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Letter to Editor

Artificial Intelligence: Very Useful if Used with Care

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Letter to Editor

Dear Editor,

Recently, while searching online for information on Negative Pressure Ventilation (NPV), I was presented via an Artificial Intelligence-generated medical summary with a list of "reasons why NPV is ignored in modern critical care." Among these were the assertions that NPV causes upper airway obstruction with apnea and desaturation in "50% of patients," and that NPV offers no physiological advantage over Positive Pressure Ventilation (PPV) as long as transpulmonary pressure is equivalent. While such claims are increasingly encountered in reviews, lectures and now AI-generated summaries, their scientific basis deserves closer scrutiny. The statement that NPV induces upper airway obstruction in 50% of patients is not supported as a generalizable physiological fact. This figure appears to originate from highly specific experimental contexts most notably sleep studies, sedated subjects or patients with neuromuscular disease where reduced pharyngeal muscle tone predisposes to airway collapse under any form of spontaneous or assisted inspiration [1]. These observations cannot be extrapolated to awake, appropriately positioned patients receiving NPV. Moreover, this claim is difficult to reconcile with the extensive historical experience of negative pressure ventilation during the poliomyelitis epidemics. Iron lung ventilation was used successfully in large numbers of conscious patients over prolonged periods [2]. Had upper airway obstruction with apnea occurred in anything approaching 50% of cases, negative pressure ventilation could not have functioned as a viable or life-saving therapy on such a scale.

Importantly, the tendency for upper airway collapse under negative inspiratory pressure reflects the collapsible nature of the upper airway acting as a Starling resistor; it is not a failure intrinsic to NPV as a ventilatory mode. Modern strategies such as minimal continuous positive airway pressure, interface optimization and patient positioning can readily mitigate this phenomenon without imposing the elevated intrathoracic pressures inherent to PPV. Equally problematic is the recurring claim of physiological equivalence between PPV and NPV based solely on transpulmonary pressure [3,4]. This assumption neglects the fundamentally different distributions of pressure within the thorax. Positive airway pressure elevates mean pleural and intrathoracic pressures, compressing lung parenchyma, promoting atelectasis and contributing to ventilator-induced lung injury [5]. Negative pressure ventilation, in contrast, achieves lung expansion through outward displacement of the thoracic wall while maintaining airway pressure near atmospheric levels. The two modes are therefore not mechanically or biologically interchangeable. That such oversimplified statements are now reproduced verbatim by AI systems is not merely a technological curiosity, but a warning signal. AI does not generate misconceptions; it amplifies prevailing opinions. When those opinions are rooted in repetition rather than physiology, they risk being perpetuated rather than re-examined. We would therefore argue that the persistent marginalization of NPV in modern critical care is sustained less by evidence than by inherited assumptions whether human- or AI-generated and merits renewed evaluation based on physiology, historical experience and contemporary technology [6,7]. Finally, it is worth noting that the present correspondence was drafted fully by an AI-based language model. This is mentioned deliberately. AI systems do not reason physiologically; they synthesize

prevailing narratives from the literature and public discourse. That this letter itself emerged from such a system underscores the central point: AI does not introduce misconceptions, it reflects and amplifies them. The responsibility for examining and correcting those assumptions therefore remains firmly with the scientific community.

Keywords: Artificial Intelligence, Negative Pressure Ventilation

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Authors' Contributions
Authors approved the final version of this paper.

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