**COMPLICATION MANAGEMENT**

Examine patient
ABC
Obtain appropriate imaging (CT head)
Check labs

Fascia lata for repair of CSF leak

**Management of intraoperative brain swelling**
**MECHANICAL**- elevate HOB
- check ETT to make sure it is still in place (make sure patient did not accidentally get extubated)
- make sure jugular veins are not kinked (turn head to midline, if possible)
- hyperventilate to PCO2 30-35
- emergently intubate patients that are undergoing awake craniotomies

**CHEMICAL**- mannitol (make sure Foley is not kinked after mannitol)
- 3% NaCl
- Lasix
- ask anesthesia to place patient in burst suppression

**STRUCTURAL**- release CSF through cistern or existing ventriculostomy or
 placement of intra-op EVD (always drape in Frazier burr hole for
 prone cases)
- use ultrasound to r/o intraparenchymal hemorrhage
- expand craniotomy and convert to decompressive craniectomy
- cyst drainage or tumor resection

**Intraoperative brain swelling, possible etiologies**
- intracerebral hemorrhage
- remote extra-axial hemorrhage
- impaired venous drainage
- hypercarbia
- hydrocephalus
- severe edema following ischemic stroke or trauma

**Sinus bleeding**
- elevate head
- packing, pressure
- direct repair
- indirect repair/buttress suture
- bypass/reconstruction
- sacrifice as the absolute last, last, last option

**Air embolism**When there is a risk of air embolism (eg. sitting position, near sinus) place a central venous catheter and precordial Doppler
- will see hypotension with a drop in CO2 and O2
- gel foam ready
- drop head
- flood field with saline (4x4), find and occlude site of air entry
- aspirate air from central line
- rotate patient to left side down (trap air in right ventricle)
- ventilate patient with 100% O2
- discontinue nitrous oxide (may expand AE)
- use pressors and volume expanders to maintain BP
- wax bone

 **Post-operative deterioration**
- hematoma
- seizure
- hydrocephalus
- pneumocephalus
- infarct
- worsening edema
- vasospasm (esp. in SAH)
- check labs

**Other complications**

Post-op airway obstruction in ACDF

ICA dissection after CEA

CSF leak during a transsphenoidal approach
- Pack with fat and bone; consider lumbar drain

Aseptic meningitis
- may be seen following epidermoid tumor resection

Abscess s/p craniotomy
- discard bone flap!