

Headmirror's ENT in a Nutshell
Anterior Cranial Base CSF Leaks
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Presentation (0:38)

- Symptoms
 - *Unilateral* rhinorrhea, often months to year
 - Can occur all the time or intermittent/positional
 - Dandy maneuver: worse with leaning forward
 - “Rush” of fluid associated with sphenoid leak
 - Salty tasting drainage
 - Headaches
 - Vision changes, occasionally, pressure transmitted to optic nerves

- Physical Exam
 - Rigid scope exam
 - 30 degree scope with patient leaning forward
 - Sites to look: sphenothmoidal recess, olfactory cleft
 - Dandy maneuver

- Differential Diagnosis:
 - Temporal bone CSF leak (lateral skull base)
 - Often dehiscence at tegmen on CT, ear exam with clear middle ear effusion
 - Allergic or non-allergic rhinitis
 - Vasomotor rhinitis

- Pathophysiology
 - Elevated intracranial pressure
 - Normal 5-15 mm Hg
 - Thinned skull base from ICP
 - CSF produced in choroid plexus (500 mL/day)

- Epidemiology
 - Obese
 - Female > Male, middle-aged

- Indication for treatment
 - Prevent ascending meningitis
 - Resolve rhinorrhea

Work-up (5:12)

- Test the fluid
 - Beta-2 transferrin positive
 - Send in a cup or on pledgets

- Must be refrigerated to prevent protein degradation
- Imaging
 - Common sites of leak to look for on imaging:
 - *Lateral recess of sphenoid*
 - Sternberg's canal, debated anatomical structure
 - Lateral to V2
 - Commonly thin, potential for CSF leak/encephalocele
 - *Cribiform/ethmoid roof*
 - Fine cut Maxillofacial CT:
 - Opacification of sinus indicates likely adjacent
 - Thin area of bone at site
 - Scalloping of skull base
 - Empty sella
 - MRI:
 - Encephalocele: protruding dura (T2 signal)
 - Not a necessary study
 - Localization:
 - CT Cysternogram
 - LP with radionuclide injection
 - CT head immediately following to identify site of leak
 - LP with fluorescein
 - Off label use, risk of seizure
 - Immediately to the OR to localize endoscopically

Treatment (10:29)

- Medical Treatment:
 - Acetazolamide
 - Decreases intracranial pressure
 - Controversial: not definitive and higher rates of meningitis longer leak is present
 - Antibiotics
 - Controversial: generally not prescribed as overall risk of meningitis very low
 - Positive ICP likely prevents ascending meningitis
- Surgical Treatment:
 - Endoscopic approach: Skull base rhinologist and neurosurgery
 - Intraoperative fluorescein LP to localize, not always necessary
 - Layered repair
 - Intranasal, mucosal layer: >90% success in spontaneous leaks
 - Free mucosal graft: harvested from nasal floor or inferior/middle turbinate or septum. Mucosa and periosteum graft. Prevent mucocele by having mucosa out and bone without mucosa at skull base site

- Nasoseptal flap: pedicled flap of mucosa from the septum and nasal floor pedicle based on posterior septal artery as it crosses inferior to the sphenoid os on the rostrum
 - Appropriate to cover anterior cranial base, posterior sphenoid, sella, lateral recess.
 - More robust: used for large defect, very elevated ICP, revision, multiple defects
 - In non-spontaneous post surgical CSF leak, vascularized better outcomes
 - Duragen or fat may be used under graft
 - In-lay rarely needed
 - Complications
 - Failure of the repair, 5%
 - Meningitis, peri-operative antibiotics
 - Cribriform leaks have risk of diminished olfaction
 - Worsened headaches or changes in vision related to increased ICP
 - Morbidity of nasoseptal flap: crusting of septum 4-6 wks post-op, septal perforation risk
 - Sphenoid leak repair have risk of injury to the Vidian nerve (dry eye) or V2 numbness
- Post-operatively:
 - Management of ICP
 - LP one month after surgery to check pressure
 - Acetazolamide or ventral shunt if continued ICP elevation
 - Counsel on weight loss: 10% reduction in weight reduces ICP
 - Follow up
 - Likely 1 year or longer to assess surgical site and management of ICP
 - Ophthalmology follow up
 - Neurology/Neurosurgery for long term ICP management