Lumbar puncture

Lumbar puncture

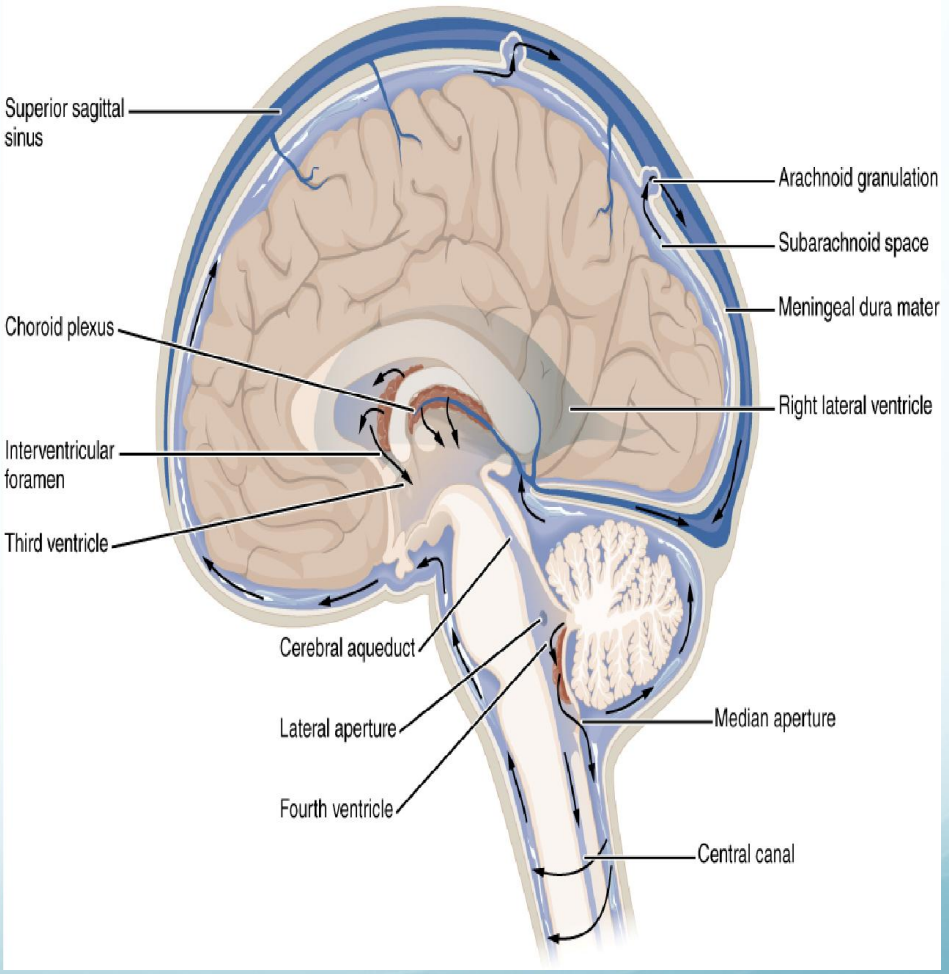
Invasive procedure: diagnostic or therapeutic.

The subarachnoid space

4-13 ys: 65-150ml

Replenished: 4- 6 h

Routine LP (3- 5 ml): <1h



INDICATIONS

- For Dx:

CNS infection

Subarachnoid hemorrhage (CT scan normal)

Spinal cord imaging

Evaluation of various neurologic conditions

- For Rx:

Idiopathic intracranial hypertension (pseudotumor cerebri)

Anesthesia

CONTRAINDICATIONS

Elevated ICP owing to a suspected mass lesion of the brain or spinal cord.

Symptoms and signs of pending cerebral herniation in a child with probable meningitis.

Critical illness.

Skin infection at the site of the LP

Thrombocytopenia.

COMPLICATIONS

Post dural puncture headache (PDPH):

- Common (5-15%)
- Frontal or occipital, 6 to 72 hours.
- Nausea, vomiting, dizziness, tinnitus, neck stiffness, and visual changes.
- Lasts 2 to 15 days

COMPLICATIONS

Cerebral herniation:

- Most serious complication, rare
- Normal results on computed tomography: do not mean safe to do a LP in a child with bacterial meningitis.

