University of Colorado **Anschutz Medical Campus**

Spinal CSF Leaks and Pregnancy

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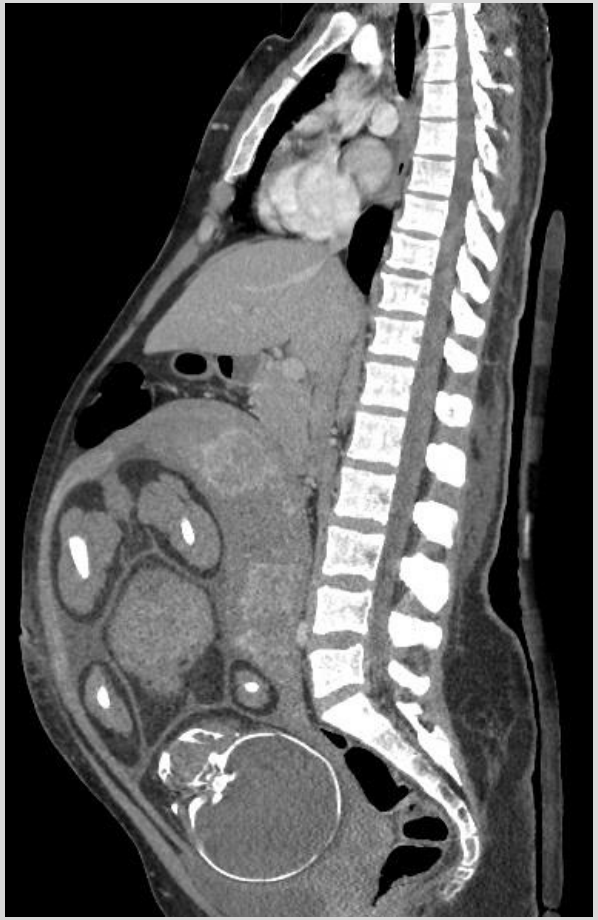
OVERVIEW

Spontaneous CSF Leaks Presenting in Pregnancy: Diagnosis and Management

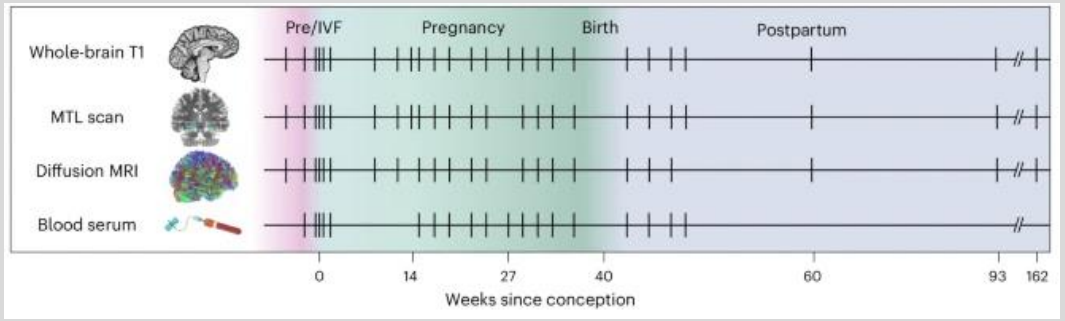
Options for Labor & Delivery Anesthesia Post-Partum Leak Cases

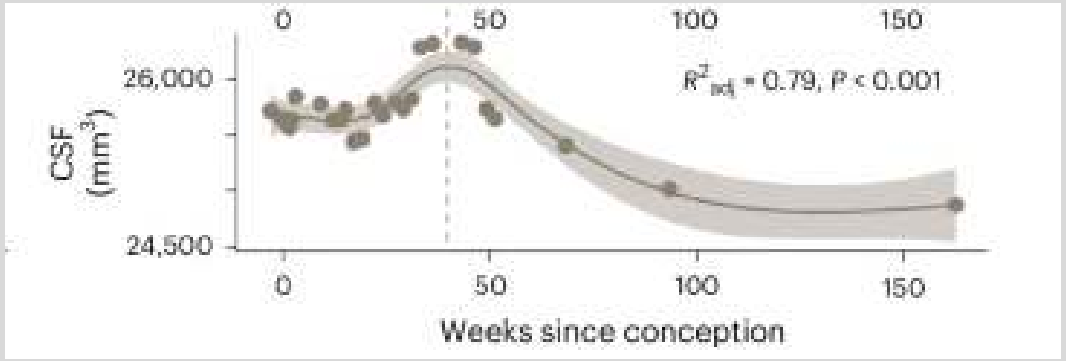
Pharmacotherapies: Considerations in Pregnancy and Lactation

PHYSIOLOGIC CHANGES IN PREGNANCY: INCREASED RISK FOR SIH?



