Effect of Prone Positioning on the Survival of Patients with Acute Respiratory Distress Syndrome

by

Chelsea Armstrong

University at Buffalo

A Capstone project proposal submitted to the

School of Nursing,

The State University of New York

In partial fulfillment of the requirements for the degree of Doctor of Nursing Practice

September 1st, 2018
DNP Capstone Project Approval Form

This is to certify that Chelsea Armstrong (Name of Student) successfully defended his/her Capstone project entitled:

Effect of Prone Positioning on the Survival of Patients with Acute Respiratory Distress Syndrome

on August 6, 2018 (Date)

Capstone Faculty Advisor (Required) Nancy Campbell-Holder, PhD, FNP, NP-C, CARN-AP, FAAN, FIAAN, FAAN

(Required)

Committee Member 1* (Typed Name) (Signature)

Committee Member 2* (Typed Name) (Signature)

Committee Member 3* (Typed Name) (Signature)

*If applicable
# TABLE OF CONTENTS

- DNP Approval Capstone Form .......................................................... 4
- Abstract .............................................................................................. 5
- Acknowledgements .............................................................................. 6
- Introduction ......................................................................................... 7
- Purpose of Study .................................................................................. 7
- Mission, Goals, & Objectives of Policy .............................................. 7
- Targeted Population ............................................................................ 8
- Stakeholders and Stakeholder Roles .................................................. 8
- Summary of Supportive Literature ...................................................... 10
- Gap in Knowledge ............................................................................... 11
- Role of the APN .................................................................................. 12
- Literature Review ................................................................................ 13
- Theoretical Framework ........................................................................ 15
- Methods, Implementation, & Evaluation ........................................... 16
  - Table 1: Data Collection Example ................................................... 18
- Ethics .................................................................................................. 18
- Statistical Analysis ............................................................................. 19
- Results ................................................................................................. 20
  - Table 2: Results of Data Collection ................................................ 21
  - Table 3: Chi-square Analysis ........................................................... 24
  - Table 4: Independent Samples T-test Analyses for Potential Survival Factors – Age and Number of Comorbidities ............................................. 24
PRONE POSITIONING

Discussion and Recommendations...............................................................25

Strengths and Limitations.................................................................26

Conclusion.............................................................................................27

DNP Outcomes.......................................................................................27

Essentials of Doctoral Education for APN ............................................28

References..............................................................................................29

Appendix A: Literature Review Matrix....................................................33

Appendix B: Timeline of Study.................................................................36

Appendix C: University at Buffalo IRB Approval........................................37

Appendix C: Catholic Health Systems Official IRB Approval Letter..................40
ABSTRACT

**Problem Under Investigation:** Acute respiratory distress syndrome (ARDS) is a pulmonary disorder associated with significant mortality. Placing a patient facedown, or prone positioning, is a new protocol for ARDS treatment at an urban hospital. Outcomes of this policy have not been evaluated.

**Objective:** To determine effectiveness of new policy in increasing survival rates for ARDS patients.

**Background Literature:** Previous studies have produced conflicting results regarding the benefits of prone positioning for ARDS.

**Theoretical Framework:** The Conceptual Model for Nursing Health Policy focuses on program evaluation, which is the impetus for this study.

**Project Methods:** Quasi-experimental retrospective chart review at a single center, with a sample size of 20 patients with an ARDS diagnosis. Survival rates of pre-policy (n=10) and post-policy (n=10) groups were compared.

**Data Analysis:** Chi-square was used to analyze the expected versus observed number of deaths for patients placed in the prone position versus supine and frequencies were not statistically significant.

**Results:** Consequently, differences in the two protocols could not be determined by this study due to a p-value greater than .05.

**Conclusion:** Continued research is needed to assist in the advancement of closing the gap in knowledge related to best practice treatment of ARDS.

**KEY WORDS:** ARDS OR acute respiratory distress syndrome AND prone OR prone positioning.
Acknowledgements

Foremost, I would like to express my sincere gratitude toward my Capstone advisor, Dr. Campbell-Heider. Your continuous patience and immense knowledge was key to my success and I thank you for that.

Next I would like to thank my parents. You both have provided incredible support and love throughout my entire schooling. I would not be nearly as successful as I am without you, and for that I will be forever grateful.

Lastly, I would like to thank three of my dearest friends—Victoria Howard, you have been by my side since the first day of nursing school, and throughout graduate school. Words cannot describe how blessed I feel to have you in my life. Isabel Mendoza, your spirit and encouragement is incomparable to any other. Thank you for being my number one fan throughout this journey. And finally Madeline Krautsak, to whom I will never be able to repay the unremitting guidance you provided. I have and always will admire your remarkable intelligence, and willingness to help others beyond expectation. I am endlessly thankful to you all.
Acute respiratory distress syndrome (ARDS) occurs after an insult to the lungs resulting in inadequate lung expansion and decreased oxygen perfusion (Koh, 2017). It is associated with significant mortality ranging from 20%-40%, affecting approximately 119,000 people in the United States annually; it requires prompt, aggressive treatment in order to avoid further progression (Drahnak & Custer, 2015). The standard of care for moderate to severe ARDS generally includes mechanical ventilation with volume control, sedation, and the use of a neuromuscular blocking agent. However, there is an additional treatment gaining popularity that has been shown in some studies to significantly reduce the mortality of this illness (Bourenne et al., 2017). This treatment is known as proning, or the act of placing a patient face down per hospital policy (typically alternating between 16 hours in prone and four hours in supine). This process is repeated until the patient’s medical status improves to desired level (Guerin, 2017).

**Purpose of Study**

Proning patients who are experiencing moderate to severe ARDS has been an active policy at a few local hospitals. Specifically, such a policy has recently been implemented in January of 2018 at an urban hospital with a large intensive care unit (ICU). In order to evaluate the effectiveness of this new program, a quasi-experimental design was used through a retrospective chart review to answer the following question:

❖ Among adult patients who suffer from moderate to severe acute respiratory distress syndrome (ARDS), are there improved survival rates for those who are prone per new hospital policy, as compared to those who were not prone per previous hospital policy.

