

# A RARE CASE OF TENSION PNEUMOCEPHALUS IN A PATIENT DIAGNOSED WITH NASOPHARYNGEAL SQUAMOUS CELL CARCINOMA (NPC)



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## Abstract

### Introduction

Tension pneumocephalus occurs when air is trapped within the cranial cavity. It is associated with neurosurgical procedures, trauma and meningitis. Here, we report a rare case of tension pneumocephalus in a patient diagnosed with NPC after concurrent chemoradiation.

### Case Presentation

The patient is a 56-year-old Caucasian male diagnosed with stage II NPC (T2N0M0). He was treated with concurrent chemoradiation with intensity-modulated-radiation therapy at a dose of 7000 cGy in 35 fractions for seven weeks with concurrent cisplatin 100mg/m<sup>2</sup> (days 1,22,and 43). This was followed by two cycles of cisplatin 80mg/m<sup>2</sup>(day 1) and 5FU 1000mg/m<sup>2</sup>(days1-4).

After completion of chemotherapy, the patient presented with fever, intractable headaches, and intermittent cerebrospinal fluid (CSF) rhinorrhea. Head CT showed erosion of the clivus with associated CSF leak along with scattered air pockets in the subarachnoid spaces and ventricular system, indicating pneumocephalus. CT-Neuronavigational Sinus Study identified contrast leakage from the roof of the right ethmoidal air cells. Even though patient underwent endoscopic repair of the CSF leak, closure of the CSF fistula, and placement of ventriculo-peritoneal shunt, his clinical course was complicated by multiple infections, free flap repairs, a tracheostomy, inpatient rehabilitation, and more than four months of hospital stay.

### Conclusion

The patient suffered from significant morbidity due to tension pneumocephalus. Concurrent chemoradiation can lead to erythema, edema, and xerostomia acutely as well as hypothyroidism, hypopituitarism, and hearing loss long term. However, the development of pneumocephalus in this case displays a very rare but significant complication that should be discussed with the patient before initiating treatment.

## Background

### Nasopharyngeal carcinoma (NPC)

- Uncommon malignancy in the Western Hemisphere
- Risk factors: EBV, exposure to formaldehyde, wood dust, and cigarette smoke.
- Standard treatment: concurrent chemoradiation
- Post radiation complications: otitis media, chronic sinusitis, temporal lobe necrosis, cranial nerve palsy, and endocrine dysfunction (Huang, 2006). Skull base osteoradionecrosis is a rare complication which can lead to tension pneumocephalus.

### Pneumocephalus

- Causes: CSF leak which results in negative pressure allowing air to enter, or increased pressure which forces air to enter the intracranial cavity (Wang, 2006).
- Presentation: headache, visual changes, rhinorrhea, dizziness, confusion, seizures, motor abnormalities, personality changes.
- Course: can lead to infection and continuous CSF leakage; considered a neurosurgical emergency.
- Management: intraventricular drainage to decompress the intracranial air followed by repair of the skull base (Lee, 1999).



Figure A: CT Neuronavigational Sinus study shows erosion of the floor of the sphenoid sinuses and identifies contrast leakage from the roof of the right ethmoidal air cells (arrow)

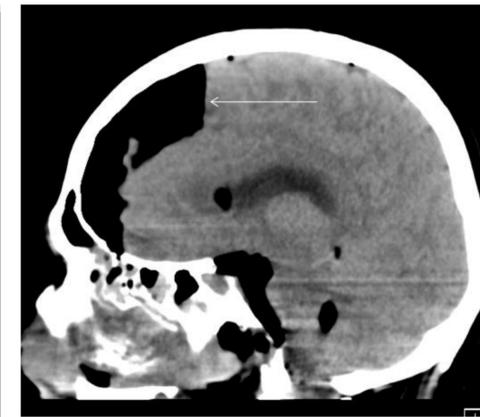
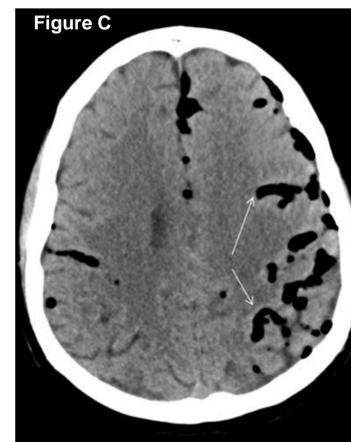
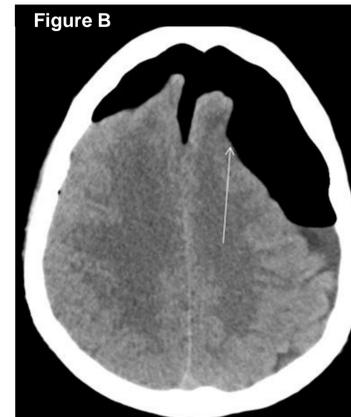


Figure B: Large amount of pneumocephalus is seen along the bicerebral convexities. Also shown is a rightward midline shift with effacement of the left lateral ventricle



Figure C: CT Head shows multiple scattered foci of pneumocephalus throughout the brain

## Discussion

•Concurrent chemoradiation is the standard of care in the management of NPC, but it can lead to a unique but serious complication highlighted in this case report, called tension pneumocephalus.

•The patient with NPC was treated with the appropriate regimen and the follow-up PET scans were negative for malignancy. However, he continued to require extensive medical management for a complication associated with his cancer treatment. He was admitted numerous times for morbidities related to the pneumocephalus including headaches, altered mental status, rhinorrhea, mucositis, and meningitis.

•Despite undergoing proper care with the placement of grafts to repair leaks, VP shunts for drainage, and antibiotics for infections, the patient continued to experience recurrent episodes of tension pneumocephalus and required prolonged hospital stays.

•The patient's course was further complicated by infections of his PEG site, port-a-cath, and VP shunt. During one of his admissions, he developed aspiration pneumonia which led to respiratory failure.

•This case reveals the need for the physician to be aware of tension pneumocephalus as a possible risk of treatment for nasopharyngeal carcinoma. A discussion of this condition should become a component of informed consent prior to starting chemoradiation .

•The physician should be familiar with the presentation of tension pneumocephalus so that urgent interventions can be undertaken. The morbidities require prompt medical and surgical management.

### Acknowledgements

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### References

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