Häggström 2017





- 60% increase in CSF volume* over the course of pregnancy

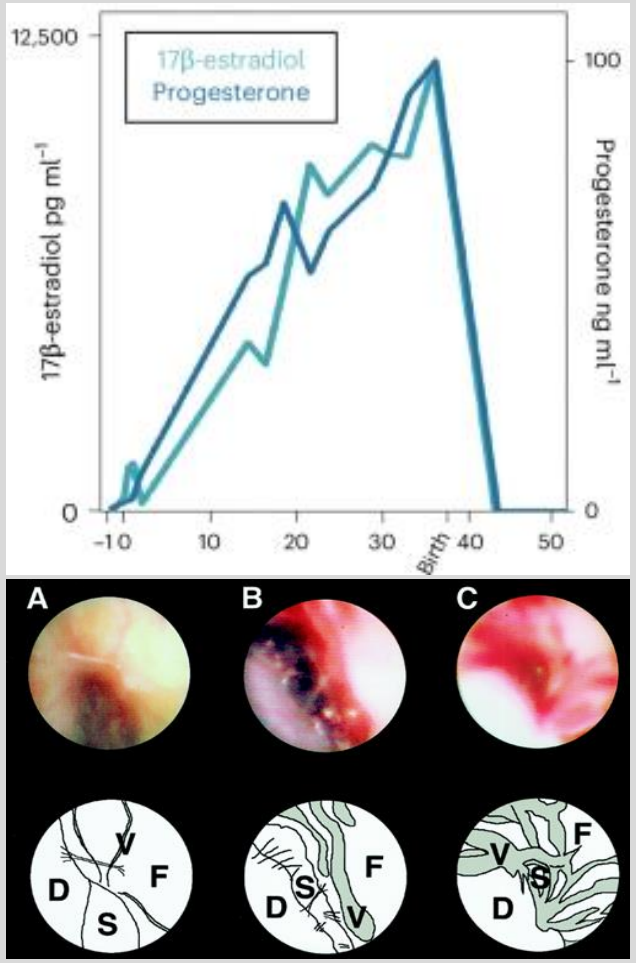
*measured intracranially. Pritschet et al. 2024

PHYSIOLOGIC CHANGES IN PREGNANCY: INCREASED RISK FOR SIH?

- Increased CSF volume, blood volume; however, normal CSF OP in 3rd trimester
- Marked increase in sex steroid levels, associated with ↑ intracranial pressures
  → "popping the balloon" phenomenon, similar to obesity/chronic IIH?

- Case reports of patients with spontaneous improvement after delivery, recurrence in subsequent pregnancy; but also improvement in symptoms over course of pregnancy

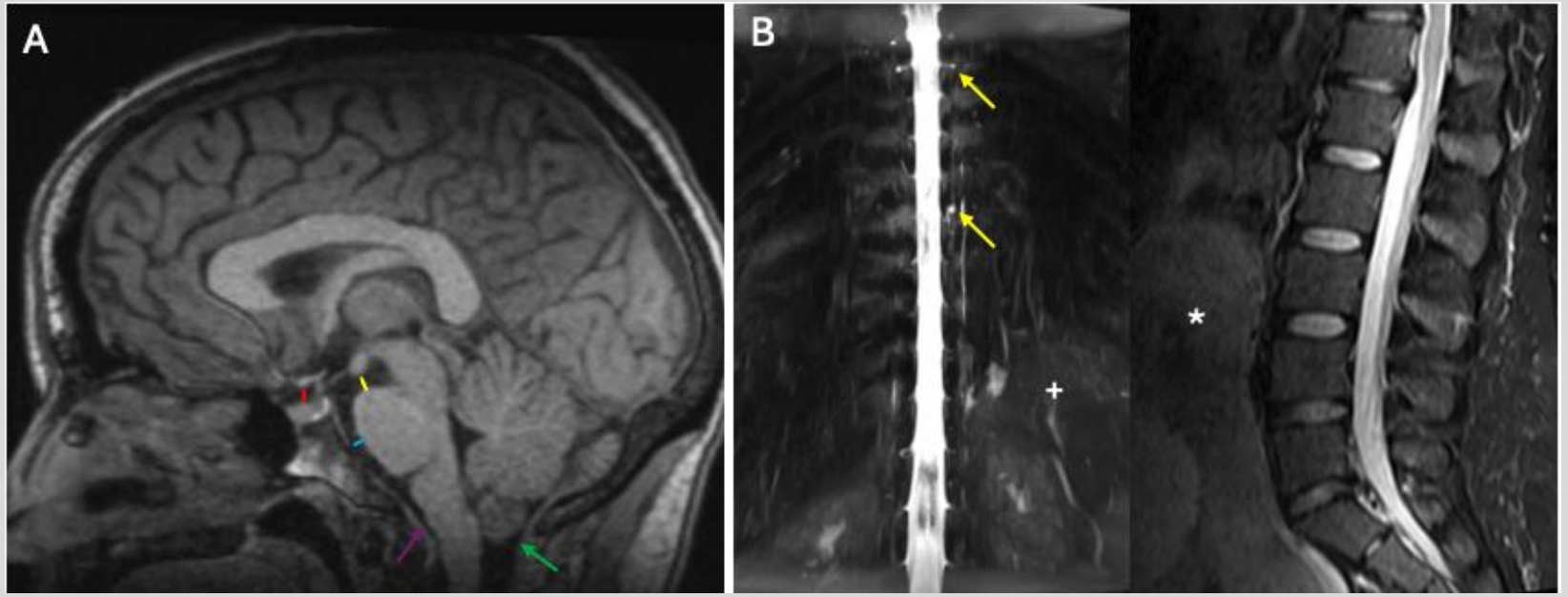
- Mass effect of increased epidural fat and venous engorgement on spinal CSF space



Igarashi et al. 2000

MANAGEMENT OF THE PREGNANT PATIENT WITH SUSPECTED SIH

- Non-contrast MRI of the brain
- Non-contrast MRI of the total spine, heavily-T2 weight fat-suppressed preferred (CSF leak protocol)
- Gadolinium-based contrast agents generally contraindicated in pregnancy



