

# PNEUMOCEPHALUS AFTER EPIDURAL CATHETER PLACEMENT FOR ANALGESIA DURING CAESARIAN SECTION

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## LEARNING OBJECTIVES

- Recognize the CNS sign and symptoms associated with pneumocephalus (PNC)
- Understand that pneumocephalus is a rare but potential complication after epidural catheter placement

## CASE PRESENTATION

A 19yo G1P0 woman presented with progressively worsening AMS after epidural placement for cesarean delivery.

**HPI:** The patient was admitted for induction of labor due to nonreassuring fetal heart rate tracings. She requested an epidural due to pain with contractions, then began to complain of difficulty swallowing. She underwent a cesarean section due to arrest of dilatation. Shortly afterward, the Medical Emergency team was activated as she was unresponsive.

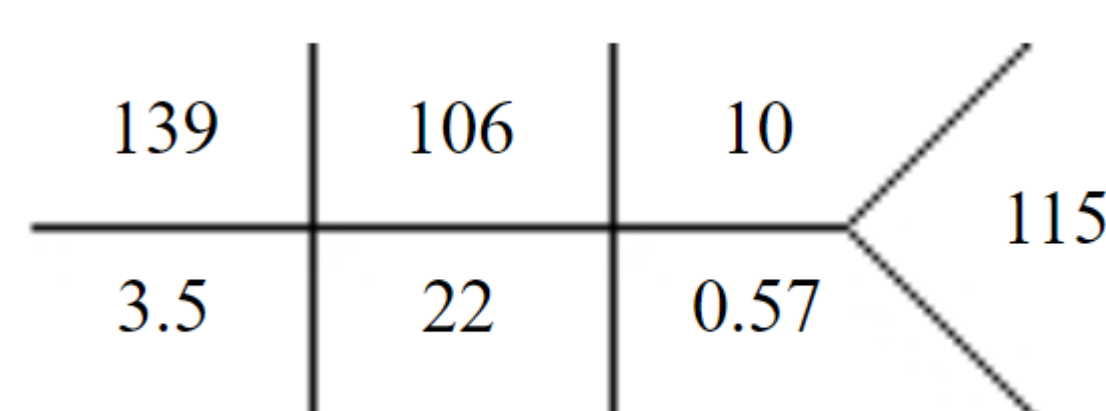
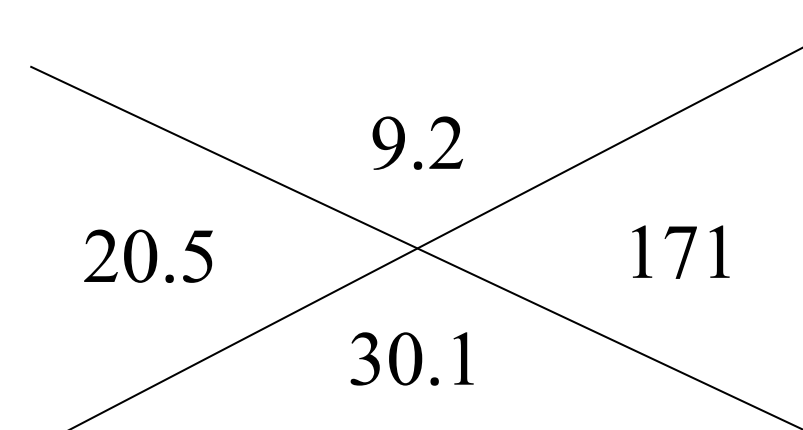
**PMH:** No known past medical history. No medications.

**Prenatal testing:** varicella non-immune, otherwise unremarkable

**SH:** Living with father of baby and relatives, currently unemployed, denied smoking cigarettes, EtOH, or illicit drug use

**Physical Examination:** Lethargic, occasionally groaned to sternal rub. Right pupil 4mm, left pupil 2mm, neither reactive to light. Decreased gag reflex. Does not follow commands.

