Position is Pertinent:

In ventilated patients, what is the effect of the prone position compared to the fowler's, supine, or lateral positions on patient mortality?

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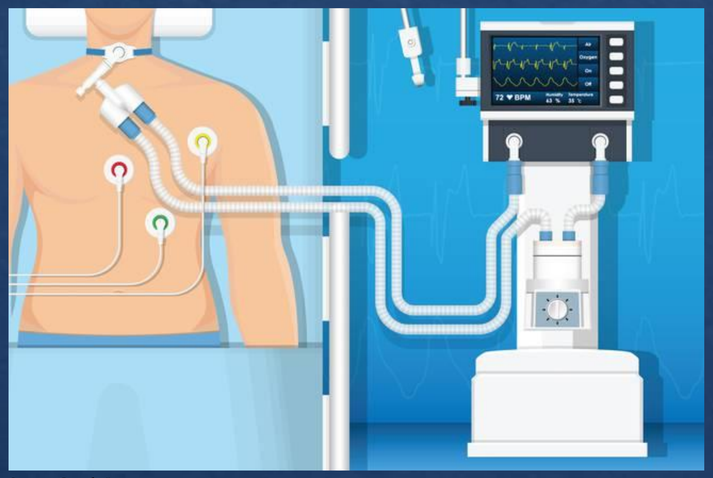
Abstract

Our research focuses on the affect patient positioning has on ventilated patients' mortality. We will be comparing the prone, fowler's, supine, and lateral positions. These findings will help us come to a conclusion on what position is the best to use for ventilated patients.

Introduction

Ventilation is the assistance that is used in patients that are not able to breathe on their own. A Mechanical ventilator is a machine that is used to take over the work of breathing for a patient that is not able to do so. The patient is sedated so that the body is not overworking to breathe, which allows for the machine to help oxygenate the body. They will remain on ventilator assistance until breathing improves and they are able to be weaned off, or they will be taken off of support at the request of their living will or family (Cleveland Clinic, 2019). Patient positioning is pertinent when using a ventilator so that the maximum assistance can be given, and lung function can improve. There are four positions commonly used when positioning patients. These include Fowler's, supine, lateral, and prone positions. In supported Fowler's position, the head of bed is elevated to a 45 to 60-degree angle. However, Fowler's position can include elevation between 30 and 90 degrees. In supine position, the patient is lying flat on their back. In a prone position, the patient is lying on their stomach, face, and chest and their head is turned to one side. In lateral position, or side-lying, the patient lies on their side with the majority of their weight resting on their hip and shoulder (Potter and Perry, 2017, pg. 429).



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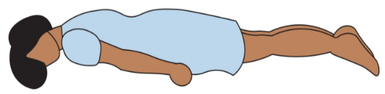
Methods

We used the PICOs tool to formulate our research question. The population is ventilated patients, the intervention is the prone position, the comparison is to the fowler's, lateral, and supine positions, and the outcome is how these positions affect patient mortality. We conducted a search for the resources utilized in this poster by searching through the databases of Longwood University's Greenwood Library website. Databases searched include Cumulative Index to Nursing and Allied Health Literature (CINAHL), Cochrane library, PubMed, and Medline. We also utilized two of our Nursing textbooks and used Google Scholar. We limited the years of our search from 2014 to 2020 to ensure we were including only current and relevant data. Keywords used in searching for resources included ventilation, positioning, mortality, supine, fowler's, prone, and lateral. After retrieving articles and scientific literature, we narrowed down our sources by reading the abstracts of each source and identifying the pieces that fit best with our topic.