**Mission, Goals, & Objectives of Policy**

The mission as stated on the “Prone Positioning in Critical Care for the Patient with Severe ARDS” policy is to create a protocol for early prone positioning in patients with
moderate to severe ARDS (Parisi, 2016). As previously noted, a patient who is proned is placed face-down for a predetermined amount of time; per policy this cannot be initiated until an order is placed by the provider (Guerin, 2017; Parisi, 2016). In order to safely prone a patient, a team of at least three to four members is needed. This team includes a respiratory therapist at the head of the bed to protect the patient’s mechanical airway. The respiratory therapist is also the team leader who is responsible for coordinating the steps of the procedure. There are then one to two members on each side of the bed who initiate the actual turning of the patient. A provider must also be in the room to monitor the process and assist if necessary. Once proned, the patient will remain in this position for 16 hours before being returned to the supine position for no more than 4 hours, after which the patient is once again proned. This process continues until the patient reaches the desired level of medical improvement. The ultimate goal of this program is improve oxygenation and survival in acute respiratory distress syndrome (Parisi, 2016).

Targeted Population

The targeted population consists of people with an ARDS diagnosis. The main criteria of an ARDS diagnosis requires a ratio between the partial pressure arterial oxygen (PaO2) and the fraction of inspired oxygen (FiO2) that equals a value less than 150 mmHg (Guerin et al., 2013). This ratio suggests that the amount of oxygen inspired and that which makes it into the bloodstream are extremely disproportionate (Guerin et al., 2013). Per the policy, the patient must also have be mechanically ventilated for less than 36 hours, and requiring a positive end-expiratory pressure (PEEP) of greater than or equal to 5 cm H2O (Parisi, 2016).

Stakeholders and Stakeholder Roles

The stakeholders for the prone positioning program include the critical care providers, nurses, respiratory therapists, patients suffering from ARDS, the caregivers and/or family of the patients,
PRONE POSITIONING

hospital administration, and the patients’ insurance companies.

The critical care providers are a very important piece to the success of this program. They must first be able to identify acute respiratory distress syndrome, and then use the policy to assist in making the decision of whether or not a patient requires proning. If prone positioning is indicated, the provider then places an order for the nurse to initiate the process, remains in the room to monitor and assist as needed throughout the position change.

The critical care nurses and respiratory therapists are the team members responsible for the actual proning of the patient and ensuring the patient’s safety throughout the act. The respiratory therapist is considered the team leader throughout the act of proning, because he or she is at the head of the bed, controlling the patient’s artificial airway. The nurses not only assist in turning the patient, but are also the staff members who are responsible for monitoring the patient’s stability while proned, and identifying any complications to be reported to the providers.

The patients suffering from acute respiratory distress syndrome and the caregivers and/or family members of these patients are all interested in the patient’s health improving and his or her ultimate survival. The patient deserves to receive the most effective treatment for his or her condition. This program evaluation will assist in determining whether prone positioning is in fact the most effective treatment.

Because the hospital administration oversees all patient care, their interest in this policy directly relates to patient care and patient satisfaction. Furthermore, administration must approve all new policies and programs being used within the hospital. They were essential stakeholders to have the program implemented in the first place, and will have marked interest in the investigation into its effectiveness.
Lastly, per Centers for Medicare & Medicaid Services (2018), the goals of insurance companies are to lower costs of care, improve patient experiences, and address population health. With this being said, the effectiveness of prone positioning patients experiencing ARDS directly affects insurance companies and the reimbursements they provide to the hospital based on the patient’s results.

Of these stakeholders, the main data source is the hospital’s administration. In order to complete a retrospective chart review and collect the data necessary to evaluation the survival rate of patients with ARDS pre and post implementation of the prone positioning policy, hospital administration must grant access to the medical records department. Once access is granted to medical records, the charts can be reviewed based on billing codes.

Prior to the policy being implemented, the critical care providers, nurses, and respiratory therapists were trained on the proning procedure. Once the evaluation of the policy is completed through the retrospective chart review, a white paper will be provided to hospital administration and the critical care team in order for these stakeholders to review the data. While the focus is on one implication, survival rates, this evaluation has the possibility of stimulating further research into the topic of study.

**Summary of Supportive Literature Review**

Prior studies have identified many benefits of prone positioning for patients in moderate to severe acute respiratory distress syndrome. These benefits include decreased mortality (Guerin et al., 2013; Munshi et al., 2017), increased oxygenation (Scholten, Beitler, Prisk, & Malhotra, 2017), increased perfusion (Kallet, 2015), and improved mechanics of the chest wall (Beitler et al., 2014).
PRONE POSITIONING

In a randomized control trial by Guerin and colleagues (2013), early proning of a patient in moderate to severe ARDS not only reduced mortality, but also increased the likelihood of early extubation. Similarly, a meta-analysis completed by Lee, Bae, Lee, and Cho (2014) demonstrated decreased mortality rates of patients with ARDS due to the increased efficacy of ventilation being in the prone position. In addition, Xin and colleagues (2018) completed a randomized control trial using rats that also concluded with the increased survival rates due to decreased progression of lung injury in the prone position.

While there is data depicting increased survival rates resulting from the use of prone positioning for an ARDS diagnosis, similar studies have been completed that yielded conflicting results. A systematic review and meta-analysis performed by Sud and colleagues (2014) concluded that while there was some proof of decreased mortality in ARDS patients receiving lung protective ventilation when in the prone position, there was an equal amount of data that was unclear regarding the significance of proning. Arias, Pokharel, Papathanassoglou, and Norris (2017) also completed a systematic review of ten articles involving 1,891 patients with an ARDS diagnosis. The conclusion of this review stated that while there were oxygenation improvements for these patients, improvement in mortality was unclear.

**Gap in Knowledge**

Even with current literature demonstrating the benefits of integrating the prone position into the standard treatment of care for those with a moderate to severe acute respiratory distress syndrome diagnosis, there is also research that suggests otherwise. Because this syndrome is associated with such significant mortality, more studies need to be executed, and further research needs to be completed in order to close this gap in knowledge to ultimately make prone positioning a standard of care.
PRONE POSITIONING

The main barrier to making this procedure a standard of care is the very fact that current literature has inconclusive results when it comes to the effectiveness of proning on decreasing mortality of patients with moderate to severe ARDS (Sud et al., 2014). There are significant risk factors to proning a patient, which is the reason providers are looking for stronger evidence that the benefits outweigh the risks (Drahnak & Cluster, 2015). These risks include “adverse airway events, displacement of the endotracheal tube, selective intubation or accidental extubation, obstruction of the endotracheal tube, pressure sores or facial edema, and dislodgement of catheters or tubes” (Drahnak & Cluster, 2015, p. 35). Furthermore, cardiopulmonary arrest is a main complication of acute respiratory distress syndrome (Oliveira et al., 2016). If a patient in the prone position were to cardiac arrest, compressions cannot be initiated while face down; the patient would need to be returned to the supine position in order to begin. The process of both proning and returning to supine is quite involved in order to ensure both patient and staff safety, and in return is not a quick maneuver (Oliveira et al., 2016). Compressions would ultimately be delayed in a proned patient. This being said, if the provider is going to risk such a development and proning is going to become a standard of care for ARDS patients, there needs to be conclusive data supporting the benefits of this positioning.