MANAGEMENT OF THE PREGNANT PATIENT WITH SUSPECTED SIH: TREATMENT

NYSORA

First line: Conservative measures

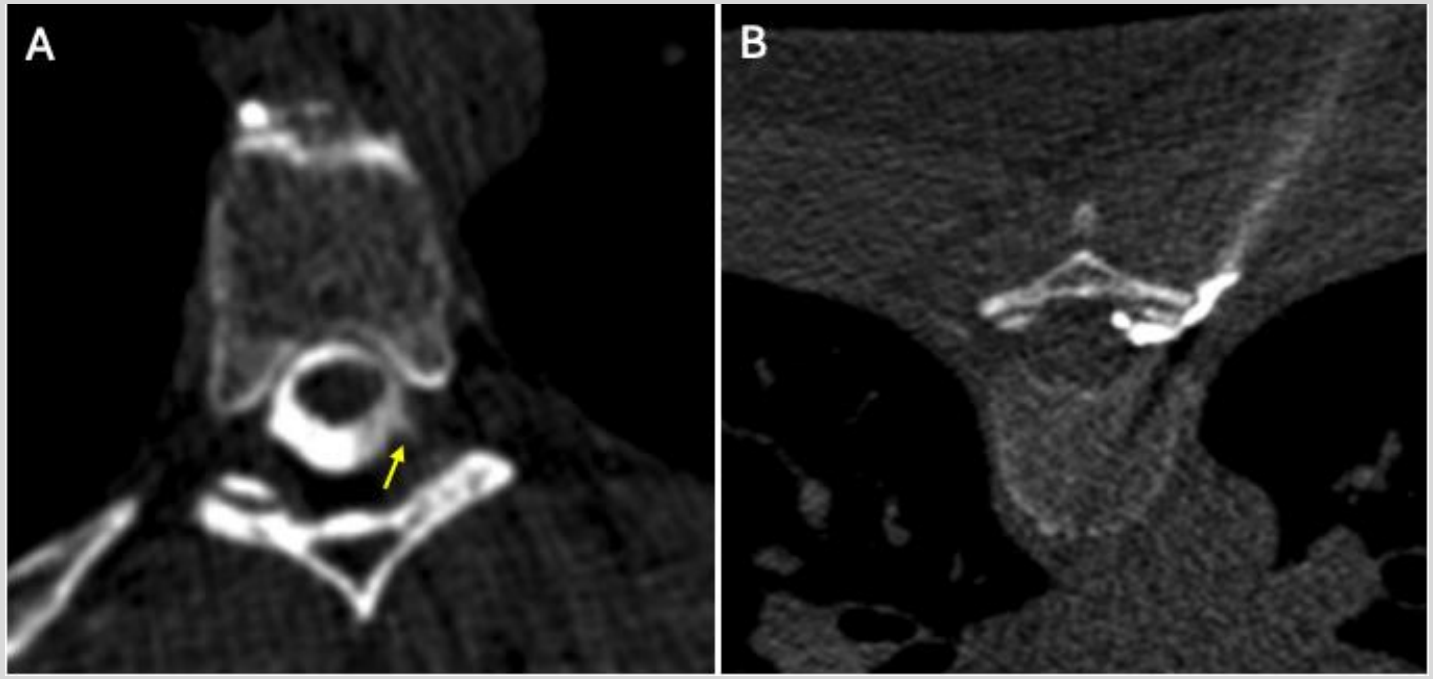
- Short duration bed rest (7-10 days)
- Hydration, steroids
- Caffeine should be limited to <200 mg/day; limited NSAID use in early pregnancy, should not be taken after 20 weeks

Second line: Invasive treatment

- Non-image guided empiric epidural blood patch
- Greater occipital nerve blocks
- In severe cases, consider risks: benefits of DSM/CTM, image-guided epidural patching. Radiation lower risk later in pregnancy

MANAGEMENT OF THE PREGNANT PATIENT WITH SUSPECTED SIH: TREATMENT

If symptoms persist, worsen, or recur post-partum, standard contrast-enhanced MRI and image-guided myelography should be pursued

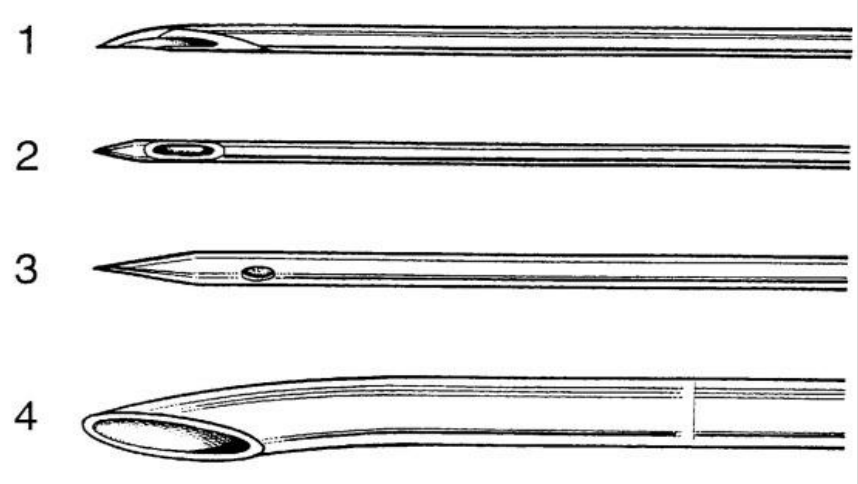


CONSIDERATIONS FOR LABOR & DELIVERY ANESTHESIA

→ Patients with leak prior to or during pregnancy should not at higher risk for iatrogenic leak related to spinal or epidural anesthesia*; however, need to avoid areas of possible pre-existing dural defect

(* those without connective tissue disease)

→ Discussion/planning with OB and OB anesthesia team; consider MFM involvement



Illustrations of needle types for obstetrical anesthesia.
1: 26G Atraucan double bevel
2. 26G Sprotte pencil point
3. 22G Whitacre pencil point
4. 16G Tuohy epidural needle.

