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Post-Dural Puncture Headache in a Pediatric Patient with Pseudotumor Cerebri

Ammar Yamani MD

Baystate Health, Ammar.Yamani@baystatehealth.org

Stanlies D'Souza MD

Baystate Health, dsouzastan@yahoo.com

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CASE DESCRIPTION

A 4 year old boy with a history of prematurity, in-utero illicit drug exposure, and pseudotumor cerebri (PTC) associated with papilledema requiring serial therapeutic lumbar punctures (LP) and acetazolamide, presents with symptoms consistent with post dural puncture headache after recent therapeutic LP. His symptoms included postural, posterior headaches and vomiting relieved by supine position. The neurologist noted evidence of optic nerve atrophy of the right eye and bilateral papilledema, consistent with persistent PTC. The acute pain service was consulted regarding potential epidural blood patch. Conservative therapy with intravenous fluids and bed rest with acetaminophen and morphine improved symptoms. If conservative therapy had failed, we would have considered epidural blood patch (EBP) under general anesthesia or ketamine sedation.

DISCUSSION

PTC is a rare pediatric condition without any identifiable pathology³. This patient has PTC causing papilledema and requiring serial LP in addition to medical treatment with acetazolamide. Paradoxically, he develops low pressure PDPH after therapeutic LP. Decision points include treatment options to use for conservative therapy, as well as whether to provide EBP under general anesthesia versus sedation. If pursuing EBP, there is a chance that intervention may worsen persistent hydrocephalus and papilledema, a finding that has not been discussed in the pediatric literature. There are many case reports of EBP after placement of lumbo-peritoneal shunt (LPS) in *adult* patients with pseudotumor cerebri⁴, as well as in pediatric patients *without* idiopathic intracranial hypertension⁵. If PDPH occurs after surgery such as LPS or ventriculo-peritoneal shunt (VPS), proceeding with EBP would provide symptomatic relief and theoretically reduce the risk of worsening PTC. Preventive measures such as using smaller gauge and pencil point needles have been shown to decrease risk of developing PDPH⁶. However, in cases of therapeutic LP specifically for CSF drainage, smaller gauge needles may not be the best option as they will slow down the rate of drainage, prolonging the procedure. This case exemplifies the need to develop a system for patients with this ailment that decreases the risk of PDPH after treatment for their underlying condition.

POST-DURAL PUNCTURE HEADACHES (PDPH)

Difference in incidence of PDPH in adult versus pediatric population thought to be due to CSF pressure being less and CSF production rate being greater in pediatric population.

	Adult ¹	Pediatric ²
INCIDENCE OF PDPH AFTER LP	10-30%	2-5%, as high as 11%
CSF PRESSURE	10-25 cmH2O	8-18 cmH2O
CSF PRODUCTION RATE	20 cc/hour	0.1-26.5 cc/hour

Figure 1: Initial MRI at time of diagnosis showing prominence of CSF within frontal-parietal regions (red arrows) consistent with external hydrocephalus