Role of the APN

A condition such as acute respiratory distress syndrome that is associated with such significant mortality, is one that an advanced practice nurse must be able to recognize while working within any department of acute care. As an advanced practice nurse working within critical care, this program evaluation of prone positioning will assist in closing the gap in knowledge as to explore whether this maneuver should be a standard of care for the APN to initiate for ARDS patients. If it becomes an evidenced-based first line treatment, the APN should
also be well-versed in the procedure itself and be able to educate other staff members who take part in the positioning.

Not only does the APN need to be able to recognize the condition and know when proning would be beneficial, APN’s within the acute care setting are known to have “a positive impact on patient experience, outcomes and safety. They improve(d) staff knowledge, skills, competence as well as enhancing quality of working life, distribution of workload and team working” (McDonnell, Goodwin, Kennedy, Hawley, Gerrish, & Smith, 2015, p. 798). It is evident that the advanced practice nurse has an important role in both the care of the patient, and leadership among the patient care team.

**Literature Review**

A literature search was conducted utilizing CINAHL, MEDLINE, and PubMed. Search terms included: ARDS OR acute respiratory distress syndrome, AND prone OR prone positioning. Initial limiters to search included: English language and research articles published within the past 5 years. This time frame was extended in following searches in order gather further data. If the articles did not focus on ARDS, they were excluded. Appendix A represents a Literature Matrix based on the comprehensive search for this study.

Prior studies have identified many benefits of prone positioning for patients in moderate to severe acute respiratory distress syndrome. These benefits include decreased mortality (Guerin et al., 2013; Munshi et al., 2017), increased oxygenation (Scholten, Beitler, Prisk, & Malhotra, 2017), increased perfusion (Kallet, 2015), and improved mechanics of the chest wall (Beitler et al., 2014).

In a randomized control trial by Guerin and colleagues (2013), early proning of a patient in moderate to severe ARDS not only reduced mortality, but also increased the likelihood of
PRONE POSITIONING

early extubation. Mancebo and colleagues (2006) also completed a randomized control trial which resulted in evidence of decreased mortality in the proning group when proning was initiated early. Similarly, a meta-analysis completed by Lee, Bae, Lee, and Cho (2014) demonstrated decreased mortality rates of patients with ARDS due to the increased efficacy of ventilation being in the prone position. Xin and colleagues (2018) performed a randomized control trial using rats that also concluded with the increased survival rates due to decreased progression of lung injury in the prone position.

While there is significant data expressing increased survival rates resulting from the use of prone positioning for an ARDS diagnosis, similar studies have been completed that concluded differently. A systematic review and meta-analysis performed by Sud and colleagues (2008) could not provide significant evidence of decreased mortality through the proning of ARDS patients. Sud and colleagues (2014) also concluded that while there was some data indicating decreased mortality in ARDS patients receiving lung protective ventilation when in the prone position, there was an equal amount of data that was unclear on the significance of proning itself. Arias, Pokharel, Papathanassoglou, & Norris (2017), completed a systematic review of ten articles involving 1,891 patients with an ARDS diagnosis, and Gattinoni and colleagues (2001), completed a randomized control trial of 304 patients. Both of these studies concluded that while there were oxygenation improvements for these patients, improvement in mortality was unclear. Lastly, meta-analyses described by Beitler and colleagues (2014) and Alsaghir and colleagues (2008) concluded that the survival benefit of proning did not rise to the level of statistical significance in either review.

As previously mentioned, even with current literature demonstrating the benefits of integrating the prone position into the standard treatment of care for those with a moderate to
PRONE POSITIONING

severe acute respiratory distress syndrome diagnosis, there is a larger amount of research that suggests otherwise. More studies need to be executed and further research needs to be completed in order to close this gap in knowledge.

Theoretical Framework

The Conceptual Model for Nursing Health Policy is the only nursing model that specifically focuses on policy or program analysis and evaluation. This is a multifactorial framework in which assists in analyzing policies in order to assess the effectiveness and quality of the program, including the services being provided (Russell & Fawcett, 2005). There are four different levels to this policy:

Level 1—efficacy of nursing practice processes on the health outcomes of individuals, families, groups, and communities; Level 2—effectiveness of nursing practice processes and effectiveness and efficiency of health care delivery systems; Level 3—equity of access to effective and efficient nursing practice processes and efficient nursing practice delivery systems, and equity in distribution of costs and burdens of care delivery; Level 4—justice and the social changes and market interventions addressing equity (Russell & Fawcett, 2005, p. 319).

For the purpose of this project, the evaluation of the prone positioning policy would not have to go any further than level 1. While the identification of ARDS and ordering of proning is not the responsibility of the nursing staff, the program is being evaluated with a focus on the health outcomes of the individuals affected by the policy. Furthermore, the identification of ARDS and ordering of proning is the responsibility of the provider, which includes the APN.
It would be beneficial for future studies to evaluate levels 2-4 of this program. For example, being that level 2 focuses on the health care delivery system, looking into time invested in training the staff on the proning procedure along with other responsibilities of the staff while a patient is proned would assist in showing the effort put forth by the health care system. Too little of an effort may be affecting proper nursing practice and patient outcomes. While the access to care that level 3 and 4 focus on may not be as much of an issue because proning is done to all patients within critical care that meet the criteria, it may be of benefit for the cost and burdens of care of proning to be explored in order to assess whether there are any burdens that may be alleviated.

Methods, Implementation, & Evaluation

In order to evaluate the effectiveness of this new program, a quasi-experimental design was used through a retrospective chart review. This chart review provided the necessary data to examine the relationship of the proning policy change to survival rates in the targeted ARDS patients. Inclusion criteria for the subjects included an ARDS diagnosis, intubation, sedation, and the use of a neuromuscular blockage agent; exclusion criteria of the subjects includes transfer to higher level of care/transfer out of hospital to another facility and patient contraindication to prone positioning.