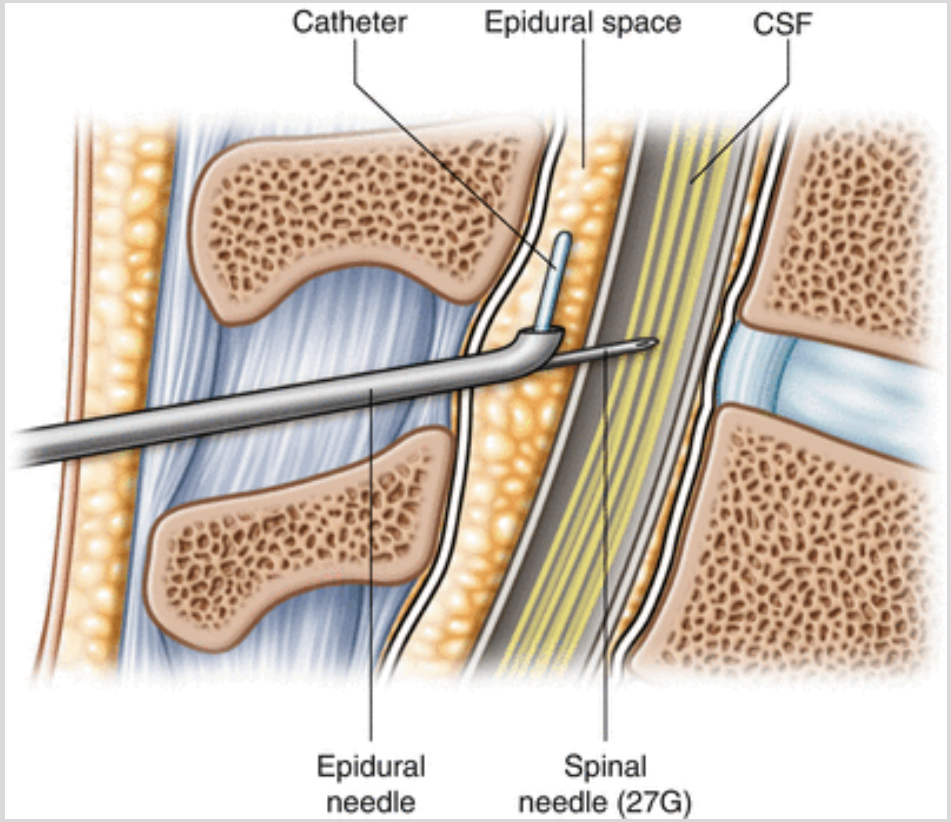
Adapted from Turnbull and Shepherd, 2003

CONSIDERATIONS FOR LABOR & DELIVERY ANESTHESIA

Analgesia Method	Advantages	Disadvantages
Epidural	-widely available -catheter placement allows for prolonged analgesia -can be used post-operatively	-largest needle (16-18G) and greatest risk of inadvertent dural puncture -patchy or asymmetric block, unreliable sacral block -slow onset -high doses of anesthetics and opioids
Spinal	-smallest needle (24-27G) and lower risk of post-dural puncture HA (PDPH) -rapid onset -reliable symmetry of block, including sacral nerve roots -lower doses of anesthetics and opioids	-limited duration of action -cannot extend block -requires dural puncture
Combined Spinal-Epidural (CSE)	-combines rapid onset and reliability of spinal with durability of epidural -reportedly lower PDPH risk due to needle-through needle technique	-risk of inadvertent dural injury with large-gauge epidural needle remains
General Anesthesia	-no dural puncture or risk of dural puncture	-parturient unconscious for delivery -increased risks of GA -poor post-operative pain control, may need to combine with local transverse abdominus block

CONSIDERATIONS FOR LABOR & DELIVERY ANESTHESIA

- Possible lower risk dural injury with CSE, as spinal needle can be used as a “depth check” to the thecal sac and avoid advancement of larger epidural needle
- 2.5X greater risk of PDPH with epidural anesthesia alone

