



Case Report

Pneumocephalus with BiPAP use after transsphenoidal surgery ☆, ☆ ☆, ★

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Abstract While the benefits of continuous positive airway pressure (CPAP) or bilevel positive airway pressure (BiPAP) for patients with obstructive sleep apnea are well described, reports in the literature of complications from its use are rare. A patient who received postoperative BiPAP after undergoing transsphenoidal craniopharyngioma resection developed severe pneumocephalus and unplanned intensive care unit admission. Although the pneumocephalus resolved with conservative management over two weeks, we propose caution in the use of CPAP postoperatively in patients undergoing procedures of the head and neck.

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1. Introduction

Continuous positive airway pressure (CPAP) or bilevel positive airway pressure (BiPAP) are beneficial in the postoperative management of patients with obstructive sleep apnea (OSA). A patient who developed pneumocephalus after BiPAP following transsphenoidal resection of a craniopharyngioma is presented.

2. Case report

A 51 year old, ASA physical status 3, nonsmoking man with a history of sellar and suprasellar craniopharyngioma,

presented to our institution for evaluation of bitemporal hemianopsia caused by tumor recurrence. The primary tumor had been resected 7 years earlier. In the intervening time, his body mass index (BMI) increased from 34.8 to 50.1 kg/m², and he developed OSA syndrome. His preoperative BiPAP settings were 20/16 cm H₂O based on a titration polysomnogram showing a combined sleep disturbance index of 3.6 events of central apnea or hypopnea per hour with BiPAP, with the lowest oxygen saturation recorded as 84%.

The patient was scheduled for an endoscopic endonasal posterior septectomy and bilateral sphenoidotomy as an approach for mass resection with abdominal fat graft closure. Based on obesity, history of OSA, and endocrine abnormalities, the patient was deemed to be at increased risk for perioperative complications at his perioperative anesthesia clinic visit. In line with the current ASA practice guidelines [1], the patient was instructed to bring his home nasal BiPAP machine to the hospital for use postoperatively (Table 1).

At the time of surgery, the anesthesia record reflected a Cormack-Lehane Grade II laryngeal view with uneventful intubation using a GlideScope. There were no immediate postoperative complications or desaturations. Although he was neurologically intact, from postoperative day (POD) 1 to 3 the patient suffered repeated episodes of fever, dyspnea,

and tachypnea. Initial workup ruled out several possible causes, including pulmonary embolism. On POD 4, morning rounds showed that the patient had received nasal BiPAP overnight. The nurse on duty had inquired of the patient's family whether he routinely used BiPAP and asked them to bring the machine from the car into the hospital room. The patient subsequently developed acute respiratory failure and confusion. With particular concern for meningitis and presumed sepsis, he was re-intubated and transferred to the intensive care unit (ICU). An urgent computed tomographic (CT) scan of the brain showed an interval decrease in postoperative pneumocephalus (Fig. 1 C, D) as compared with the routine postoperative magnetic resonance imaging (MRI; Fig. 1 A, B); analysis of cerebrospinal fluid (CSF) obtained via lumbar puncture was within normal limits. With reassuring imaging and no other source of infection identified, the patient was weaned from ventilatory support, extubated, and discharged from the ICU to the neurosurgery floor. After this event, the nurses were instructed verbally and in the chart not to apply the patient's BiPAP machine.