The main and initial investigation involved the comparison of survival rates between patients with an ARDS diagnosis prior to the prone policy implementation, to survival rates post policy implementation. The independent variable in this study was the act of proning those patients with a diagnosis of acute respiratory distress syndrome. Being that the patient is either proned or not proned, this is a nominal measurement (Polit, 2013). The secondary investigation
involved the assessment of correlation factors, specifically age and number of comorbidities, which can impact survival status. As defined by Vidal and Santos (2017), comorbidities were considered any chronic diseases the patients were diagnosed with prior to the development of acute respiratory distress syndrome. A summary of these comorbidities is displayed in Table 2. The mean age and mean number of comorbidities were calculated and compared between both the pre and post-policy groups in order to assess whether these factors may have affected survival rates. In both the pre and post policy groups.

Data analysis was completed using both the chi-square and the independent samples t-test. Because the initial variables were nominal measures, the chi-square test was used to determine if there was any significant difference in survival rates between the pre and post policy groups. The t-test was used in the secondary analysis in order to compare the mean age and mean number of comorbidities of those in the pre-policy group, to the mean age and mean number of comorbidities of those in the post-policy group (Polit, 2013).

After IRB approval was granted, medical records were accessed. Clerical staff of the medical records department were provided with the ICD-10-CM code for acute respiratory distress syndrome, along with a timeframe. With this information, the medical records’ staff provided the investigator with all of the medical record numbers within this search. These charts were then directly accessed, and the appropriate data were collected.

Data analysis was completed using the statistical software known as the Statistical Package for the Social Sciences (SPSS). Researchers use this relatively simple software for both data management and analysis. SPSS has the ability to run all basic and multivariate testing, including the independent samples t-test and chi-square test, which are the two analytical tests used for this study (SPSS Tutorials, 2018). Table 2 shows how the data was organized. This data
collection template was modified from *Chart Review Guidance and Instructions* created by Northwestern University (Northwestern University, n.d). As this chart was not altered in any way throughout data collection, the consistency translates to reliability (Phelan & Wren, 2006). It also includes the aspects needed to collect the data necessary to create a conclusion for this evaluation (survival rates), showing its validity (Phelan & Wren, 2006). See data collection table below, in Table 1.

Table 1

*Data Collection Example*

<table>
<thead>
<tr>
<th>Patient*</th>
<th>Age</th>
<th># of Comorbidities</th>
<th>Position (Supine/Prone)</th>
<th>Alive at Discharge (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#101</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#102</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#201</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>#202</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Medical record numbers will not be used, rather patients will be organized using a custom numbering system. Pre-policy implementation patients will be assigned to group number one and post policy implementation patients (those who were prone) will be assigned to group number two. Cases will be assigned a number according to the order they are accessed.

**Ethics**

“The principal goal of the IRB is to protect human subjects” involved in research, whether intervention is actually taking place, or if intervention is not taking place but there will be analysis of data based on human subjects (Enfield & Truwit, 2008, p. 1330). Due to the
retrospective nature of the current study, waiver of consent was granted by the IRB. Still, ethical guidelines necessitate that confidentiality and anonymity of the human subjects the data is based on will be respected. Patient charts were reviewed through the medical records department.

These records remained on the secure server of the hospital. The medical records database is password protected, any patient identifiers were removed as data was collected, and data was stored within Microsoft Excel, which was then saved onto an encrypted flash drive, not the computer itself. Medical record numbers were not used; rather, patients were organized using a custom numbering system. Pre-policy implementation patients were assigned to group number one and post policy implementation patients (those who were proned) were assigned to group number two. Cases were assigned a number according to the order they were accessed. This information was saved on an encrypted flash drive, only accessible to the PI. Being that it is encrypted, a password was required in order to access the information on the flash drive. There will be no other participants within the data collection process, only the PI, and no paper files. The flash drive was attached to a lanyard and kept in a personal locked safe whenever it was not being used.

When it was time for data analysis, the flash drive containing the data were hand delivered by the PI to a University at Buffalo approved statistician who was given the password to the encrypted flash drive. All HIPAA regulations were followed during this process to protect the identity of all patients.

**Statistical Analysis**

As previously mentioned, for the initial investigation into survival rates, the independent variable in this study was the act of proning patients with a diagnosis of acute respiratory distress syndrome (ARDS). Chi-square provides the information necessary to estimate how similar what
one observes is to what one would expect by chance alone (Salkind, 2011). The closer to zero that the chi-square value is, the more likely the value occurred by chance, and therefore has less significance (Salkind, 2011). As for the value used to evaluate actual significance of the chi-square testing, p-value of < .05 is needed to be considered statistically significant (Salkind, 2011). Lastly, a narrow confidence interval is needed in order to show significance within the value (Salkind, 2011).

For the investigation into other factors, two independent sample t-tests were used to calculate and compare the mean age and the mean number of comorbidities between the pre and post-policy groups to see if either of these factors could have affected survival rates. The t-test compares means, in order to determine whether these means differ more than what would be expected by chance alone (Salkind, 2011). The t-score is taken into consideration with the degrees of freedom to evaluate the significance of the result (Salkind, 2011). In order for a t-test to result as a significant value, the p-value or significance needs to be less than .05 (Salkind, 2011).

Results

A total sample of 20 patients were identified who met the inclusion and exclusion criteria, split into a pre-policy group (n = 10) and a post-policy group (n = 10). Table 2 displays the data that were successfully collected, with patients 101-110 belonging to the pre-policy group, and patients 201-210 belonging to the post-policy group. Patients’ exact ages, comorbidities, position, and survival status are displayed below in Table 2.
## PRONE POSITIONING

