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Physiological effects of using humidifiers in invasive mechanical ventilation: a literature review

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Introduction: The airways play an important role in warming and humidifying inspired gas. During inspiration under normal physiological conditions, the air in the upper airway is heated to 37°C and becomes fully saturated at approximately 44 mgH2O per liter. The air passage through the airways that goes from the nose to the terminal bronchioles needs to fulfill three essential functions: humidifying, filtering and warming the inspired air. The use of invasive respiratory mechanical ventilation through an endotracheal tube alters the protective mechanisms of the upper airways, causing a lack of air heating and drying out of the airway mucosa, which can lead to various complications. The lack of air humidification reduces nasal and lung defenses, increasing the risk of damage to the tracheobronchial mucosa due to the dry air inspired. Ciliary dysfunction, inflammation of the respiratory mucosa and low levels of humidification achieved can lead to complications such as mucosal obstruction, decreased functional residual capacity, atelectasis, endotracheal tube occlusion and ventilator-acquired pneumonia. Given the importance of humidification and the damage that its absence can cause, devices are used to artificially meet the needs for humidification and heating of the airways. Carrying out a review of the literature on humidifiers and heaters in mechanical ventilation is extremely important, as it allows a comprehensive and up-to-date understanding of the topic.[1-10] **Objective:** To review the currently used devices for heating and humidification methods effects in The Physiology of Respiration in patients undergoing mechanical ventilation. **Methods:** The literature review was based on scientific journals available in open access electronic databases: PubMed, Web of Science, Scopus, Embase and Bireme. The descriptors used for searching were: humidification and mechanical ventilation. The connector "and" was used for an accurate selection of articles. Original articles, with full text available, in English and Portuguese languages were included. Repeated articles and/or articles that did not address the subject of this research theme were excluded. Inclusion criteria: articles that explain the use of humidification in adults undergoing mechanical ventilation, published from 2013 to 2023, without language barrier. **Results:** The initial research resulted in 410 studies. One hundred and seventy three were duplicated and got excluded. The title and summary of the remaining 237 publications were read and analyzed until 5 articles were selected to compose this review. **Conclusions:** Humidification and heating devices are allies against the loss of the physiological barrier of the airways caused during invasive mechanical ventilation, but it is still not possible to define the superiority of one over the other without associating it with the clinical conditions of each patient.

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