, low threshold for remaining intubated.

Postoperative Period
- Pediatric ICU
- Potential for continued blood loss, coagulopathy
- Risk of cerebral edema
- Adequate pain management
- Potential for difficult reintubation due to facial and airway edema

Anticipated Problems/Concerns
- Risk of venous air embolism during skull removal

Pneumocystis jirovecii Pneumonia

Neal H. Cohen

Risk
- PJP is a respiratory infection seen in immunocompromised pts, usually associated with a CD4 cell count <500/μL.
- Can affect pts with both acquired and congenital immunodeficiency syndromes.
- Seen in both males and females and all age groups.
- Often associated with chronic HIV infection, particularly if not treated with HAART.

Perioperative Risks
- Respiratory failure often necessitating mechanical ventilatory support with high airway pressures even when ventilating with low tidal volumes; often accompanied by severe dyspnea independent of gas exchange.
- Hemodynamic instability associated with induction of anesthesia, initiation of positive pressure ventilation.
- Pneumothoraces.
- Persistent expiratory airflow reduction after resolution of acute infection.
- Bronchiectasis, lung cysts.
- Often associated with other comorbidities related to immune deficiency.

Worry About
- Progressive respiratory failure with diffuse bilateral interstitial infiltrates.
- Pneumothoraces, either spontaneous or associated with positive-pressure ventilation.
- Persistent pulm dysfunction.
- Common cause of nonproductive cough, dyspnea, fevers in immunosuppressed pt
- Associated with other opportunistic infections, particularly CMV and *Candida albicans* esophagitis.
- Toxicity from therapy with sulfa antimicrobials, including methemoglobinemia, anemia, leukopenia, and severe skin rashes.
- High incidence of drug resistance.

Overview
- Indolent disease; can progress to severe respiratory failure.
- May be cause for nonproductive cough in high-risk pt.
- High incidence of spontaneous pneumothoraces.
- Extrapulmonary sites of *Pneumocystis* infection are rare.
- May be associated with other infections (tuberculosis, bacterial, viral, fungal) and malignancies (Kaposi sarcoma, lymphoma) in immunosuppressed pts.

Etiology
- *P. jiroveci* (previously *carinii*), originally characterized as a parasite, is now classified as a fungus.
- Organisms reside in the lungs, usually as latent infection; activated in an immunosuppressed host.
- High prevalence of antibodies to *P. jirovecii* in nonimmunosuppressed humans, suggesting that most individuals are "colonized" early in life.
- Human-to-human transmission has not been documented.

Usual Treatment
- Chemoprophylaxis for PJP: TMP/SMX.
  - Second-line agents: Dapsone; pentamidine, systemic and aerosolized; atovaquone.
- Treatment for PJP:
  - TMP-SMX is the mainstay.
  - Corticosteroids (strongly recommended but conflicting data on value of steroids, particularly for non-HIV pts).
  - Alternative antimicrobial therapy: Pentamidine, clindamycin plus primaquine, dapsone plus trimethoprim, atovaquone.
  - Supportive respiratory care including positive-pressure ventilation.

Assessment Points

System	Effect	Assessment by Hx	PE	Test
HEENT	Oropharyngeal lesions	Fever, chills, sweats	Circumoral, acral, and mucous membrane lesions	
CV	Intravascular volume deficits Cardiomyopathy	Fluid intake, syncope, respiratory rate	Hemodynamic lability Distended neck veins Abnormal heart sounds	Orthostatic BP changes
RESP		Cough, usually nonproductive Progressive dyspnea Hemoptysis	Tachypnea Breath sounds, prolonged expiratory phase Exam often normal though coarse breath sounds common	ABG PFTs Transbronchial biopsy Gallium scan of lung LDH
GI	Hepatopathy Bowel lesions	Often associated with wt loss, other infections causing diarrhea, GI symptoms	Hepatosplenomegaly	LFTs
HEME	Anemia, leukopenia Coagulopathy			CBC Clotting studies
RENAL	Nephropathy, oliguria	Oliguria		BUN, Cr
CNS	Encephalitis, meningitis	CNS changes	Abnormal mental status	

Key References: Travis TJ, Hart E, Helm J, et al.: Retrospective review of *Pneumocystis jirovecii* pneumonia over two decades, *Int J STD AIDS* 20(3):200–201, 2009; *Centers for Disease Control and Prevention*: Pneumocystis pneumonia. <http://www.cdc.gov/fungal/diseases/pneumocystis-pneumonia/>, (Accessed 01.06.16.)