### Table 2

**Results of Data Collection (n=20)**

<table>
<thead>
<tr>
<th>Patient*</th>
<th>Age</th>
<th># of Comorbidities</th>
<th>Position (Supine/Prone)</th>
<th>Alive at Discharge (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>#101</td>
<td>43</td>
<td>GERD, hypothyroidism, anemia, atrial septal defect, Barrett’s esophagus, cerebral palsy = 6</td>
<td>Supine</td>
<td>No</td>
</tr>
<tr>
<td>#102</td>
<td>54</td>
<td>Coronary artery disease, congestive heart failure, type 2 diabetes, dyslipidemia, hypertension = 5</td>
<td>Supine</td>
<td>Yes</td>
</tr>
<tr>
<td>#103</td>
<td>87</td>
<td>Type 2 diabetes, hypertension, hypothyroidism, dyslipidemia, depression, chronic kidney disease stage 3, coronary artery disease = 7</td>
<td>Supine</td>
<td>No</td>
</tr>
<tr>
<td>#104</td>
<td>68</td>
<td>Coronary artery disease, cerebrovascular accident, depression, dyslipidemia, hypertension, myocardial infarction = 6</td>
<td>Supine</td>
<td>Yes</td>
</tr>
<tr>
<td>#105</td>
<td>69</td>
<td>Asthma, hypothyroidism = 2</td>
<td>Supine</td>
<td>No</td>
</tr>
<tr>
<td>#106</td>
<td>33</td>
<td>Asthma = 1</td>
<td>Supine</td>
<td>No</td>
</tr>
<tr>
<td>#107</td>
<td>70</td>
<td>Hypertension = 1</td>
<td>Supine</td>
<td>No</td>
</tr>
<tr>
<td>#</td>
<td>Age</td>
<td>Diagnosis</td>
<td>Position</td>
<td>Status</td>
</tr>
<tr>
<td>------</td>
<td>-----</td>
<td>----------------------------------------------------------------------------------------------------</td>
<td>----------</td>
<td>--------</td>
</tr>
<tr>
<td>#108</td>
<td>68</td>
<td>Chronic obstructive pulmonary disease, myocardial infarction, congestive heart failure, hyperlipidemia, hypothyroidism = 5</td>
<td>Supine</td>
<td>Yes</td>
</tr>
<tr>
<td>#109</td>
<td>34</td>
<td>Asthma, type 2 diabetes = 2</td>
<td>Supine</td>
<td>No</td>
</tr>
<tr>
<td>#110</td>
<td>63</td>
<td>Down’s Syndrome, seizures, deep vein thrombosis, dementia = 5</td>
<td>Supine</td>
<td>No</td>
</tr>
<tr>
<td>#201</td>
<td>56</td>
<td>Hypertension, asthma = 2</td>
<td>Prone</td>
<td>No</td>
</tr>
<tr>
<td>#202</td>
<td>41</td>
<td>Hypertension, hyperlipidemia = 2</td>
<td>Prone</td>
<td>Yes</td>
</tr>
<tr>
<td>#203</td>
<td>58</td>
<td>Small cell carcinoma = 1</td>
<td>Prone</td>
<td>No</td>
</tr>
<tr>
<td>#204</td>
<td>59</td>
<td>Type 2 diabetes, end stage renal failure, congestive heart failure, coronary artery disease, hypertension, hyperlipidemia = 6</td>
<td>Prone</td>
<td>Yes</td>
</tr>
<tr>
<td>#205</td>
<td>60</td>
<td>None = 0</td>
<td>Prone</td>
<td>Yes</td>
</tr>
<tr>
<td>#206</td>
<td>78</td>
<td>Asthma, GERD, congestive heart failure = 3</td>
<td>Prone</td>
<td>Yes</td>
</tr>
<tr>
<td>#207</td>
<td>70</td>
<td>Hypertension, coronary artery disease, hyperlipidemia, spinal stenosis = 4</td>
<td>Prone</td>
<td>Yes</td>
</tr>
</tbody>
</table>
The analysis resulted in a chi-square statistic of 1.818 and a p-value of .178. Being that a score of 1.818 is statistically close to zero, it is likely this value happened by chance and is therefore considered insignificant. More importantly, the p-value is greater than .05, also confirming the value as insignificant. This is translated into a result that yielded no significant difference in survival rates between the pre-policy and post-policy sample populations. Lastly, there was a confidence interval of 0.231-0.685. These decimals are the proportion of survivors, meaning the actual mean of survivors in the whole population between the two samples is somewhere between 23% and 68%. Being that this is such a wide confidence interval, lack of significance is further shown. Therefore, no conclusions can be drawn regarding the relationship between proning and survival of patients diagnosed with acute respiratory distress syndrome based on this analysis. Summary of this data is organized below in Table 3.
As previously mentioned, the secondary analysis regarding the effect of patients’ comorbidities and ages on the survival rate of those who were proned was completed using two independent or unpaired t-tests, which also resulted in non-significant results. When comparing the mean ages of the two groups, a significance of .828 was produced. When comparing the comorbidities of the two groups, a significance of .100 was produced. Being that both of these values are greater than .05, there is no significant difference between the mean age and mean number of comorbidities between the pre and post policy groups. Therefore, these variables are unlikely to have confounded the results of the study. Summary of these data are displayed below in Table 4.

Table 4

**Independent Samples T-test Analyses for Potential Survival Factors – Age and Number of Comorbidities**

<table>
<thead>
<tr>
<th>Pair</th>
<th>Age – Pre</th>
<th>Age – Post</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% Confidence Interval of the Difference</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 2</td>
<td>Comorbidities – Pre</td>
<td>Comorbidities – Post</td>
<td>1.400</td>
<td>2.413</td>
<td>.763</td>
<td>-.326 to 3.126</td>
<td>1.835</td>
<td>9</td>
<td>.100</td>
</tr>
</tbody>
</table>
Discussion and Recommendations

This pilot study was completed in order to assist in closing the gap in knowledge of the effect of prone positioning on the survival of patients diagnosed with acute respiratory distress syndrome. There is significant data expressing increased survival rates resulting from the use of prone positioning for an ARDS diagnosis, however several studies have been completed that yielded contradicting results. Being that the current literature has such inconclusive overall results when it comes to the effectiveness of proning on decreasing mortality of patients with moderate to severe ARDS, proning is not yet accepted as a standard of care for these patients (Sud et al., 2014). Unfortunately, the results of this study add to the inconclusive nature of many of the previously completed studies, showing no significant difference in the survival rates between patients with ARDS who were proned and those who were left supine.

Given that results are inconclusive, recommendations for best practice cannot be drawn until further research is completed. While the positive effects of the policy have not been significantly established, there have not been detrimental effects of the policy since implementation. Given this information, continuation of the prone positioning policy for patients with acute respiratory distress syndrome is not contraindicated, and continued research is warranted.

Although outside the scope of the current study, a possible explanation for differences in mortality could be related to the point in the progression of an illness that treatment is sought. Acute respiratory distress syndrome is associated with significant mortality ranging from 20%-40%, affecting approximately 119,000 people in the United States annually, and requires prompt, aggressive treatment in order to avoid further progression (Drahnak & Custer, 2015). The longer this treatment postponed, the more damaging the effects are to the patient’s lungs, followed by
advanced systemic involvement (Koh, 2017). A study related to the progression of disease when treatment is sought could be beneficial to the advancement of proper treatment of ARDS. Further research to explore should include:

❖ Is there a difference in hospital length of stay for those who survived prior to policy implementation as compared for those who survived post policy implementation?