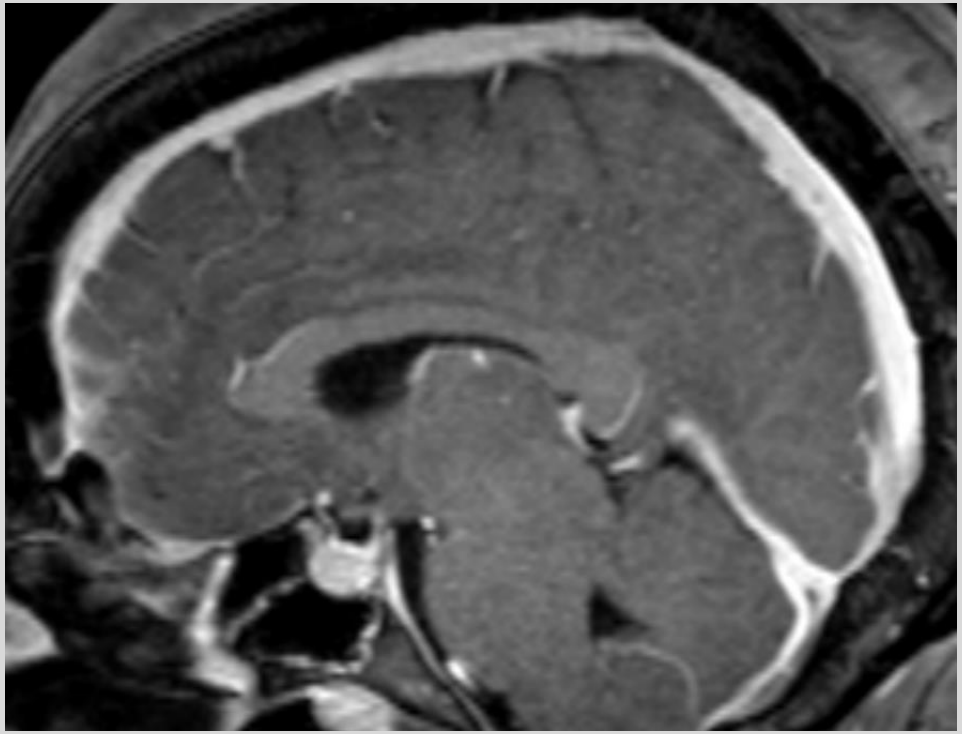


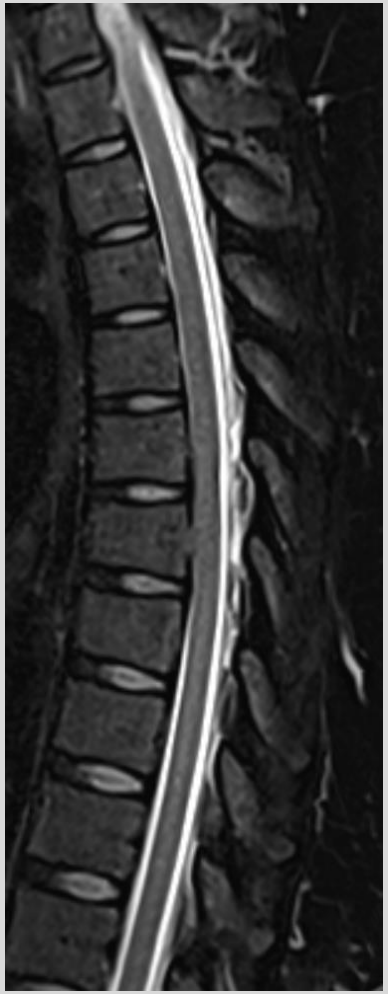
Turnbull and Shepherd, 2003

COMPLICATIONS OF L&D ANESTHESIA: FAST IMMEDIATE LEAK

- 35 yo received epidural placement in setting of IOL
- 17G Tuohy needle placed at L4-L5; subsequent complicated delivery
- Post-partum: worsening headache when upright, underwent bedside epidural blood patch with Anesthesia x2
- Discharged home, severe postural headaches persisted, unable to care for infant

