Other CSF Sampling Procedures

Last updated: December 20, 2020

CISTERNAL (S. SUBOCCIPITAL) PUNCTURE **1**
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LATERAL CERVICAL (C1-2) PUNCTURE **1**
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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

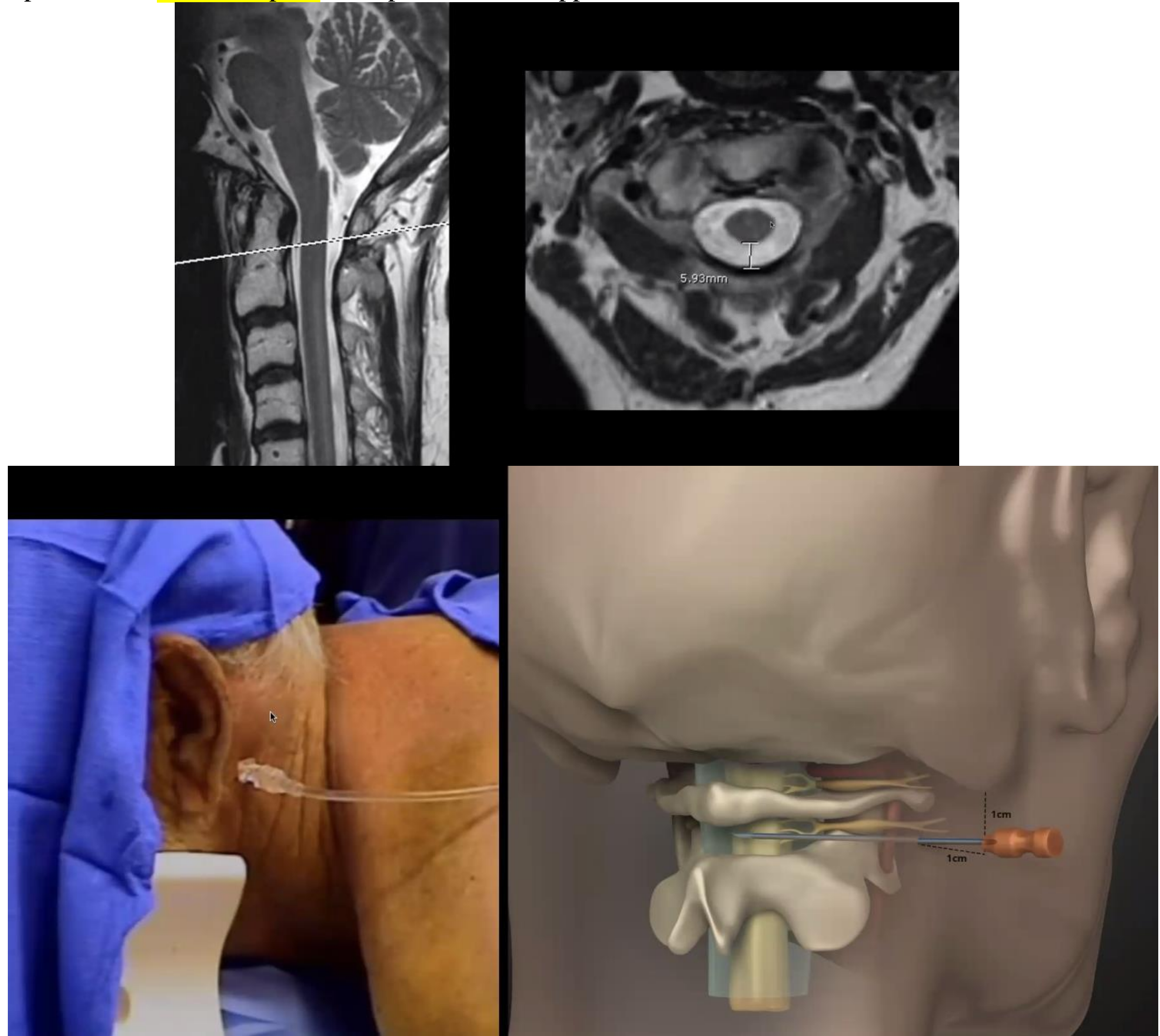
- neck is shaved from external occipital protuberance to mastoid process laterally.
- patient in lateral decubitus position (sitting position can be used).
  - neck is flexed to chest.
  - pillow under head (to keep neck and vertebral axis in same plane).
- patient is cleaned and anesthetized similar to LP.
- **spinal needle** is placed *in midline halfway* between **C_2 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  - needle is then withdrawn and subsequently advanced at less acute angle with horizontal plane of cervical spine.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