❖ Is there a difference in discharge disposition (home, rehab, long-term care) for those who survived prior to policy implementation as compared for those who survived post policy implementation?

The stakeholders for the prone positioning program, the critical care providers, nurses, respiratory therapists, patients suffering from ARDS, the caregivers and/or family of the patients, hospital administration, and the patients’ insurance companies, would also benefit from further research into this specific topic of mortality rates, and these questions that extend beyond this topic. While each stakeholder has his or her own specific interests within this study, all are ultimately interested in the patient’s health improving and his or her eventual survival.

**Strengths and Limitations**

While the study used a small sample size, all patient data was taken from one location. For the purpose of a pilot study, this is an important check to prevent location bias. Furthermore, the policy included a uniform protocol that was applied consistently across cases within the post-policy patient group. This limited possible confounding variables such as the duration spent in the prone position, among other factors. In addition, the outcomes of this study were objective measures, removing susceptibility for bias. Lastly, the t-test analyses revealed no significant difference of the mean age and mean number of comorbidities between the pre and post-policy groups. This indicates that neither variable affected the observed relationship.
PRONE POSITIONING

There were numerous limitations to this pilot study. First and foremost, being that there was a limited timeframe to work with, the sample size was extremely small. The limited timeframe was due to the fact that the policy was just implemented in January of 2018, leaving the primary investigator with only 6 months from which to gather data on the post-policy sample. The potential sample was further limited by individual patient complications, preventing qualifying patients from before proned (e.g. large abdominal wounds, sternal precautions, etc.). Secondly, a narrow range of variables were examined in relation to the effect of prone positioning of survival rates. There could be additional confounding variables that were not examined. Thirdly, as a retrospective study the principle investigator had to rely on data that was entered into the medical record at the time of treatment by the medical provider, as opposed to collecting it first-hand.

Conclusion

The results of this pilot study add to the inconclusive data of many of the previously completed studies. Continued research with a larger sample size and greater resources would assist greatly in the advancement of closing the overwhelming gap in knowledge related to best practice treatment of acute respiratory distress syndrome.

DNP Outcomes

The DNP Outcomes provided by the University at Buffalo’s School of Nursing (n. d.) revolve around improving advanced nursing practice and advancing healthcare outcomes through leadership, use of advanced technology, and interprofessional collaboration. This pilot study met these outcomes on various levels. Any condition that results in such high mortality, deserves to be researched and studied in order to improve the care provided and healthcare outcomes associated with the disorder. This study was an effort at accomplishing both of these factors—
PRONE POSITIONING

advancement of nursing practice through research into new and upcoming treatments and therefore attempting to advance the healthcare outcomes of those diagnosed with acute respiratory distress syndrome. Furthermore, leadership, use of technology, and interprofessional collaboration were all used in order to properly research, collect, and synthesize the best data available.

Essentials of Doctoral Education for APN

While the Essentials of Doctoral Education for the APN, also provided by the University at Buffalo’s School of Nursing (n.d.), have similar goals of improving advanced nursing practice and advancing healthcare outcomes through leadership, use of advanced technology, and interprofessional collaboration, there is one key addition to these essentials—advocacy. This study includes the ideal of advocacy because every patient deserves to receive the top evidence-based treatment for his or her diagnosis. If proning were to show significant decrease in mortality rates for those diagnosed with acute respiratory distress syndrome, patients deserve to receive this treatment. This study is attempting to evaluate best practice for the treatment of ARDS, with the hopes that further research will be stimulated.
PRONE POSITIONING

References


PRONE POSITIONING

doi:10.1513/AnnalsATS.201704-343OT

Northwestern University. (n.d). Chart review guidance and instructions. Retrieved from

