

Title:

The Use of Prone Positioning in Acute Respiratory Distress Syndrome: An Evidence Based Review

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Session Title:

Rising Stars of Nursing Invited Posters - Group 2

Slot (superslotted):

RSG STR 2: Friday, September 26, 2014: 10:00 AM-10:30 AM

Slot (superslotted):

RSG STR 2: Friday, September 26, 2014: 11:45 AM-1:00 PM

Slot (superslotted):

RSG STR 2: Friday, September 26, 2014: 3:00 PM-3:30 PM

Keywords:

Acute Respiratory Distress Syndrome (ARDS) and Prone Positioning

References:

Beitler, J., Shaefi, S., Montesi, S., Devlin, A., Loring, S., Talmor, D., & Malhotra, A. (2014). Prone positioning reduces mortality from acute respiratory distress syndrome in the low tidal volume era: a meta-analysis. *Intensive Care Medicine*, 40(3), 332-341. doi:10.1007/s00134-013-3194-3 Gattinoni, L., Carlesso, E., Taccone, P., Polli, F., Guérin, C., & Mancebo, J. (2010). Prone positioning improves survival in severe ARDS: a pathophysiologic review and individual patient meta-analysis. *Minerva Anestesiologica*, 76(6), 448-454. Guérin, C., et al. (2013). Prone positioning in severe acute respiratory distress syndrome. *The New England Journal of Medicine*, 368(23), 2159-2168. doi: 10.1056/NEJMoa1214103 Guérin, C. (2011, June). Benefits of Prone Positioning during ARDS. SRLF 1st International Conference. Lecture conducted from Réanimation Médicale Hôpital de la Croix Rousse Université de Lyon, France. Kopterides, P., Siempos, I., & Armaganidis, A. (2009). Prone positioning in hypoxemic respiratory failure: meta-analysis of randomized controlled trials. *Journal Of Critical Care*, 24(1), 89-100. doi:10.1016/j.jcrc.2007.12.014 Morrell, N. (2010). Prone positioning in patients with acute respiratory distress syndrome. *Nursing Standard*, 24(21), 42-45. Protti, A., Chiumello, D., Cressoni, M., Carlesso, E., Mietto, C., Berto, V., & ... Gattinoni, L. (2009). Relationship between gas exchange response to prone position and lung recruitability during acute respiratory failure. *Intensive Care Medicine*, 35(6), 1011-1017. doi:10.1007/s00134-009-1411-x Sud, S., Friedrich, J., Taccone, P., Polli, F., Adhikari, N., Latini, R., & ... Gattinoni, L. (2010). Prone ventilation reduces mortality in patients with acute respiratory failure and severe hypoxemia: systematic review and meta-analysis. *Intensive Care Medicine*, 36(4), 585-599. doi:10.1007/s00134-009-1748-1 Taccone, P., Pesenti, A., Latini, R., Polli, F., Vagginelli, F., Mietto, C., & ... Gattinoni, L. (2009). Prone Positioning in Patients With Moderate and Severe Acute Respiratory Distress Syndrome. *JAMA: Journal Of The American Medical Association*, 302(18), 1977-1984

Learning Activity:

LEARNING OBJECTIVES	EXPANDED CONTENT OUTLINE	TIME ALLOTTED	FACULTY/SP EAKER	TEACHING/LEARNING METHOD	EVALUATION/FEEDBACK
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Example	Example	Example	Example	Example	Example
Critique selected definition of the term, "curriculum"	Definitions of "curriculum" Course of study Arrangements of instructional materials The subject matter that is taught Cultural "training" Planned engagement of learners	20 minutes	Name, Credentials	Lecture PowerPoint presentation Participant feedback	Group discussion: What does cultural training mean to you?
The learner will be able to discuss evidence related to prone positioning and its impact on 30-day mortality in patients with varying degrees of ARDS.	A review of current evidence reveals that overall positioning does not improve 30-day mortality in any statistically significant way; however, all-cause mortality	Time allotted	Nicholas Cress, BCSN	Poster Presentation	Discussion

	is approximately 10% lower in patients with the most severe cases of ARDS who are prone. Severe cases of ARDS may be defined as those with a baseline PaO ₂ /FiO ₂ less than 100 mmHg.				
The learner will be able to identify possible risk and benefits of prone positioning for patients with ARDS.	Benefits: Decreased instances of ventilator-induced lung injury or ventilator acquired pneumonia. Risks: dislodgement of tubes and equipment (i.e. chest tubes, ventilator tubing,	Time allotted	Nicholas Cress, BCSN	Poster Presentation	Discussion

		and central and arterial lines), new or worsenin g pressure ulcers, airway infection, obstructio n of endotrach eal tube, and need for further sedation or muscle paralysis.				
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Abstract Text:

