

Low Pressure Headache, Intracranial Hypotension

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ETIOPATHOPHYSIOLOGY

Causes of CSF hypotension:

1. **Lumbar puncture** (CSF leakage through dural puncture site) - most common cause.
2. **Dural tear or avulsion of nerve root** (head or back **trauma, craniotomy, spinal surgery, spontaneous** dural tears, pituitary tumor*).
*can cause CSF rhinorrhea
 - craniotomy and trauma also decrease CSF formation.
3. **CSF shunts**
4. **Spontaneous intracranial hypotension:**
 - a) **CSF hyperabsorption** (no evidence of CSF leak) - radionuclide cisternogram shows *rapid transport of isotope* and rapid uptake in kidneys and bladder.
 - b) **decreased CSF production** - radionuclide cisternogram shows *slow isotope flow*; leads to **brain sagging** with compression of pituitary-hypothalamic axis and further reduction in CSF production.
 - c) **TARLOV cysts** - arachnoid perineural cyst found in proximal radicles of lower spinal cord; rupture of cysts can occur with minor trauma and cause occult CSF leak.
5. **Hypertonic solution** infusion.
6. **Systemic illness** (severe dehydration, hyperpnea, meningoencephalitis, uremia, severe systemic infection).
 - patient in **erect position** → downward movement of brain → stretching of pain-sensitive structures (meninges and vessels) → **TRACTION HEADACHE**.
 - patient in **recumbent position** → brain is shifted cephalad → headache relief.

CLINICAL FEATURES

- **ORTHOSTATIC HEADACHE:**

- accentuated by erect position and relieved with recumbency.
 - longer patient is upright, longer it takes headache to subside with recumbency.
- mild to incapacitating, dull, or throbbing.
- **location** - frontal, occipital, cervical; may involve shoulders and entire cranium.
- **not relieved** with analgesics.
- **aggravated** by head-shaking, Valsalva (coughing, straining, sneezing), jugular compression.
- **associated** with nausea & vomiting, dizziness, tinnitus.

Physical examination is usually normal; except **mild neck stiffness** and **slow pulse rate** (so-called VAGUS PULSE).

DIAGNOSIS

Diagnosis = **orthostatic headache** + **obvious etiology**.

If no obvious cause is apparent:

- 1) **neuroimaging** - *diffuse meningeal enhancement* (reflects Monro-Kellie rule - intracranial venous engorgement results from reduced CSF volume).
 - *signs of "sagging" brain* - optic chiasm flattening, pons displacement against clivus, cerebellar tonsils below foramen magnum (simulating Chiari malformation).
- 2) **lumbar puncture** (at time of **cisternography**) – *low opening pressure* (0-70 mmH₂O).
 - after period of recumbency opening pressure may be in normal range.
 - CSF composition is normal (± slight protein elevation, few RBCs).
- 3) **intrathecal injections (cisternography)** - **radioisotope, ionic, fluorescein** - to identify *CSF leaks*.

TREATMENT

1. **Bedrest** with head in horizontal position + **fluid** intake.
2. **CAFFEINE sodium benzoate** - 500 mg in 2 mL saline by IV push (± second injection 1-2 hours later); alternative - 500 mg in 1 L of saline IVI over 1 hour.
 - alternative - **AMINOPHYLLINE** 5-6 mg/kg IVI over 20 minutes.
3. Brief trial of **steroids** with quick taper (e.g. **PREDNISONE** 60 mg tapered to zero over 10 days).
4. **Epidural blood patch** - forms gelatinous tamponade, stopping CSF leak.
 - 10-20 mL of autologous blood is drawn aseptically into syringe and slowly injected (1-2 mL every 10 seconds) into epidural space at site of prior lumbar dural puncture.
 - if back pain or paresthesias develop → slow or stop injection.
 - remain supine for 1 hour while receiving IV hydration.
 - relief occurs within 20-30 minutes of procedure.
 - in patch failures (15-20%), second patch is often successful.
5. **Continuous intrathecal saline infusion** - epidural catheter in L₂₋₃, rate 20 ml saline/hour for as long as 72 hours.
6. **Surgical closure** of fistula.

Prophylaxis of post-lumbar puncture headache – see Op3 p.

BIBLIOGRAPHY see p. S50