doi:10.1590/1806-9282.62.03.287


doi:10.1177/1527154405283304


### Appendix A

#### Literature Review Matrix

<table>
<thead>
<tr>
<th>Article Citation</th>
<th>Type of Study</th>
<th>Method, Description, Tools</th>
<th>Results &amp; Key Findings</th>
<th>Relevance to Proposed Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alsaghir et al., (2008)</td>
<td>Meta-analysis</td>
<td>5 studies were evaluated to review the effectiveness of prone positioning as compared to supine for patients diagnosed with ARDS.</td>
<td>There was not a significant difference in mortality between the prone and supine groups. Prone positioning did improve oxygenation.</td>
<td>The survival benefit of proning could not be made significant in this review, showing there is a gap in literature and the need for further evaluation of this procedure.</td>
</tr>
<tr>
<td>Arias et al., (2014)</td>
<td>Systematic review</td>
<td>10 articles involving 1,891 patients were included in the review.</td>
<td>While prone positioning demonstrated improved oxygenation, the survival benefit is unclear.</td>
<td>The survival benefit of proning could not be made significant in this review, showing there is a gap in literature and the need for further evaluation of this procedure.</td>
</tr>
<tr>
<td>Beitler et al., (2014)</td>
<td>Meta-analysis</td>
<td>7 trials were identified within this analysis which included 2,119 patients, 1,088 were proned.</td>
<td>Only the most recent trial showed significant reduction in mortality in the prone group. While differences in mortality of the other studies was not overly significant, the cumulative meta-analysis did show that increasingly recent studies proved a trend toward decreased mortality for those who were proned.</td>
<td>While more recent studies are trending toward reduced mortality, the survival benefit of proning is still inconclusive, showing there is a gap in literature and the need for further evaluation of this procedure.</td>
</tr>
<tr>
<td>Gattinoni et al., (2001)</td>
<td>Randomized control trial</td>
<td>304 patients with an ARDS diagnosis were studied in this trial, 152 in the supine position, and 152 in the prone position for 6 or more hours daily for 10 days.</td>
<td>Placing patients in the prone position with an ARDS diagnosis improves oxygenation, but does not improve survival.</td>
<td>While oxygenation was improved, the main outcome of this study (mortality) was not improved by prone positioning. This provides evidence as to way prone positioning patients who</td>
</tr>
<tr>
<td>Study</td>
<td>Study Design</td>
<td>Participants Details</td>
<td>Key findings</td>
<td>Conclusion</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Guerin et al., (2013)</td>
<td>Prospective randomized control trial</td>
<td>466 patients with severe ARDS were randomly assigned to undergo prone positioning sessions of at least 16 hours or be left in the supine position.</td>
<td>The prone positioning group experienced a 28-day mortality rate of 16.0%, as compared to 32.8% in the supine group.</td>
<td>Patients within the prone positioning groups had decreased mortality, which is the main goal of the program being evaluated.</td>
</tr>
<tr>
<td>Lee et al., (2014)</td>
<td>Meta-analysis</td>
<td>Analysis of 11 randomized control trials totaling 2,246 patients, half of which were proned, and half of which were left supine.</td>
<td>The prone position was significantly associated with decreased mortality.</td>
<td>Patients within the prone positioning groups had decreased mortality, which is the main goal of the program being evaluated.</td>
</tr>
<tr>
<td>Mancebo et al. (2006)</td>
<td>Randomized-control trial</td>
<td>136 patients with an ARDS diagnosis were included, 60 supine and 76 prone.</td>
<td>There was 58% mortality in the supine group, and 43% mortality in the prone group. Results were translated that proning may reduce mortality in patient with ARDS when initiated early and applied for long periods of time.</td>
<td>Patients within the prone positioning groups had decreased mortality, which is the main goal of the program being evaluated.</td>
</tr>
<tr>
<td>Sud et al., (2014)</td>
<td>Systematic review and meta-analysis</td>
<td>11 RCTs were evaluated that compared prone and supine positioning for patients with ARDS.</td>
<td>6 of the 11 trials showed a significant decrease in mortality with the proned patients, the significance was less clear in the other 5 trials evaluated.</td>
<td>Being that this review was inconclusive, further research is necessary to show whether there is significant benefit to proning</td>
</tr>
<tr>
<td>Sud et al. (2008)</td>
<td>Systematic review and meta-analysis</td>
<td>13 randomized control trials that included 1,559 patients meeting the proper ARDS criteria.</td>
<td>In 10 of the trials (1,486 patients), prone positioning did not reduce mortality.</td>
<td>The survival benefit of proning could not be made significant in this review, showing there is a gap in literature and the need for further evaluation of this procedure.</td>
</tr>
<tr>
<td>Xin et al., (2018)</td>
<td>Randomized-control trial</td>
<td>Evaluated and compared the survival rates of the independent (supine) and dependent (prone) groups.</td>
<td>Within the dependent group, the prone position limited lung function compared to those who were supine.</td>
<td>Subjects who are proned have increased survival rates as compared to those who were supine.</td>
</tr>
<tr>
<td>dependent (prone) groups after injury was induced to subjects (rats) lungs.</td>
<td>injury and increased survival rates, as compared to the independent group.</td>
<td>were left supine, which is the main goal of the program being evaluated.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix B

Timeline of Study

- Fall 2017: Brainstorm Capstone topics.
- January 2018: Solidify Capstone topic, receive approval on topic from advisor, begin research.
- February 2018: Continue research, begin organizing information.
- May 2018: Complete final draft of paper, apply for IRB approval.
- April 2018: Complete in-depth review of literature, theoretical framework, proposed methods, implementation and evaluation. Submit proposal defense.
- June 2018: Receive IRB approval, begin and complete data collection.
- July 2018: Complete data analysis, synthesize conclusion, compare and contrast results with existing body of evidence.
- August 2018: Defend Capstone project.
APPROVAL OF SUBMISSION: EXEMPT RESEARCH DETERMINATION

June 11, 2018

Dear CHELSEA ARMSTRONG,

On 6/11/2018, the University at Buffalo IRB reviewed the following submission:

<table>
<thead>
<tr>
<th>Type of Review: Initial Study</th>
<th>Title of Study: Effect of Prone Positioning on the Survival of Patients with Acute Respiratory Distress Syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigator: CHELSEA ARMSTRONG</td>
<td>IRB ID: STUDY00002509</td>
</tr>
<tr>
<td>Funding: None</td>
<td>Grant ID: None</td>
</tr>
<tr>
<td>IND, IDE, or HDE: None</td>
<td>Documents Reviewed: • Armstrong, C. - HRP-503 Protocol (4).docx, Category: IRB Protocol; • Armstrong - HRP-612-HIPAA-Waiver (3).docx, Category: Other; • Armstrong - Data Collection Sheet Revised.docx, Category: Other;</td>
</tr>
</tbody>
</table>

The study materials for the project referenced above were reviewed and approved by the SUNY University at Buffalo IRB (UBIRB) by Non-Committee Review. The UBIRB has determined on 6/11/2018 that the research is Exempt according to 45 CFR Part 46.101. There is no expiration date.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the Click system.

This UBIRB determination is given with the understanding that the proposed study design will be followed. If modifications are needed that significantly alter the purpose, design, or data collected, then those changes should be submitted to the IRB to determine if the modifications alter the research such that the criteria for an exempt determination are no longer met. You can create a modification by navigating to the active study in Click IRB and selecting ‘Create Modification / CR’. Otherwise, this study no longer needs to be reviewed by the IRB.
Appendix C continued

For more information on exemption criteria and categories, see the IRB Toolkit Worksheet: Exempt Determination (HRP-312). If you have any questions about this determination, please contact the IRB.

Full HIPAA Waiver

Based on the information you have provided in the “University at Buffalo Human Research Protections Program Request for Full Waiver of Individual Authorization for Use of Individually Identifiable Health Information” form (waiver request), the UBIRB has determined a full waiver of the individual authorization required by 45 CFR §164.508 for use or disclosure of protected health information is warranted based on the following criteria as specified in 45 CFR 164.512(i)(2). Accordingly:

A) The use or disclosure of protected health information involves no more than a minimal risk to the privacy of individuals, based on, at least, the presence of the following elements:

1) An adequate plan to protect the identifiers from improper use and disclosure;

2) An adequate plan to destroy the identifiers at the earliest opportunity consistent with conduct of the research, unless there is a health or research justification for retaining the identifiers or such retention is otherwise required by law; and

3) Adequate written assurances that the protected health information will not be reused or disclosed to any other person or entity, except as required by law, for authorized oversight of the research study, or for other research for which the use or disclosure of protected health information would be permitted by this subpart;

B) The research could not practicably be conducted without the waiver or alteration; and

C) The research could not practicably be conducted without access to and use of the protected health information.

A brief description of the Protected Health Information for which this alteration or waiver has been granted is provided on the “Request for Waiver of the Authorization for Use of Individually Identifiable Health Information” or “Request for Limited Waiver of the Authorization for Use of Individually Identifiable Health Information for Study Recruitment” which is part of this approval. If HIV information is requested, this waiver is only valid for disclosures consistent with New York Code Public Health Article 27-F.