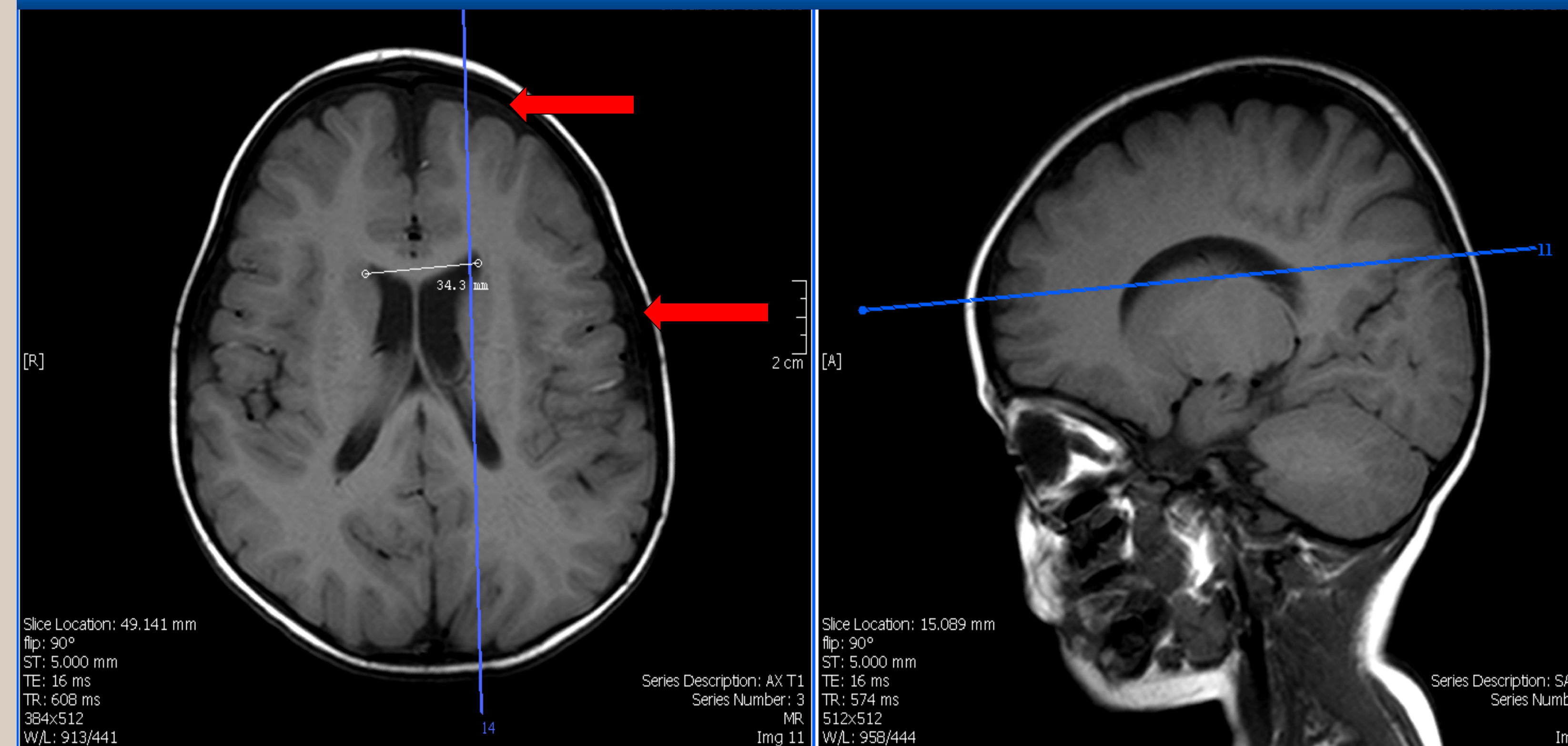
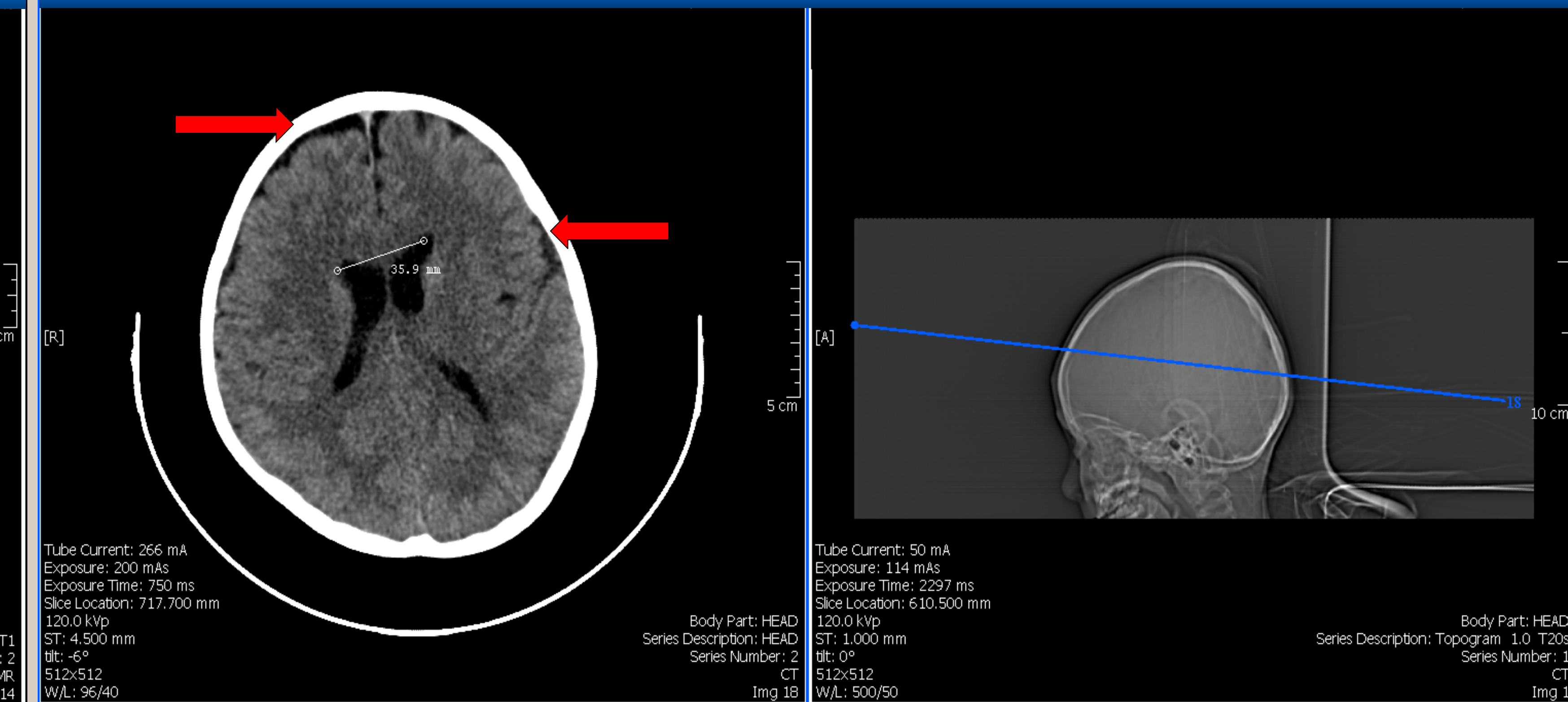