Infection: Meningitis, epidural abscess, or osteomyelitis

- Cellulitis or soft tissue infection at the site of puncture

COMPLICATIONS

Epidermoid tumor: Rare, years after

- Epidermoid tissue, transplanted into the spinal canal, without a stylet, or poorly fitting

Spinal hematoma: Epidural, subdural, and subarachnoid hemorrhage

- Uncorrected bleeding disorders/ no apparent risk factors for bleeding
- Back pain + neurologic findings →emergent evaluation

Evidence-based clinical decision

INDICATIONS

LP in Febrile Seizure (FS)

- Systematic Review and Meta-Analysis : MEDLINE, INIST, and the COCHRANE Library databases: 14 studies
- first “seizure and fever”: 5 studies (1996 patients); the pooled prevalence of Bacterial Meningitis (BM) was 2.6% (95% CI 0.9–5.1)
- apparent simple FS: 7 studies (1869 patients) ; 0.2% (range 0 to 1%).
- apparent complex FS: 2 studies (718 patients); 0.6% (95% CI 0.2–1.4)

- CONCLUSIONS: The risk of BM presenting solely as an apparent FS is very low, whatever age or features of seizure (simple or complex). Routine LP in the absence of any other signs and symptoms suggestive of BM: low utility in febrile, young children presenting with a first seizure

From *Pediatrics* 2010;126:62–69

Retrospective cohort review: 526 patients, aged 6 to 60 months, first complex FS. 340 (64%) had a LP

- 3 patients: acute BM, all with S pneumoniae (0.9%:[95% CI: 0.2–2.7]), ill appearing or meningeal signs and symptoms
- CONCLUSIONS: Few patients who experienced a CFS had ABM in the absence of other signs or symptoms

Unnecessary in most well-appearing children who have returned to a normal baseline after FS

- should be performed : ill appearing or meningeal signs and symptoms
- an option: child 6 to 12 months + deficient in Hib and *S pneumoniae* immunizations or immunization status is unknown.
- an option: have been pretreated with antibiotics.

(From UPTODATE 2014; AAP, Clinical Practice Guidelin - Febrile Seizures, *Pediatrics* 2011)

Evidence-based clinical decision

COMPLICATIONS

PDPH

The Cochrane Library 2013, Issue 7

RCTs: 23 trials (2477 participants)

PDPH: Risk for bed rest 26.4%; risk for mobilization 20.5%; risk ratio (RR) 1.30; 95% confidence interval (CI) 1.09 to 1.55).

Two trials that assessed fluid supplementation did not find this preventive measure to be useful in the prevention of PDPH

- CONCLUSION: Routine bed rest after dural puncture is not beneficial for the prevention of PDPH onset. The role of fluid supplementation in the prevention of PDPH remains unclear.

- Randomized trial: 111 patients, 2-17 ys (24- hour bed rest >< free mobility).
- Patients of the bed-rest group encountered significantly more head- or backaches (positional headache 15 vs 2%; all headaches 39 vs 21%; backaches 42 vs 23%).

→*Prophylactic bed rest following lumbar puncture in children and adolescents is of no benefit and may actually be disadvantageous.*

Evidence-based clinical decision

COMPLICATIONS

Cerebral Herniation

- Retrospective review of case notes: 445children (>30ds) admitted to hospital with bacterial meningitis.
- Cerebral herniation was detected in 19(4,3%) of the 445 children: 14 (45%) of the 31 children who died; 17 children LP.
- The first 12 hours after LP over six other 12 hour periods: odds ratio 32.6 (95% confidence interval 8.5 to 117.3) p<O.OO1)
- The results of cranial CT were normal in 36% (14 episodes of herniation)

- **CONCLUSION**-The temporal relation between lumbar puncture and herniation strongly suggests that a lumbar puncture may cause herniation in some patients, and normal results on CT do not mean that it is safe to do a lumbar puncture in a child with bacterial meningitis.

CONCLUSION

- Invasive procedure.
- Unnecessary in most well-appearing children who have returned to a normal baseline after FS
- Routine bed rest after dural puncture is not beneficial for the prevention of PDPH onset.