COMPLICATIONS OF L&D ANESTHESIA: FAST IMMEDIATE LEAK





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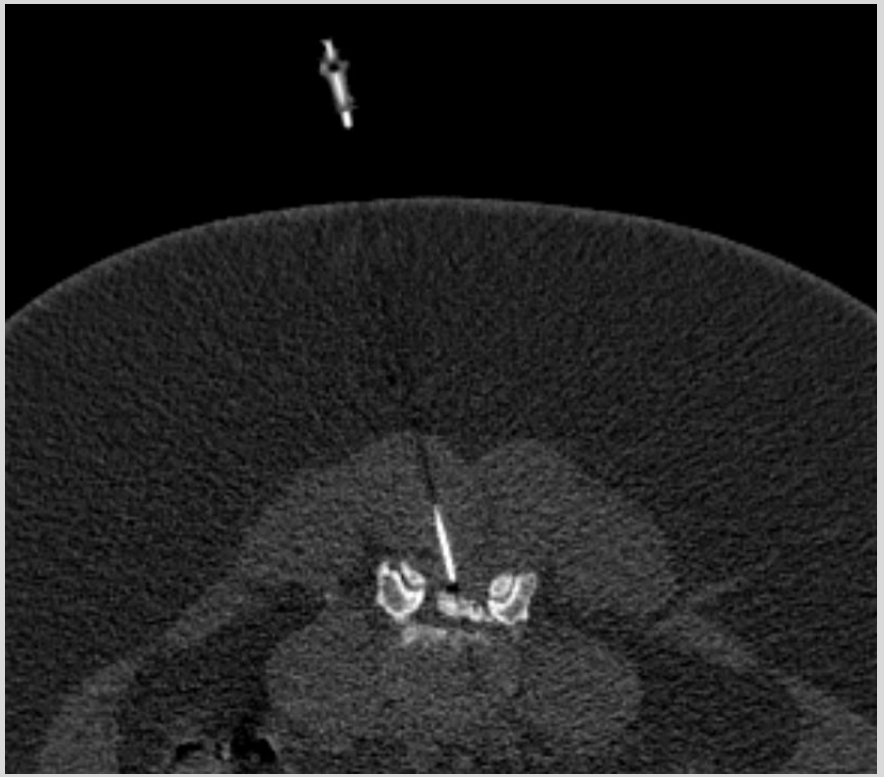
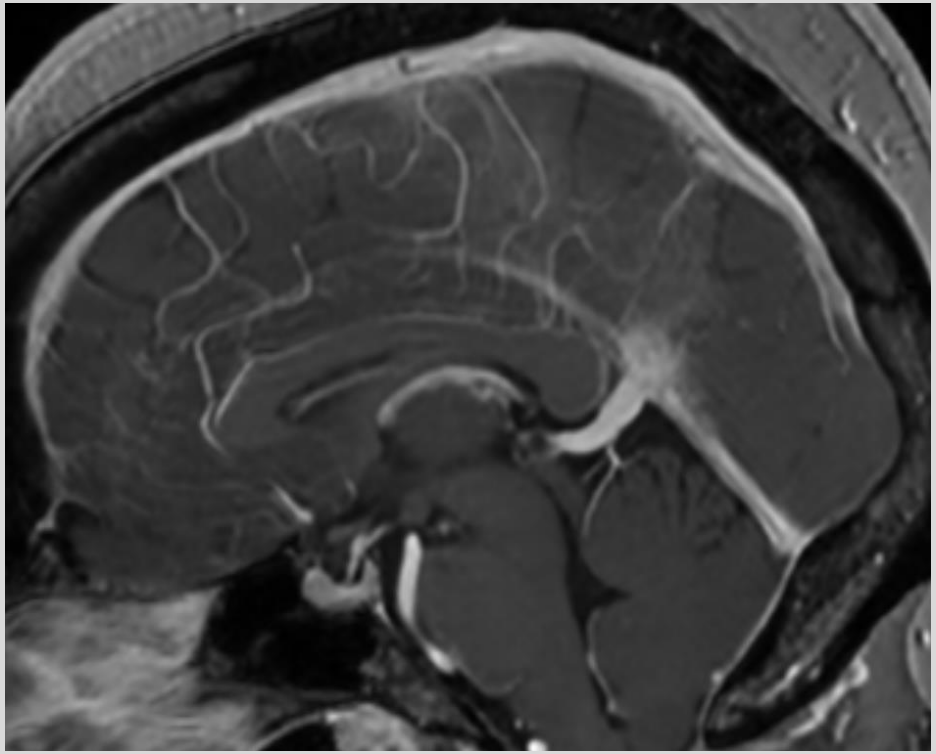
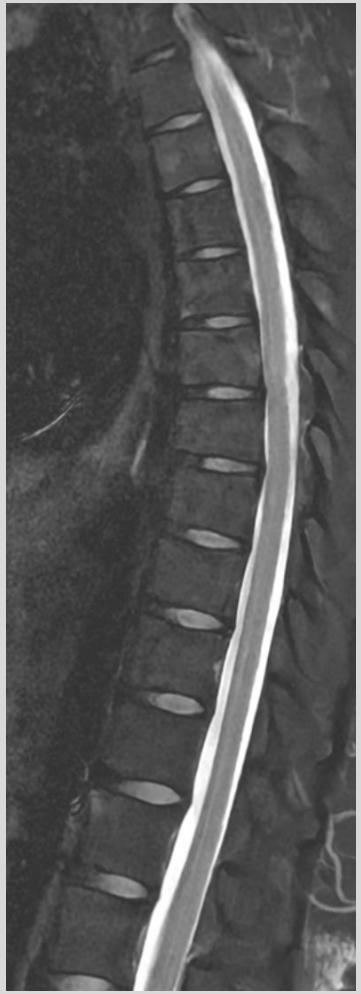