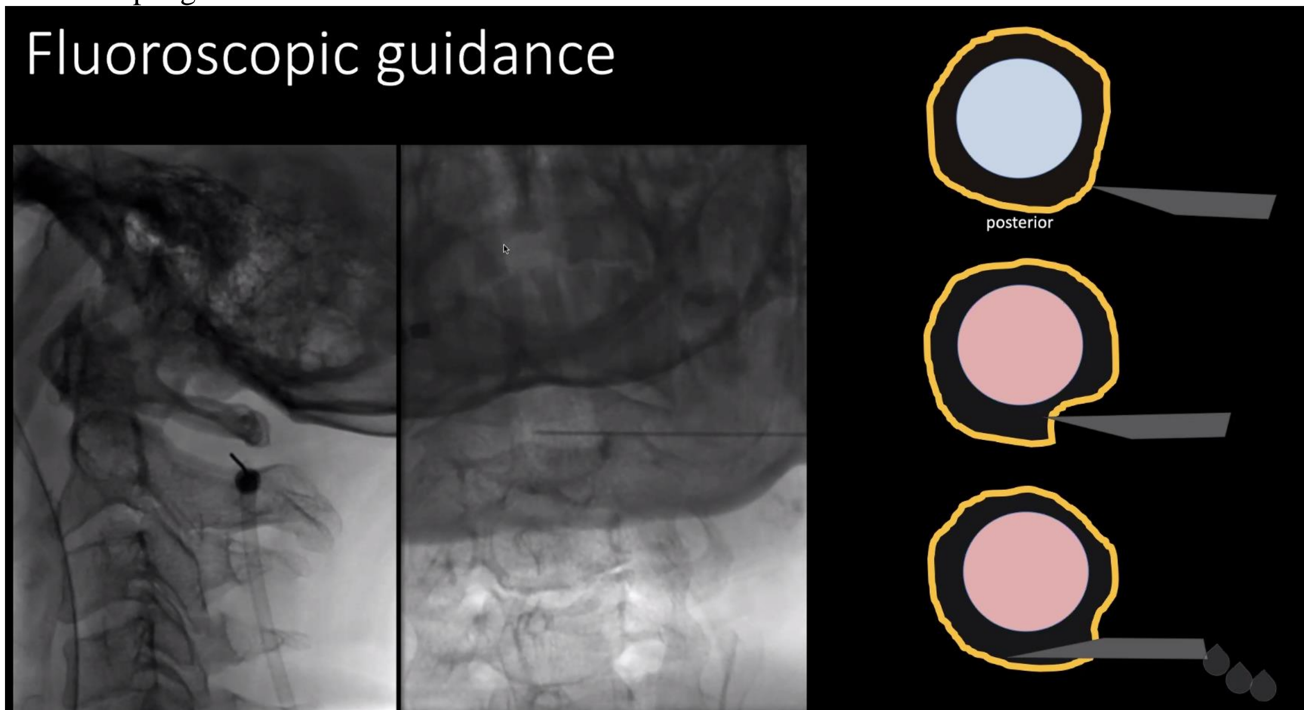
- **brain stem** puncture (vomiting, apnea).
- **upper cervical cord** damage.
- cisterna magna **hematoma**.
- dural veins are less extensive - *bloody taps* are less common.
- subarachnoid pressure is lower and dural tear can heal faster - *low-pressure headaches* are less common.

LATERAL CERVICAL (C1-2) PUNCTURE

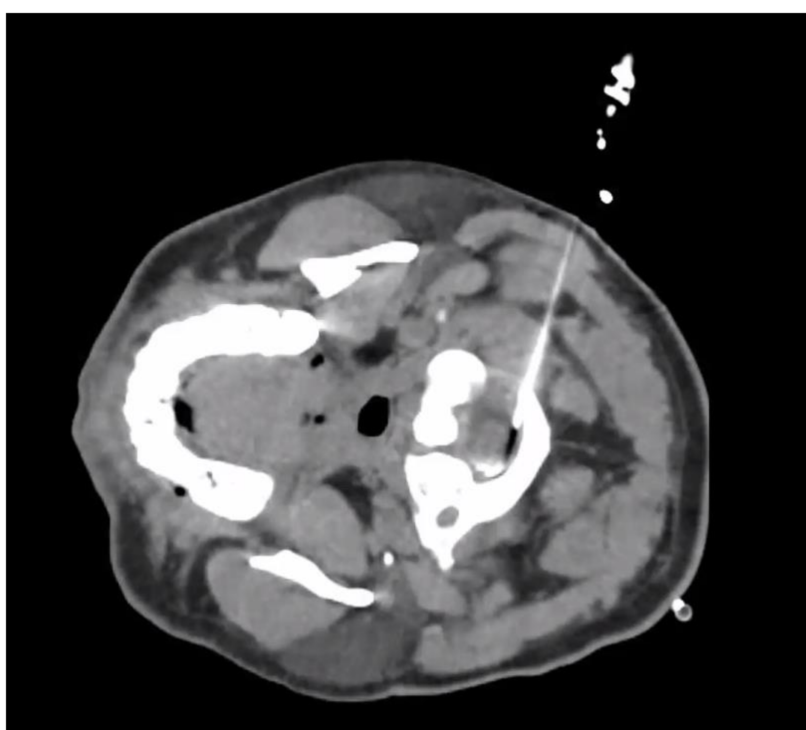
- puncture in C_{1-2} interspace from posterolateral approach:



