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DEPARTMENT OF IMAGING SCIENCES

Imaging Sciences Interesting Cases

CASE 47

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CLINICAL PRESENTATION: A 35-year-old female presents with headache post-delivery of nonviable twins.

IMAGING FINDINGS: Non-contrast CT (NCCT) of the head demonstrates intraventricular and subarachnoid air (**Figs. 1 and 2**). There is no evidence of intracranial hemorrhage or infarct. A head MRI obtained several hours following the CT was unremarkable (not shown).

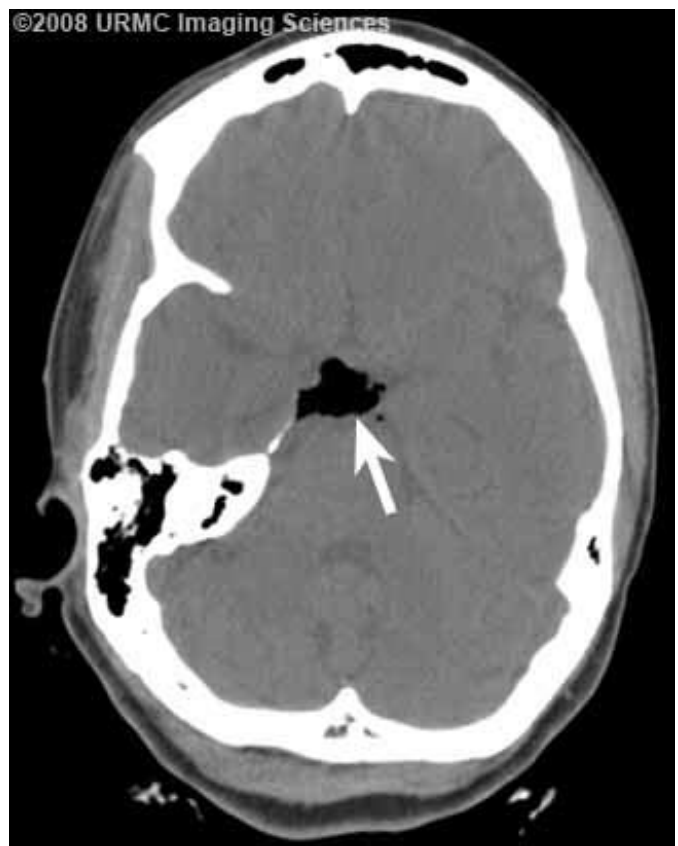


Figure 1. NCCT with soft tissue window demonstrates an area of low attenuation which measured -937 HU consistent with air within the subarachnoid space of the suprasellar cistern.

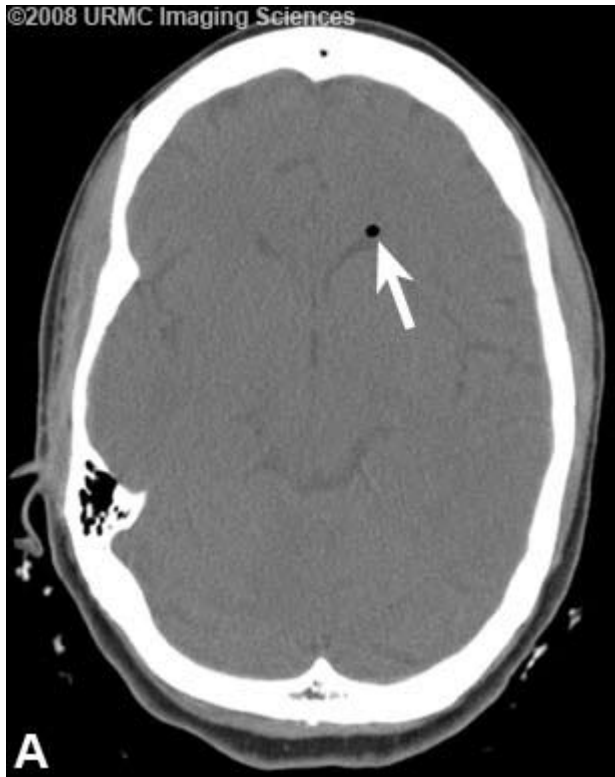


Figure 2: NCCT with soft tissue window reveals air within the left frontal horn of the lateral ventricle (A) and third ventricle (B).

DIAGNOSIS: Pneumocephalus, iatrogenic following epidural placement.

DISCUSSION: Pneumocephalus is defined as the presence of intracranial air or gas. Although there are many causes, pneumocephalus in the postpartum setting is typically secondary to inadvertent dural puncture at the time of epidural placement with air injection by the loss-of-resistance technique for identifying the epidural space. The air may enter the subdural or subarachnoid space and migrate intracranially resulting in meningeal irritation producing a headache. The air may eventually circulate within the CSF and spread to the ventricular system, as was the case in our patient. The process is usually self-limited and resolves within days as the amount of intracranial air decreases.

Headache accompanying epidural placement is a common complication and may be caused by either pneumocephalus or CSF leak. The two distinct etiologies may be differentiated clinically based upon the timing of headache onset and symptomatic postural dependence: a headache due to pneumocephalus typically presents immediately following the procedure and is not relieved by lying down, whereas a headache due to CSF leak has an onset of 24-48 hours post procedure and is relieved when the patient is supine.

Posterior reversible encephalopathy syndrome (PRES) is a rare entity that may also present with postpartum headache and is characterized by transient vasogenic edema most commonly involving white matter supplied by the posterior circulation. Although most causes of headache in the postpartum period are benign in nature, imaging is routinely performed to exclude more serious conditions such as intracranial hemorrhage or infarction. NCCT is the initial study of choice followed by MRI if clinically warranted.

Pneumocephalus is readily identifiable on NCCT by the presence of low attenuating intracranial collections (approximately -1000 HU). Although not as readily apparent, air on MRI may also be identified as areas of low signal on both T1- and T2-weighted sequences.

The clinical context is important in forming an appropriate differential in the setting of pneumocephalus. The most common causes are listed below:

1. Trauma (74%): If pneumocephalus is present, look for an associated paranasal or skull base fracture.
2. Neoplasm (13%): Tumors arising from a sinus or the nasopharynx may erode the adjacent bone and penetrate the dura. Common entities include osteoma, pituitary adenoma, mucocele, epidermoid, and malignancies such as nasopharyngeal squamous cell or adenocarcinoma.
3. Infection (9%): Gas-forming organisms from mastoiditis or sinusitis with intracranial extension, meningitis, and/or abscess formation.
4. Iatrogenic (4%): Surgery or post-procedure, i.e. shunt, ICP monitor, or epidural placement.

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