On POD 8, the patient had CSF rhinorrhea and a lumbar drain was placed for decompression. Later that same evening (after a witnessed apneic event), he again received nasal

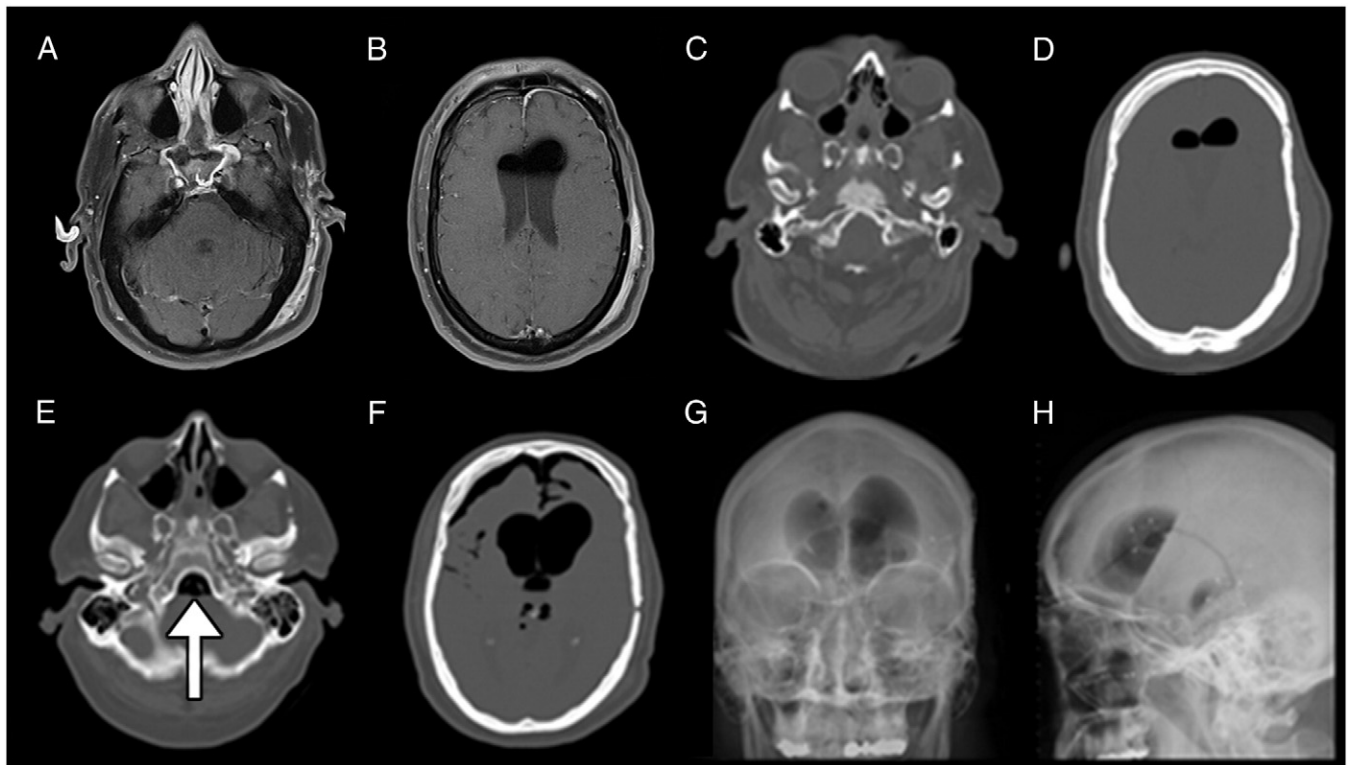


Fig. 1 Postoperative pneumocephalus after bilevel positive airway pressure (BiPAP) use. A. and B. Axial cuts of T1 magnetic resonance imaging (MRI) of the head on postoperative (POD)1 showing normal postoperative pneumocephalus and fluid collection in the lateral ventricles. C. and D. Axial cuts of a computed tomographic (CT) scan of the head on POD 4 showing an interval decrease in pneumocephalus after receiving BiPAP, compared with postoperative MRI. E. and F. Axial cuts of a CT scan of the head after receiving BiPAP again on POD 9 with placement of a lumbar drain earlier the same day, with expanded pneumocephalus at the skull base (arrow in E.) and in the lateral ventricles and anteriorly in F. G. Plain anteroposterior and H. lateral views of radiographic films of the head showing a large amount of pneumocephalus with a large air-fluid interface.

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