Figure 2: CT scan at time of admission for PDPH showing frontal parietal regions with less CSF (red arrows)



MANAGEMENT OF PDPH IN PEDIATRICS

CONSERVATIVE MANAGEMENT

- Bed rest, supine position
 - Impractical in active child
- IV Fluids if cannot tolerate PO
- Caffeine—limited studies in pediatric population
 - Side effects: restless, nervous, insomnia
- Pain management (NSAIDs, APAP, Opioids)
- 24-48 hours: patients may not tolerate this

CONSIDERATIONS FOR EBP

- GA vs. sedation?
 - Ketamine sedation used successfully
- Autologous blood volume 0.2-0.3 cc/kg
 - Limited studies for maximum volume in pediatric population
- In Pedi-Onc population risk introducing malignant cells to CSF
 - High risk for thrombocytopenia and infection

MANAGEMENT OF PSEUDOTUMOR CEREBRI AND EXTERNAL HYDROCEPHALUS IN PEDIATRICS

CONSERVATIVE MANAGEMENT

- Weight loss
- Carbonic anhydrase inhibition (Acetazolamide, topiramate)
 - Risk of metabolic acidosis
- Furosemide
- Corticosteroids

INVASIVE MANAGEMENT

- Serial LPs
- Surgery (deteriorating vision or intractable headache)
 - LPS vs. VPS
 - Optic nerve sheath decompression (rare)

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