



Pneumocephalus following Cervical Epidural Steroid Injection: A Rare Complication and Literature Review

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Introduction:

- Pneumocephalus is a rare, but potentially serious complication following a cervical epidural steroid injection (CESI). [3]
- Pathophysiology is linked to unintentional dural puncture during needle placement, especially when using the loss-of-resistance (LOR) to air technique. [2]
- Air is introduced into the subarachnoid or subdural space and can ascend cranially. [1]
- There is no defined “safe” amount of air. [3]
- Clinically, pneumocephalus can mimic a SAH or PDPH, presenting with sudden-onset, intense headache, nausea, vomiting, AMS, and rarely cardiopulmonary arrest. [1][4][3]
- Today’s case highlights a patient with pneumocephalus following CESI.

Case Report:

- A 64-year-old male with past medical history notable for presence of a ventriculoperitoneal (VP) shunt presented for an interlaminar CESI due to cervical radiculopathy.
- During the procedure, multiple attempts were required to obtain epidural access.
- Contrast imaging under fluoroscopy showed appropriate epidural spread.
- Our patient tolerated the procedure well and remained asymptomatic for two hours post-injection.
- While eating lunch, he experienced sudden-onset, severe pain in his left forearm radiating to his fifth digit.
- CT imaging of cervical spine revealed air within the left lateral recess at the C6/T1 level consistent with pneumocephalus.
- Our patient was admitted for overnight observation and treated conservatively with intravenous fluids and oxygen.
- The following morning, repeat CT imaging demonstrated interval decrease in the volume of air.
- Our patient was discharged home and had complete resolution of symptoms.

Discussion:

- Pneumocephalus is most commonly seen following trauma or cranial surgery, but can occur with CESI. [1]
- Our patient experienced radiating forearm pain, unlike more typical symptoms seen with pneumocephalus. [2][3]
- CT without contrast is the gold-standard for confirming the diagnosis and was used in this case. [1]
- Management is conservative including high-flow oxygen, elevation of head-of-bed, rest, analgesia, and avoidance of Valsalva. [2]
- Approximately 85% of cases resolve spontaneously within one week and prognosis is favorable with early recognition. [1]
- Saline as a safer alternative to air during the LOR technique remains controversial but could be a preventative measure. [3]
- Prior VP shunt placement may have been a contributing factor to our patient’s development of pneumocephalus.
- This case emphasizes the importance of heightened awareness of pneumocephalus in patients with previous cranial pathology.

References:

- [1] Barr DL, McDonald BS. *Iatrogenic pneumocephalus following a cervical epidural steroid injection*. Case report. [PubMed Central]. 2021.
- [2] Ahmad M, Bellamy S, Ott W, Mekhail R. *Pneumocephalus secondary to epidural analgesia: a case report*. J Med Case Rep. 2023 May 26;17(1):217. doi:10.1186/s13256-023-03955-5. PMCID: PMC10214711.
- [3] Kim YD. *Delayed Pneumocephalus Following Fluoroscopy Guided Cervical Interlaminar Epidural Steroid Injection: A Rare Complication and Anatomical Considerations*. J Korean Neurosurg Soc. 2015.
- [4] Stauber B, Ma L, Nazari R. *Cardiopulmonary arrest following cervical epidural injection*. Pain Physician. 2012 Mar–Apr;15(2):147–152. PMID: 22430652.

Materials / Methods:

- IRB review was not required due to institutional policy.