Pulmonary complications

see Transthoracic approach.

Atelectasis.

Empyema.

Hypoventilation.

Pleural effusion.

Subarachnoid pleural fistula.

Pneumonia.

Pulmonary embolism.

The incidence of postoperative pulmonary complications was 12.1% following posterior fossa tumor surgery. The predictors for the occurrence of postoperative pulmonary complications were postoperative blood transfusion, lower cranial nerve (LCN) palsy, prolonged ICU stay, and tracheostomy. [1].

Risk factors

Current smoker, lymphocyte count, clotting time, and ASA score were independent risks of pulmonary complications. Machine learning approaches can also provide more evidence in the prediction of pulmonary complications [2].

Reviews

In a review Zhou et al. published in Neurosurgery clinics of North America the most common pulmonary complications following traumatic brain injury (TBI) and spinal cord injury (SCI) — such as neurogenic pulmonary edema, Acute Respiratory Distress Syndrome, Ventilator-Associated Pneumonia, and thromboembolic events — and summarize current understanding of their pathophysiology and treatment, with the goal of guiding early recognition and management to improve outcomes in neurotrauma patients [3)]

 Verdict: **"**A clinically themed PowerPoint stretched into ten pages. No risk. No depth. No new thought.**"**

⚠ Fundamental Flaws No Original Contribution → This is not a review — it's a recitation. The article contributes zero new data, no expert algorithm, and no provocative insight into managing a leading cause of secondary injury in neurotrauma.

Glosses Over Complexity → Terms like "neurogenic pulmonary edema" and "ARDS" are mentioned, but their nuanced diagnostic dilemmas and overlapping features are avoided. The real challenges are not described — only named.

Management Section = Brochure-Level Medicine → The discussion on treatment reads like an ICU handbook summary. No attention to ICU controversies, no comparison of ventilator strategies (e.g., low PEEP vs. high PEEP in neurotrauma), no mention of prone positioning, recruitment maneuvers, or novel interventions.

No Critical Thinking → The authors seem terrified of taking a stance. There's no debate, no evaluation of the evidence quality, no suggestions for changing or questioning existing protocols. This could have been written 15 years ago.

Missed Audience → For neurosurgeons, it's too superficial. For intensivists, it's insultingly basic. For trainees, it's uninspiring.

 Scientific Rigor: Low.

No clear methodology for literature selection

No evaluation of guideline discrepancies

No statistical synthesis or rating of evidence quality

 What the Article Should Have Done Provided a decision-making flowchart for pulmonary events in neurotrauma

Compared competing ICU strategies in high ICP vs. low pulmonary compliance scenarios

Addressed controversies (e.g., when to delay tracheostomy in SCI, permissive hypercapnia vs. brain oxygenation)

Proposed a research agenda or hypothesis about pathophysiology (e.g., the sympathetic surge in neurogenic pulmonary edema)

 Final Judgment: Not a review. A placeholder. It fills pages, not gaps in knowledge. The title promises “challenges,” but the text avoids every real one. It’s a missed opportunity from authors who should know better — and a sad sign of what Neurosurg Clin N Am is becoming: safe, sanitized, and forgettable.

A review of Wen et al. summarizes the common pulmonary diseases and pathophysiology affecting neurocritical care patients and the progress made in strategies of respiratory support in neurocritical care. This review highlights the possible interactions and pathways that have been revealed between neurological injuries and respiratory diseases, including the catecholamine pathway, systemic inflammatory reactions, adrenergic hypersensitivity, and dopaminergic signaling. Pulmonary complications of neurocritical patients include pneumonia, neurological pulmonary edema, and respiratory distress. Specific aspects of respiratory management include prioritizing the brain protection, and the goal of respiratory management is to avoid inappropriate blood gas composition levels and intracranial hypertension. Compared with the traditional mode of protective mechanical ventilation with low tidal volume (Vt), high positive end-expiratory pressure (PEEP), and recruitment maneuvers, low PEEP might yield a potential benefit in closing and protecting the lung tissue. Multimodal neuromonitoring can ensure the safety of respiratory maneuvers in clinical and scientific practice. Future studies are required to develop guidelines for respiratory management in NCC [4].

1)
Hooda B, Chouhan RS, Rath GP, Lamsal R, Bithal PK. Incidence and predictors of postoperative pulmonary complications in patients undergoing craniotomy and excision of posterior fossa tumor. J Anaesthesiol Clin Pharmacol. 2019 Apr- Jun;35(2):254-260. doi: 10.4103/joacp.JOACP_350_17. PMID: 31303718; PMCID: PMC6598580.
2)
Jing X, Wang X, Zhuang H, Fang X, Xu H. Multiple Machine Learning Approaches Based on Postoperative Prediction of Pulmonary Complications in Patients With Emergency Cerebral Hemorrhage Surgery. Front Surg. 2022 Jan 18;8:797872. doi: 10.3389/fsurg.2021.797872. PMID: 35127804; PMCID: PMC8812295.
3)
Zhou X, Bates AH, Hoffer A. Challenges in Pulmonary Management after Traumatic Brain and Spinal Cord Injury. Neurosurg Clin N Am. 2025 Jul;36(3):355-364. doi: 10.1016/j.nec.2025.03.004. Epub 2025 Apr 28. PMID: 40543944.
4)
Wen J, Chen J, Chang J, Wei J. Pulmonary complications and respiratory management in neurocritical care: a narrative review. Chin Med J (Engl). 2022 Apr 5;135(7):779-789. doi: 10.1097/CM9.0000000000001930. PMID: 35671179.