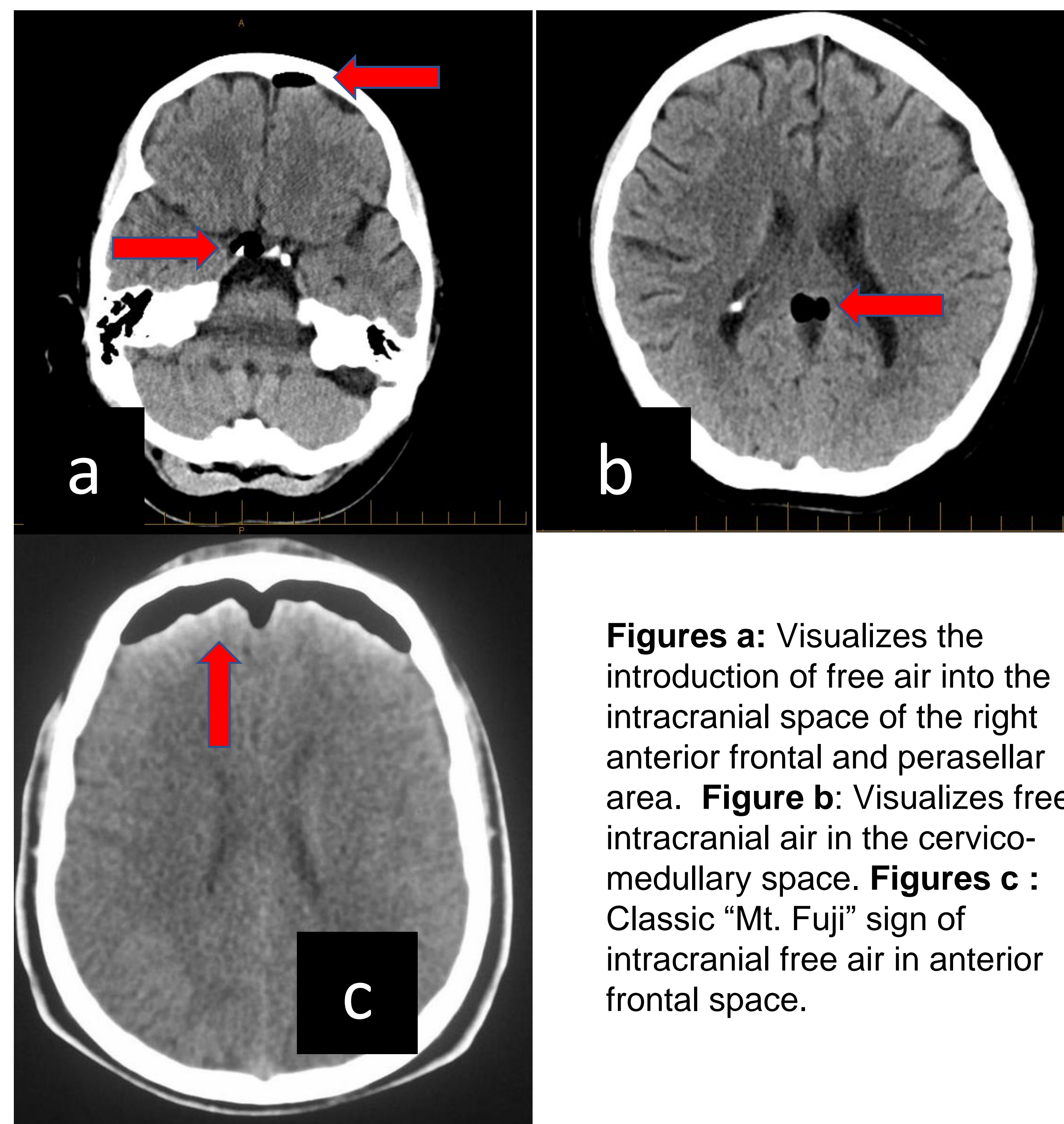
**Data:**



**CT Head:** Pneumocephalus in left anterior frontal, right parasellar, along high ambient cistern and in right cervico-medullary extra-axial space

**MRA Head w and w/o Contrast:** Unremarkable MRV of the cerebral veins and sinuses. No evidence of venous sinus thrombosis.

**MRI Head:** Pneumocephalus in left anterior frontal region



**Figures a:** Visualizes the introduction of free air into the intracranial space of the right anterior frontal and parasellar area. **Figure b:** Visualizes free intracranial air in the cervico-medullary space. **Figures c:** Classic "Mt. Fuji" sign of intracranial free air in anterior frontal space.

## Pneumocephalus

- Intra-cranial air.
  - Often results from:
    - Trauma
    - Gas forming CNS infection
    - ENT/Spinal/Neurosurgery
  - Rarely a complication of Neuraxial Anesthesia
  - Symptomology non-specific and includes:
    - Headache
    - Changes in vision
    - Nausea/vomiting
    - Confusion
    - Loss of consciousness
    - Any focal neurological deficit
  - Caused by introduction of air into the sub-dural space.
  - Associated with "Loss of resistance" method for epidural placement
  - Diagnosed with CT of brain and presence of Mt. Fuji Sign
  - Treatment:
    - Place patient in Supine position
    - 40-100% O<sub>2</sub>
    - Hyperbaric oxygen therapy if available
- Reabsorption of air usually occurs within 3-5 days, commonly with no residual neurological abnormalities.

## HOSPITAL COURSE

- In the following 2 hours, the patient became gradually more alert and conversive, complaining of bilateral hand numbness and double vision
- Stat consult was placed to neurology who were initially concerned for midbrain air embolus, which was not visualized on imaging
- Patient was transferred to a facility with hyperbaric oxygen therapy capabilities, and was discharged within 72 hours without complication

## Complications associated with Neuraxial Anesthesia

- Neuraxial Anesthesia is generally very safe.
- Hypotension – caused by sympathetic blockade resulting in vasodilation and decreased venous return. Incidence is greater in Spinal vs epidural.
- Local Anesthetic toxicity- inadvertent high dose administration of anesthetic into epidural vein. CNS and cardiovascular symptoms are seen including perioral numbness, metallic tastes, mental status changes, seizure, tachycardia, hypo/hypertension and ventricular arrhythmias. Treated with IV lipid emulsion.
- Other complications include inadequate anesthesia, unwanted motor blockade, Total spinal or High neuraxial blockade. Postdural puncture headache, Spinal hematoma

## CONCLUSION

PNC as a result of unnoticed accidental dural puncture is a rare but potentially devastating complication from epidural catheter placement. In patients with altered mental status or focal neurological deficits following the placement of an epidural, PNC should be included in the differential diagnosis.

### REFERENCES:

- Norris MC, Grieco WM, Borkowski M, et al. Complications of labor analgesia: epidural versus combined spinal epidural techniques. *Anesth Analg* 1994; 79:529.
- Wang JC, Tsai SH, Liao WI. Pneumocephalus after epidural anesthesia in an adult who has undergone lumbar laminectomy. *J Neurosurg Anesthesiol*. 2014 Jul;26(3):261-3.