Assessment Points

System	Effect	Assessment by Hx	PE	Test
HEENT	Acromegaly: Bone and soft tissue hypertrophy Cushing disease and thyrotropic adenoma: Exophthalmos		Enlarged facial bones, tongue and mandible, laryngeal and pharyngeal thickening, glottic narrowing, possible recurrent laryngeal nerve injury	Indirect laryngoscopy, fiberoptic laryngoscopy
CV	Acromegaly: Htn, CAD, CM Cushing disease: Htn, septal and LV hypertrophy Thyrotropic adenomas: Palpitations, arrhythmias	Chest pain, dysrhythmias, diastolic heart failure Diastolic dysfunction	BP, S_3 and S_4 heart sounds, peripheral edema, JVD	ECG, ECHO, CXR ECG ECG
RESP	Acromegaly and Cushing disease: OSA	Snoring, daytime somnolence		Sleep study
ENDO	Acromegaly: DM type 2 Cushing disease: DM type 2, hypercortisolism Prolactinoma: Infertility, amenorrhea, galactorrhea, impotence (male) Nonfunctioning macroadenoma: Panhypopituitarism		Truncal obesity, striae, moon facies	Preop labs: Metabolic panel (sodium, calcium, glucose), TSH, thyroxine, serum cortisol, ACTH, insulin-like growth factor-1, testosterone, LH, FSH, prolactin, pregnancy test
CNS	Optic chiasm compression	Visual field deficit		Visual field testing
MS	Acromegaly: Bone and soft tissue overgrowth Cushing disease: Osteoporosis, truncal obesity, myopathy	Pathologic fractures, weakness, fatigue	Enlarged hands and feet, cervical spine changes Proximal muscle weakness	
DERM	Cushing disease: Fragile skin	Easy bruising	Striae	

Key References: Miller BA, Ioachimescu AG, Oyesiku NM: Contemporary indications for transsphenoidal pituitary surgery, *World Neurosurg* 82(6S):S147–S151, 2014; Nemergut EC, Dumont AS, Barry UT, et al.: Perioperative management of patients undergoing transsphenoidal pituitary surgery, *Anesth Analg* 101(4):1170–1181, 2005.

Perioperative Implications

Preoperative Preparation

- Hormone replacement therapy for panhypopituitarism
- "Stress dose" steroid is often unnecessary, but the prudent practitioner should be aware of the risk of absolute or relative hypocorticalism and be prepared to treat if necessary.

Monitoring

- Consider invasive arterial monitoring if BP cuff size is inadequate or in pts with significant cardiac disease
- Acromegalic pts may have compromised ulnar blood flow; place radial arterial line with caution.
- Theoretical risk of VAE due to head up positioning. No reports of VAE-related morbidity or mortality and additional monitors (i.e., end-tidal nitrogen or precordial Doppler) not typically required.

Airway

- A standard ETT or oral RAE tube is acceptable.
- Be prepared for difficult airway in acromegalic pts; 20% of those with Mallampati class 1 and 2 airways are difficult to intubate.
- If macroglossia is present, intubation with intubating LMA or fiberoptic bronchoscope difficult. Consider awake fiberoptic intubation.

Induction

- Consider rapid sequence induction in pts with GERD or DM and delayed gastric emptying.

Maintenance

- Infiltration of nasal mucosa with local anesthetic and epinephrine may cause dysrhythmias and hypertension.
- Choice of anesthetic to facilitate rapid emergence; propofol, remifentanil, or volatile anesthetics are all reasonable.
- Muscle relaxation to provide immobile surgical field and reduce risk of CSF leak, visual field or vascular injury.
- Injury to carotid artery may result in significant blood loss, but this is uncommon. Deliberate Htn may facilitate repair.
- Valsalva maneuver may be used to check for CSF leak.

Extubation

- Suction stomach and oropharynx to remove blood and irrigation fluid.
- Perform awake extubation with pt in seated position to minimize risk of airway obstruction or aspiration.

Postoperative Period

- Prophylaxis for and treatment of PONV.
- Treat headache pain with opioids, NSAIDs, or acetaminophen.
- Monitor serum sodium and UOP for development of DI or SIADH (rare).
- Postop visual field testing is important, as injury optic nerves may result in catastrophic loss of vision.
- Complications include cranial nerve palsy and CSF leak.
- Screen for hypopituitarism and replace hormones as needed.

Adjuvants

- Use opioids cautiously in pts with OSA.
- Treat hemodynamic instability with α_1- and β-blockers.

Anticipated Problems/Concerns

- Airway management
- Hemodynamic instability and risk of myocardial ischemia
- OSA and need for assisted ventilation postop

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Placenta Previa

Courtney G. Masear | Karen S. Lindeman

Risk

- Incidence: 1:200-250 pregnancies
- Highest incidence with multiparity, repeat C-section or other uterine surgery, prior placenta previa, advanced maternal age, tobacco use, cocaine use, male fetus

Perioperative Risks

- Maternal mortality is <1%.
- Fetal complications: Prematurity (45% of deliveries at <37 wk); mortality increased 3 to 4 times.
- Life-threatening hemorrhage of mother or fetus.
- Fetal hypoxia.

Worry About

- Blood loss, hypovolemia.
- Increased risk of aspiration due to pregnancy or recent oral intake.
- Higher risk of placenta accreta, increta, and percreta, possibly requiring hysterectomy.
- Fetal compromise from inadequate intervillous blood flow.
- Preterm labor: Concomitant tocolytic therapy can alter hemodynamic response to hemorrhage.

Overview

- Placental implantation in advance of fetal presenting part.
  - Placenta previa: Placenta overlies cervical os.
  - Low-lying placenta: Placenta is near but not overlying the os.
- Often presents as painless vaginal bleeding in the second or third trimester.
- Diagnosis confirmed by transvaginal ultrasound ("gold standard") by measuring distance from internal cervical os to placental edge.

Etiology

- Unknown

Usual Treatment

- Expectant management.
- In pts with low-lying placenta, mode of delivery depends on distance from placental edge to internal cervical os.
  - >2 cm: Can undergo trial of labor.
  - 1-2 cm: Controversial, but consider trial of labor.
  - <1 cm: C-section.
- Uncomplicated placenta previa, stable without bleeding: Planned C-section at 36 wk.
- Persistent hemorrhage: Emergency C-section.

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.