Purpose

The purpose of this poster is to review current evidence on the effects of prone positioning on 30-day survival of patients with acute respiratory distress syndrome (ARDS)

Background

ARDS is a form of acute lung injury (AKI) characterized by non-cardiogenic pulmonary edema resulting in stiff, non-compliant alveoli and impaired gas exchange from either direct or indirect lung injury.

Research estimates that 20 to 75 per every 100,000 persons each year are affected by acute lung injury (ALI) such as ARDS. ARDS can have mortality rates as high as 90%. This complex condition is further associated with high rates of morbidity and increased healthcare costs.

No current standardized treatment guidelines exist for ARDS. Treatment may involve intubation, mechanical ventilation using low tidal volumes and increased peak end-expiratory pressure (PEEP), fluid management, systemic support, pharmacological intervention, kinetic therapy, and most notably prone positioning.

Therapeutically placing patients with ARDS in the prone position was first proposed by Douglas, et al. in 1977. Prone positioning is believed to exert its effect by utilizing gravity and the weight of the lung itself, which is 2-3 times greater in patients with ARDS, to increase elasticity of the chest, shift pressure from the heart to the lungs, and alter distribution of alveolar inflation and make use of the greater number of alveoli in dorsal lung regions.

Methods

A search of MEDLINE and the Cumulative Index to Nursing and Allied Health was conducted utilizing the following search strategies: (prone OR prone positioning) AND (ARDS OR respiratory distress) AND (mortality OR survival). Obtained articles were limited to those sources published within the last five years, peer-reviewed, written in English, and that excluded those that addressed ARDS in a single patient population (i.e. secondary to burns, trauma, etc.).

The search yielded seven studies and one expert opinion. The sources were then reviewed by the author and data including: the title, author(s), year of publication, the study design, the number of participants, the mortality rates, factors directly impacting mortality rates, and the occurrence of complications was compiled into a table (Appendix, Table 1)

Each source was then evaluated for their strength as evidence using the Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions.

Current Evidence

A review of current evidence reveals that *overall* prone positioning does not improve 30-day mortality in any statically significant way; however, all-cause mortality is approximately 10% lower in patients with the most severe cases of ARDS who are prone. Severe cases of ARDS may be defined as those with a baseline PaO₂/FiO₂ less than 100 mmHg.

Strong evidence also suggests prone positioning in severe cases may reduce incidences of ventilator-induced lung injury (VILI) and ventilator acquired pneumonia (VAP) which could greatly impact mortality and morbidity.

Evidence reveals as with any treatment prone positioning holds risks that must be weighed against potential benefits. Risks include dislodgement of tubes and equipment (i.e. chest tubes, ventilator tubing, and central and arterial lines), new or worsening pressure ulcers, airway infection, obstruction of endotracheal tube, and need for further sedation or muscle paralysis; however, evidence is inconsistent as to what rate these risks may occur. Evidence does indicate that fewer adverse effects are likely to occur in ICUs where prone positioning has been implemented and where staff is familiar with equipment.

A final factor that may impact mortality is evidence suggesting that prone positioning is not being implemented soon enough for patients with ARDS and cites several obstacles including: late recognition and diagnosis, discrepancy over the effectiveness of prone positioning among healthcare providers (HCP), and failure of nursing staff to recommend prone positioning due to perceived difficult and risk or insufficient knowledge.

Recommendations

First, overcome obstacles that prevent implementing prone positioning for patients with serve ARDS, including: forming a consensus among healthcare providers on a more standardized treatment plan for ARDS that utilities the latest and ongoing research and educating HCP and nurses to promote early recognition of ARDS and clear misconceptions about prone positioning.

Second, implement prone positioning only for the most severe cases of ARDS (baseline PaO₂/FiO₂ less than 100 mmHg) and ensure care is provided by a well-equipped healthcare team including trained and experienced ICU staff.

Third, continue to further research interventions for ARDS including prone positioning and factors related to prone positioning, such as potential risk and benefits.