Targeted CT guided fibrin epidural patch

COMPLICATIONS OF L&D ANESTHESIA: FAST IMMEDIATE LEAK



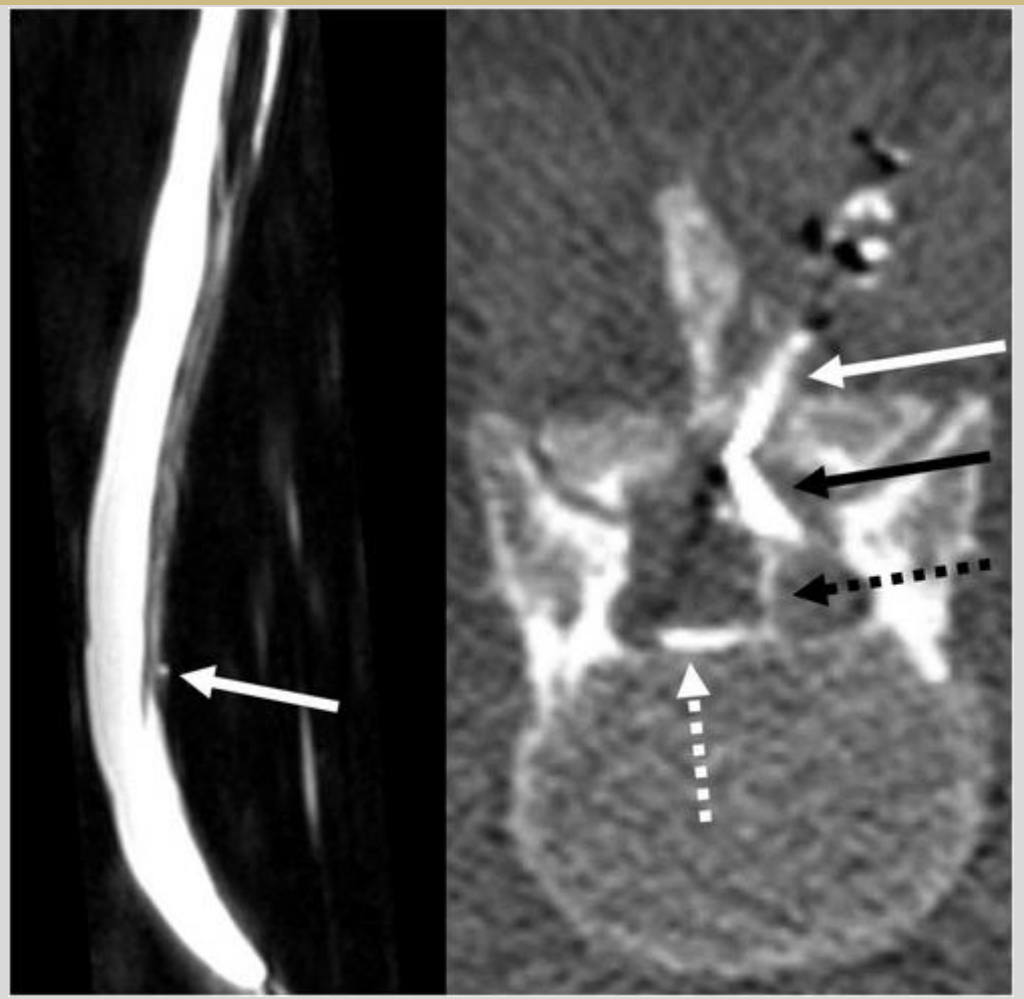


COMPLICATIONS OF L&D ANESTHESIA: CHRONIC DURAL INJURY

- 24 yo received labor epidural block
- Initially had an orthostatic headache, which improved after 24 h bed rest
- Remained headache free for 12 years. Then developed new holocephalic HA, persisted daily for 6 years
- MRI brain negative for findings suggestive of intracranial hypotension

Callen et al., 2023

COMPLICATIONS OF L&D ANESTHESIA: CHRONIC DURAL INJURY



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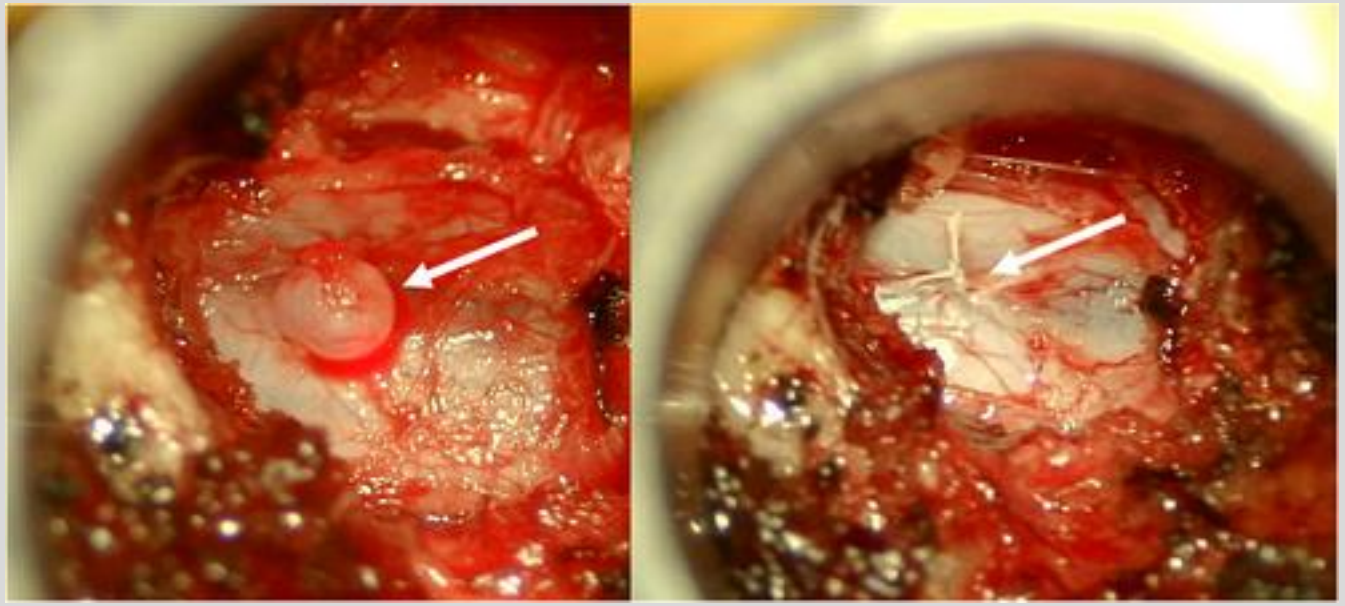
COMPLICATIONS OF L&D ANESTHESIA: CHRONIC DURAL INJURY



Callen et al., 2023

PHARMACOTHERAPIES: CONSIDERATIONS IN PREGNANCY AND LACTATION

- As previously discussed, caffeine and NSAIDs should be limited during pregnancy

- Most medications for rebound intracranial hypertension relatively safe during pregnancy and breastfeeding
  → Topiramate carried additional risks to fetus and newborn

NIH National Library of Medicine
National Center for Biotechnology Information

Drugs and Lactation Database (LactMed®)

Bethesda (MD): National Institute of Child Health and Human Development;

