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Prolonged Wakeup Caused by Pneumocephalus Following Resection of Craniopharyngioma

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Introduction

The differential diagnosis for a depressed mental status and delayed awakening following resection of an intracranial tumor with general anesthesia (GA) is quite large and includes metabolic, ventilatory, pharmacologic, infectious, and CNS etiologies. We present a case of prolonged wakeup secondary to pneumocephalus, a condition which is more common in sitting craniotomies, but has been reported in supine craniotomies as well.[1]

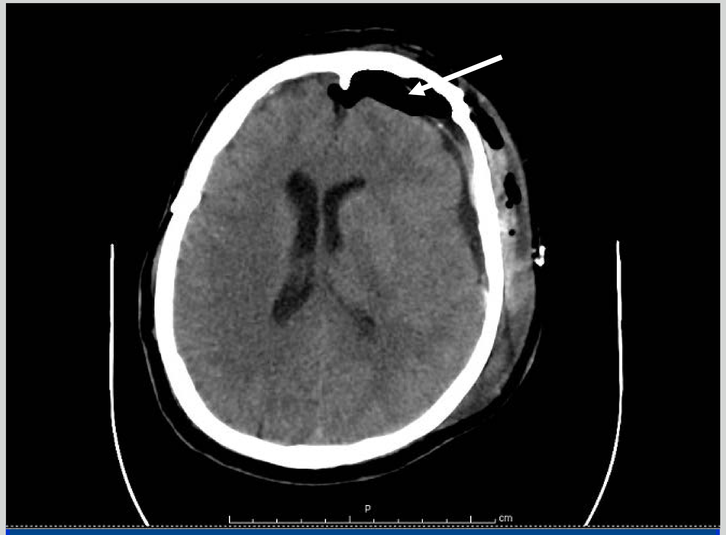
Case Description

Two years after resection of a large craniopharyngioma compressing the optic chiasm with resultant panhypopituitarism, a 66-year-old male developed new visual symptoms. Imaging revealed tumor recurrence with several cystic outpouchings, the largest being 3cm, causing significant pressure upwards into the hypothalamic area.

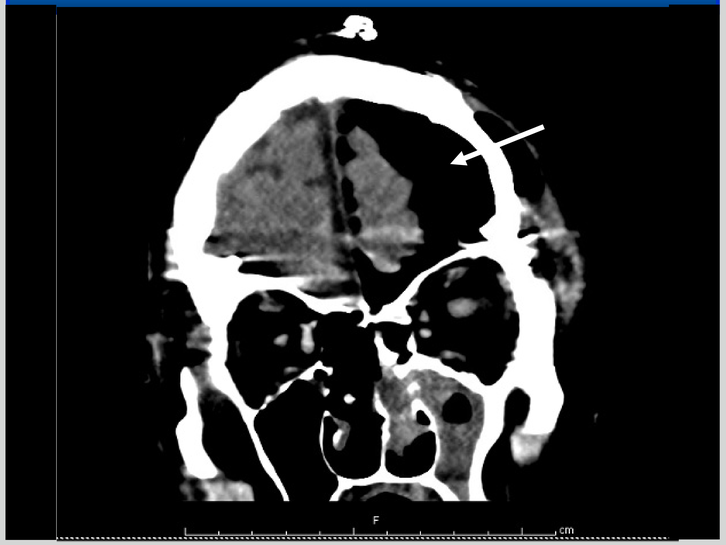
He subsequently underwent a left pterional craniotomy and resection of recurrent craniopharyngioma in a supine position using sevo and remifentanil anesthesia. The case was complicated by internal carotid artery rupture, but no significant blood loss resulted. Upon cessation of GA, he exhibited delayed awakening with depressed mental status with inability to follow commands and significant right-sided weakness. Re-imaging showed pneumocephalus (see white arrows) causing a left-to-right 6mm midline shift.

References

1. Prabhakar H, Bithal PK, Garg A. J Neurosurg *Anesthesiol* 2003; 15:278-81
2. Schirmer CM, Heilman CB, Bhardwaj A. Pneumocephalus: case illustrations and review. Neurocrit Care 2010; 13:152-8
3. Drummond JC, Patel PM. Neurosurgical Anesthesia. In: Miller RD editor. Miller's Anesthesia 7th ed. Philadelphia: Churchill Livingstone; 2007.p. 2054-5



Computed Tomography Showing Pneumocephalus with Midline Shift



Discussion

Perioperative Risk Factors[2]

- N2O anesthesia
- Head position
- Hyperventilation
- Intraoperative osmotherapy
- Spinal/Epidural anesthesia
- Barotrauma
- Intracranial neoplasm

Clinical Presentation[2]

- Headache
- Nausea/Vomiting
- Depressed Neurologic Status
- Seizures
- Dizziness

Prevention

- If hypocapnia was employed for brain relaxation, let PaCO2 to climb prior to dural closure to minimize residual intracranial pneumatocele[3]
- Discontinue N_2O when intracranial space has been completely sealed from the atmosphere[3]
- Avoid sitting position when possible[3]
- Reposition head during final moments of dural closure so that the dural defect is at the highest point in the cranial cavity and facilitates escape of remaining air while allowing surgeon to fill intradural space with irrigation fluid[2]

Diagnosis[3]

- Brow-up lateral X-ray
- Computer Tomography

Conclusion

Although there are many postulated mechanisms to prevent clinically significant pneumocephalus during craniotomies, there is currently no evidence to show that any particular anesthetic technique can influence the amount of postoperative pneumocephalus. Even though the use of N_2O and a sitting position was avoided in our patient, he still developed a clinically significant pneumocephalus.