

## Other CSF Sampling Procedures

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External Ventricular Drainage (EVD) → see p. Op6 >>	

Indicated when lumbar puncture cannot be done.

### CISTERNAL (s. SUBOCCIPITAL) PUNCTURE

- puncture to **CISTERNA MAGNA**
- neck is shaved from external occipital protuberance to mastoid process laterally.
- patient in lateral decubitus position (sitting position can be used).
  - neck is flexed to chest.
  - pillow under head (to keep neck and vertebral axis in same plane).
- patient is cleaned and anesthetized similar to LP.
- **spinal needle** is placed in midline halfway between **C<sub>2</sub> spinous process** and **inferior occiput**.
  - needle is angled cephalad through subcutaneous tissue until it comes in contact with bony occiput.
  - needle is then withdrawn and subsequently advanced at less acute angle with horizontal plane of cervical spine.
  - this is repeated until dural "pop" is felt.
    - N.B. *stylet is removed frequently* so that dura is not punctured unknowingly!
  - CSF is removed in usual manner.
  - **contrast material** may be injected into cisterna magna (to identify rostral extent of obstructing lesion identified by lumbar myelography).

### COMPLICATIONS

- **brain stem** puncture (vomiting, apnea).
- **upper cervical cord** damage.
- cisterna magna **hematoma**.
- dural veins are less extensive - *bloody taps* are less common.
- subarachnoid pressure is lower and dural tear can heal faster - *low-pressure headaches* are less common.

### LATERAL CERVICAL PUNCTURE

- puncture in **C<sub>1-2</sub> interspace** from posterolateral approach.
- prone or supine position, fully sterilized and anesthetized.
- 20-22G **spinal needle** is inserted perpendicular to neck and parallel to bed under **lateral fluoroscopy**.
- point for insertion: 5-10 mm inferior and up to 5 mm anterior or posterior to tip of mastoid process.
- physician advances needle slowly and frequently removes stylet to check for fluid return.
  - if needle goes too deeply and encounters paraspinous muscles, it is probably too deep posteriorly and should be repositioned more anteriorly.
  - if bone is encountered, more dorsal placement is needed.
- pressure and fluid samples are collected, as in other sites.
- complications: vertebral artery obstruction, cervical cord damage.
- contraindications: lesion at foramen magnum (e.g. cerebellar ectopia), unreduced atlanto-axial subluxation.

### VENTRICULAR PUNCTURE

- similar to subdural tap: see p. TrH13 >>
- 23-25G ventricular needle with stylet (or AngioCath with automatically retractable needle) is placed in **lateral border of anterior fontanel** and is directed toward **inner canthus of ipsilateral eye**.
- needle is advanced slowly, and stylet is removed frequently to determine presence of CSF.
- ventricle is usually encountered  $\approx$  4 cm from skin surface.
- aspirate **10 mL/kg** of CSF.