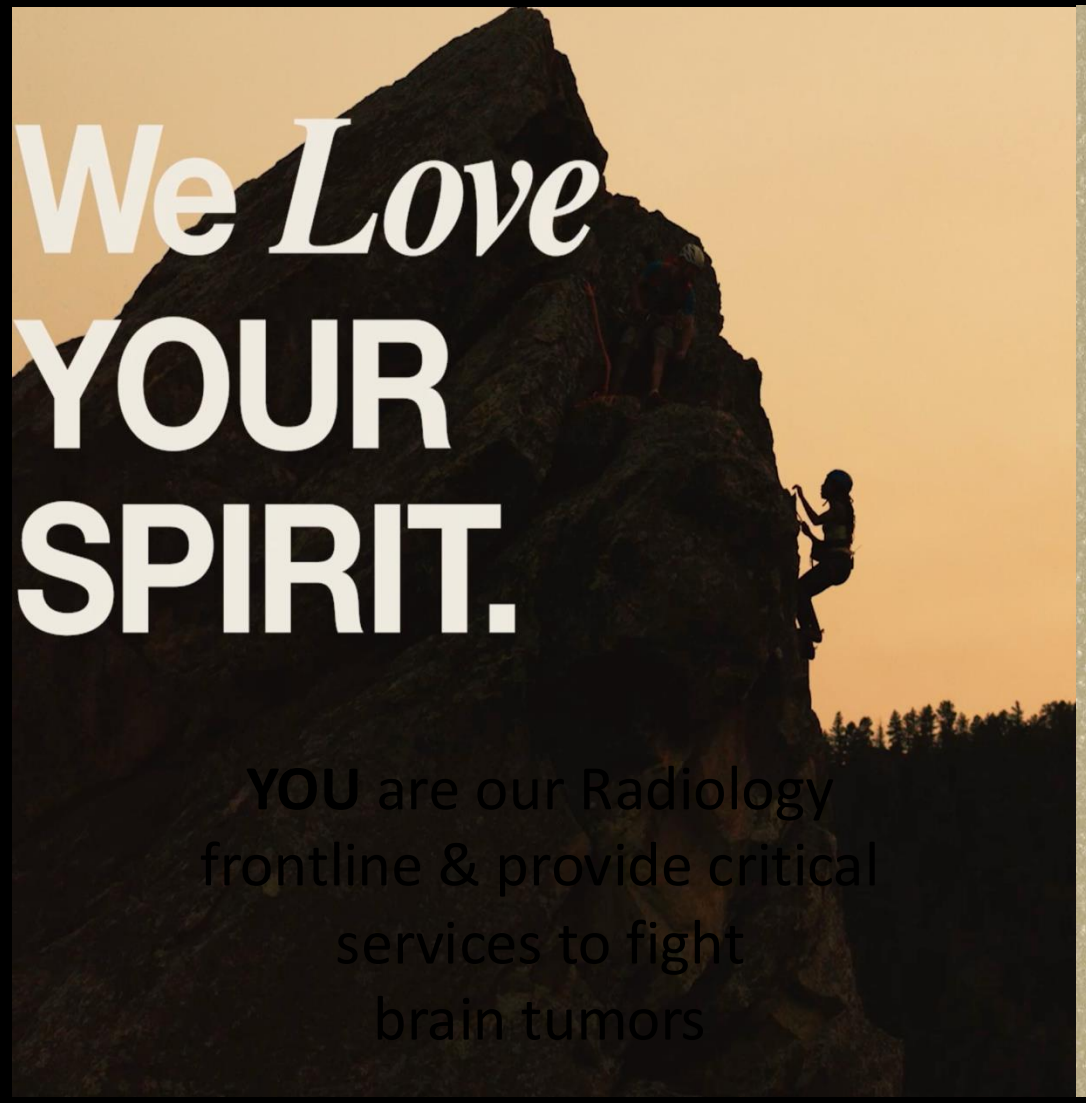
PHARMACOTHERAPIES: CONSIDERATIONS IN PREGNANCY AND LACTATION

Pharmacologic Agent	Antepartum Use	Postpartum Use
Acetazolamide	-Category C: use conservatively when benefits outweigh risks -regular monitoring of serum k+ -some instances of metabolic acidosis reported in neonates	-excreted into breastmilk at very low levels thought to cause no adverse effects in breastfed infants
Methazolamide	-Category C: use conservatively when benefits outweigh risks -regular monitoring of serum k+	-no data regarding breastmilk excretion and effects in infant; carbonic anhydrase inhibitors generally considered acceptable during breastfeeding
Furosemide	-Category C: use conservatively when benefits outweigh risks -regular monitoring of serum K+ and hematocrit -additional fetal monitoring due to association w/ polyhydramnios and macrosomia	-high doses (> 20 mg/d) may suppress lactation -likely low excretion into breastmilk and low oral bioavailability to infant; no adverse effects in newborns reported
Topiramate	-Category D: known increased risk of cleft lip/palate (1.4%; baseline 0.07%). Possible additional risks for fetal growth restriction and neurodevelopmental disorders	-excreted into breastmilk at low levels when used at anti-epileptic doses (100-200 mg/d) -infant drowsiness, irritability, diarrhea have been reported

CONCLUSION

- Pregnancy, labor and deliver confer distinct risks to develop or exacerbate a spinal CSF leak
- Diagnostic and treatment options are available while pregnant or lactating
- Make informed decision regarding risks/benefits of OB anesthesia; look for supportive team

Thank You!



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