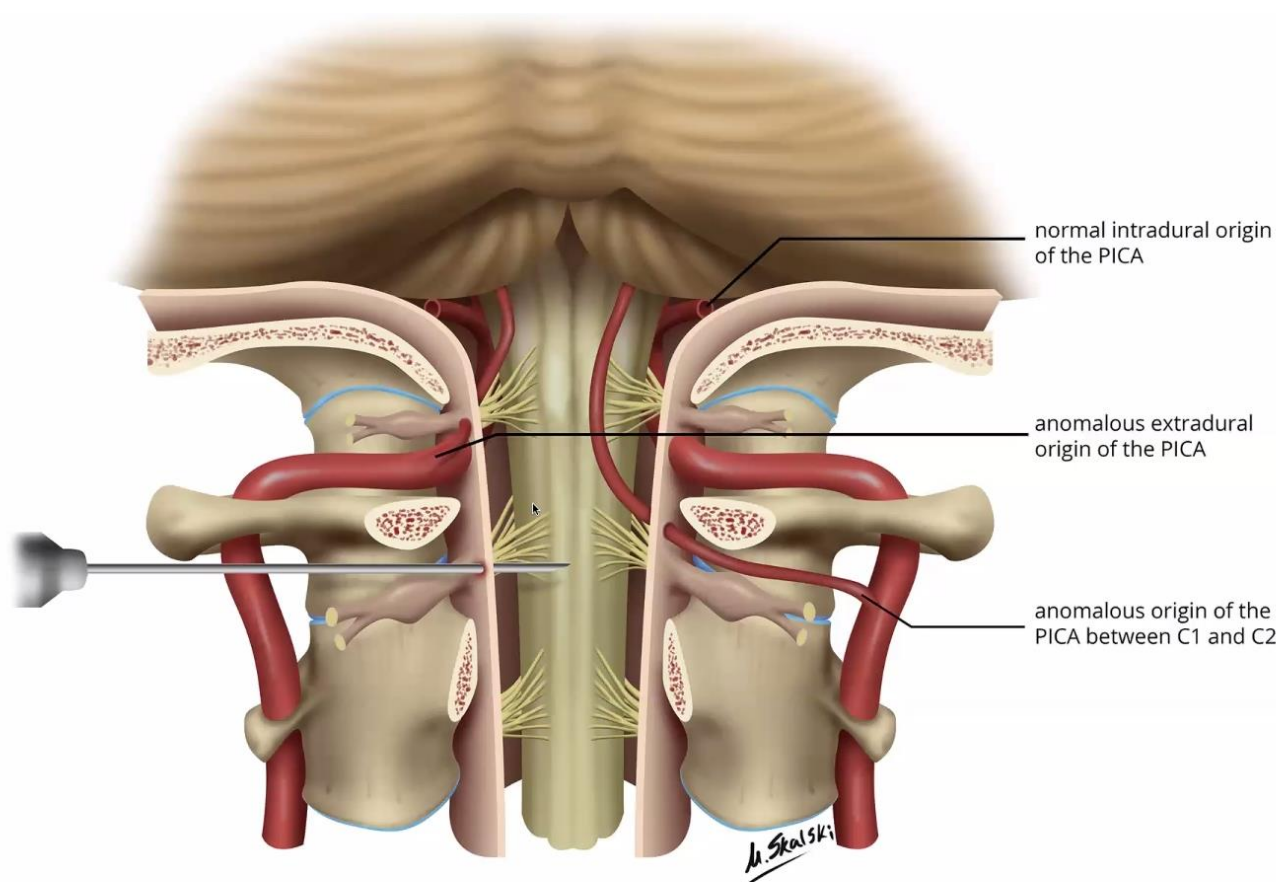
A. Fluoroscopic guidance:



B. CT-guidance:



- 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.
- contraindications: lesion at foramen magnum (e.g. cerebellar ectopia), unreduced atlanto-axial subluxation.
- complications: cervical cord damage, vertebral artery injury, anomalous PICA injury



Anterior to the canal	70.6% (113)
Anterior 1/3 of the canal	26% (45)
Mid canal	1.9% (3)
Posterior canal	1.9% (3)

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 ≈ 4 cm from skin surface.
- aspirate **10 mL/kg** of CSF.