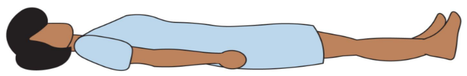
Evaluation & Analysis

The prone, lateral, and Fowler's positions each have positive findings in relation to outcomes for the patient and decreased mortality. However, each of these positions allows for different ventilation capabilities to be enhanced. We did not find the supine position to be of benefit to ventilated patients. When looking at the prone, lateral, and Fowler's positions, lateral positioning has the least amount of change compared to supine. We believe this is because when in the lateral position, one lung has more room for expansion than the other. In regard to the prone position, Bloomfield, Noble, and Sudlow (2015), found that the prone position resulted in lower short-term and long-term mortality rates than the supine position. Prone positioning has also been found to improve oxygenation, increase drainage of airway secretions, reduce stress on the alveoli, and allow the use of less positive end-expiratory pressure (PEEP) (Marini, Josephs, Mechlin, & Huford, 2016; Henderson, Griesdale, Dominelli, & Ronco, 2014). Regarding the lateral position, when compared to the supine position, there is less incidence of fever, less time needed on ventilation, and a shorter intensive care unit stay (Hewitt, Bucknall, & Faraone, 2016). In support of the Fowler's position, studies have found that this position can increase oxygenation, decrease the incidence of ventilator associated pneumonia, and improve end-expiratory lung volumes (Spooner, Corley, Sharpe, Barnett, Caruana, Hammond, & Fraser, 2014). The Fowler's position has also been found to reduce mortality in mechanically ventilated patients (Wang, Li, Yang, Tang, Yuan, Deng, & Sun, 2016). It is said to be an "easy, effective, and safe treatment" for ventilated patients (Van Beers & Vos, 2014). In regard to the supine position, when compared to all other positions it's effectiveness in all aspects is not as efficient. According to Spooner et al. (2014), "supine positioning should be avoided where possible".



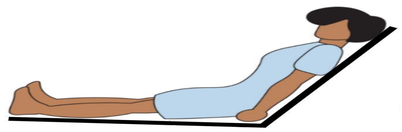
Prone

- Ventilation is improved due to changes in pleural pressure (PPL) and the amount of lung atelectasis present
- Oxygenation is improved in the prone position compared with the supine position
- Improvements in oxygenation were often preserved after returning to the supine position (suggesting that once alveoli have reopened, they are more likely to stay open)
- Decrease in lung tissue strain
- Cost effective treatment with proper staffing and patient improvement
- May worsen chest wall compliance
- Airway obstruction
- ET tube dislodgement/ occlusion
- Hypotension and arrhythmias
- Loss of venous access
- Facial and airway edema
- Greater need for paralysis or sedation
- Unstable vertebral fractures and increased intracranial pressure are regarded as contraindications
- Increased pressure sores



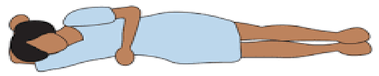
Supine

- More likely to develop complications, including ventilator associated pneumonia
- Decreased lung compliance
- Increased compliance of the abdomen
- Increased airway resistance
- Functional Residual Capacity decreases



Fowler's

- Improvement of functional residual capacity (FRC), reduction in the work of breathing, and improvement of oxygenation compared to supine
- Increase in end-expiratory lung volume
- Reduces the risk of ventilator associated pneumonia
- Increased SPO2 levels
- Decreased CO2 levels



Right Lateral Recumbent

Left Lateral Recumbent

- Airway resistance and lung and chest wall elastance increase with opposite findings to the nondependent lung as compared to supine
- Functional residual capacity (FRC) is larger in the opposite lung of the side the patient is lying on
- Decreased respiratory compliance
- Decreased lung compliance
- Decreased chest wall compliance
- No change in oxygenation

Source: Google Images

Conclusion & Implications for Future Research

Changing position in ventilated patients is important because it helps clear respiratory secretions, prevents complications and infection, increases oxygenation, and improves lung volume (Mezidi & Guérin, 2018). According to Mezidi and Guérin (2018), "the change in position can affect respiratory mechanics by changing resistance and/or compliance of the respiratory system and its lung and chest wall components, and by changing static lung volume and either its components and regional distribution". After reviewing multiple studies and comparing findings, we believe that a combination of positions is best for ventilated patients and would be sufficient to maintain maximum lung function and decrease mortality. We believe a rotation between the Fowler's, prone, and lateral positions is the best practice. The patient's condition, including respiratory and other body systems, would also need to be taken into consideration. According to Hewitt, Bucknall, & Faraone (2016), patient positioning may be changed due to respiratory or haemodynamic instability in the patient. Further research is needed to examine the effect of frequent changes in position on the lungs and other body systems. Research is also needed to determine how frequent these changes in position should occur.

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