

A Rare Case of Atraumatic Pneumocephalus with Associated CSF Leak

Introduction/Background

- Pneumocephalus is a condition characterized by air infiltrates within the brain parenchyma, most common caused by traumatic mechanisms¹.
- A cerebrospinal fluid (CSF) leak is a condition that is demonstrated by cerebrospinal fluid leaking from sanctuary compartments (cranial and spinal cord space), most commonly leaking through the nares¹.
- Patients with pneumocephalus with associated CSF leaks usually have an underlying traumatic mechanism², which make atraumatic pneumocephalus with associated CSF leaks in the context of URI symptoms an infrequent diagnosis and require immediate surgical referral and transfer in the rural setting.

Methods

- A 46-year-old female presented to the emergency department (ED) with complaints of excessive rhinorrhea, headache, and mild dizziness.
- 2 days prior to the ED visit, the patient sneezed and noticed excessive rhinorrhea that was clear and without blood. The patient was unable to control the fluid coming out of her nose.
- Pertinent Negatives:** Fever, chills, ear pain, dizziness that worsens upon positioning, blood-tinged sputum, sore throat, cough, recent trauma, strikes to the head, or previous concussions.
- Pertinent Positives:** Dizziness, headache, clear rhinorrhea
- No history of known congenital abnormalities, idiopathic intracranial hypertension (IIH), or previous craniofacial procedures.
- DDx:** Acute viral URI, allergic rhinitis, COVID, influenza, and CSF leak. Given that the patient did not present with other ENT symptoms and was afebrile, viral URI, influenza, and COVID was less likely.

Results

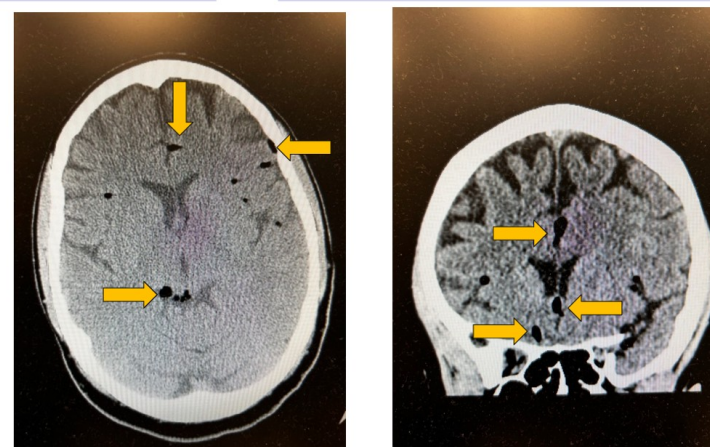
Physical exam

- Skin:** No rashes, urticaria, lesions, or ecchymosis
- HEENT:** Clear rhinorrhea in left nostril, no presence of blood, no erythematous oropharynx
- Cardio:** S1, S2 present w/o murmurs or gallops
- Pulm:** CTAB, not hyper/hyporesonant to percussion
- GI:** Bowel sounds x4, no tenderness to percussion or palpation
- GU:** Unremarkable
- MSK:** Unremarkable
- Neuro:** A/O x 4, no focal neurologic deficits
- Heme/Onc:** Unremarkable

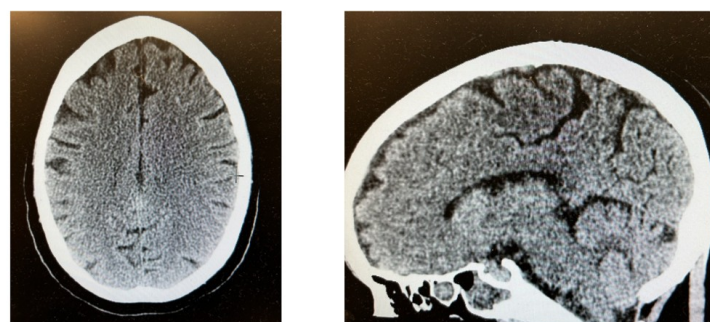
Labs

- WBC:** 13.1
- Blood work:** Unremarkable
- COVID Ab:** Negative
- Influenza Ab:** Negative
- Nasal fluid testing:** Unable to test

Initial Imaging



Follow-up Imaging (1 month later)



Summary

- Mild leukocytosis at 13.1; COVID/Influenza negative
- Nasal fluid analysis unable to be performed due to limited laboratory resources.
- CT head non-contrast** revealed *diffuse air infiltrates in the brain parenchyma* and an incidental *ethmoid bone fistula*.
- Broad spectrum antibiotics started
- The patient was subsequently transferred from a critical access hospital to a tertiary medical center for emergent surgical evaluation of atraumatic pneumocephalus and a CSF leak in the setting of an ethmoid bone fistula.

Discussion/Conclusions

- In this case, the prompt diagnosis and management of atraumatic pneumocephalus with associated CSF leak highlights the importance of maintaining a broad differential, even in seemingly straightforward presentations.
- Follow-up revealed an ethmoid insertion surgery to fix a cribriform plate fistula and resulted in no surgical complications. The patient was followed up with ENT and neurology.
- Repeat head CT non-contrast revealed resolution of pneumocephalus, and physical exam revealed no neurologic deficits.

References

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- Das JM, Munakomi S, Bajaj J. Pneumocephalus. [Updated 2024 Dec 11]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-.
- Van Liedekerke L, Sanoussi S. Spontaneous pneumocephalus secondary to a cerebrospinal fluid fistula demonstrated by CT cisternography. *Radiol Case Rep*. 2020;15(10):1829-1831. Published 2020 Aug 7. doi:10.1016/j.radcr.2020.07.036