As principal investigator for this study involving human participants, you have responsibilities to the SUNY University at Buffalo IRB (UBIRB) as follows:

1. Ensuring that no subjects are enrolled prior to the IRB approval date.
Appendix C continued

2. Ensuring that the UBIRB is notified of all reportable information in accordance with the New Information SOP (HRP-024).

3. Ensuring that the protocol is followed as approved by UBIRB including minor changes which can be made if they do not impact the exempt determination.

4. Ensuring that the study is conducted in compliance with all UBIRB decisions, conditions, and requirements.

5. Bearing responsibility for all actions of the staff and sub-investigators with regard to the protocol.

6. Bearing responsibility for securing any other required approvals before research begins.

If you have questions, please contact the UBIRB at 716-888-4888 or ub-irb@buffalo.edu. Please include the project title and number in all correspondence with the UBIRB.
Appendix D

Catholic Health System IRB Approval

July 6, 2018

Chelsea Armstrong
University at Buffalo School of Nursing/Research 3435 Main Street
Wende Hall
Buffalo, New York 14214

RE: CHS/IRB/1821- Effect of Prone Positioning on Survival of Patients with Acute Respiratory Distress Syndrome

Ms. Armstrong:

Thank you for submitting the documentation necessary to inform the Catholic Health System IRB that you will be using our facilities for the UBIRB approved research, mentioned above.

Following administrative review by our board chair on June 20, 2018, you have approval to proceed with the above mentioned study for one year at Catholic Health.

The Board expects a progress report from the principal investigator every twelve months or at the end of this study, whichever comes first. There are to be no changes made in the procedures being followed. In the event of any adverse events or mishaps, these must be reported to the IRB within 5 business days. The IRB members may request you to appear at the next scheduled IRB meeting to discuss the incidence. Please take note that you must submit a follow-up report and request for continuation of the study before the expiration date noted above or your study will be terminated.

Please quote the Catholic Health System IRB protocol number, cited above, in any further correspondence, and send it to:

If you have any questions or concerns, please feel free to contact me at Sisters Hospital Medical Staff Office or Katherine DeWitt at 716-821-4477 or kdewitt@chsbuffalo.org.
Capstone Defense
Effect of Prone Positioning on the Survival of Patients with Acute Respiratory Distress Syndrome
Presented by: Chelsea Armstrong RN BSN DNP-s
The State University of New York at Buffalo
Graduate School of Nursing
Summer 2018

Purpose of Capstone
➢ To evaluate the effectiveness of a new prone positioning policy on the survival rates of patients with acute respiratory distress syndrome (ARDS).

Capstone Question
➢ Among adult patients that suffer from moderate to severe acute respiratory distress syndrome (ARDS), are there improved survival rates for those who are proned per new hospital policy, as compared to those who were not proned per previous hospital policy.

What is Acute Respiratory Distress Syndrome?
Treatment of ARDS

- Mechanical ventilation with volume control
- Sedation
- Neuromuscular blocking agent

The Prone Positioning Policy

- Purpose: To create a protocol for early prone positioning in patients with moderate to severe ARDS.
- Patient Selection:
  - 1) PaO2:FiO2 <150 mm Hg with an FiO2>0.6 and PEEP>5 cm H2O.
  - 2) Receiving lung protective ventilation and be mechanically ventilated for <36 hours (Parisi, 2016).

Pathophysiology of Proning

- Decrease pleural pressure
- Allow re-expansion of lungs
- Increase ventilation (Henderson, Griesdale, Dominelli, & Ronco, 2014).

Background & Significance

- Current literature has inconclusive results when it comes to the effectiveness of proning on decreasing mortality of patients with moderate to severe ARDS (Sud et al., 2014).
Theoretical Framework

- The Conceptual Model for Nursing Health Policy

Level 1—efficacy of nursing practice processes on the health outcomes of individuals, families, groups, and communities;
- Level 2—effectiveness of nursing practice processes and effectiveness and efficiency of health care delivery systems;
- Level 3—equity of access to effective and efficient nursing practice processes and efficient nursing practice delivery systems, and equity in distribution of costs and burdens of care delivery;
- Level 4—justice and the social changes and market interventions addressing equity

Protection of Human Subjects

- IRB approval was obtained from both the University at Buffalo and the Catholic Health System.

METHODS
Study Design

- **Design**: Single center, quasi-experimental study of patients diagnosed with ARDS during hospital admission from July 2017 to June 2018 via retrospective chart review.
- **Setting**:
  - One of the largest hospitals in Western New York
  - 28 ICU / 12 CV ICU beds
  - 260 medical surgical beds.
  - Accredited Stroke Center
  - Open Heart Surgery and Percutaneous Coronary Intervention

Main Investigation

- Comparison of survival rates pre and post-policy
- Chi-square statistic

Secondary Investigation

- Correlation Factors
  - Age
  - Number of comorbidities
- T-test statistic.

Study Design cont.

**Inclusion Criteria**

- Inpatients
- Adult over age 18
- ARDS diagnosis
- Intubated/sedated
- Use of neuromuscular blockade agent

**Exclusion Criteria**

- Transferred to higher level of care/transferred out of hospital to another facility
- Contraindications to proning
Variables

- The following information was collected on those with an ARDS diagnosis:
  - Alive or expired at time of discharge
  - Age
  - Comorbidities

Data Collection Protocol

- Data Collection
  - Medical record numbers of those with an ARDS diagnosis between July 2017-June 2018
  - Survival status, age, and comorbidities

Data Collection Protocol cont.

- Data was originally organized in this manner using Microsoft Excel, shown aside.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Age</th>
<th># of Comorbidities</th>
<th>Position</th>
<th>Alive at Discharge (Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>patek</td>
<td>25</td>
<td>3</td>
<td>supine</td>
<td>Yes</td>
</tr>
<tr>
<td>patek</td>
<td>25</td>
<td>3</td>
<td>supine</td>
<td>Yes</td>
</tr>
<tr>
<td>patek</td>
<td>25</td>
<td>3</td>
<td>supine</td>
<td>Yes</td>
</tr>
<tr>
<td>patek</td>
<td>25</td>
<td>3</td>
<td>supine</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Sample

- A total sample of 20 patients were identified who met the inclusion and exclusion criteria, split into a pre-policy group (n = 10) and a post-policy group (n = 10).

Comparison of Survival Rates

- Pre-Policy Sample
  - 3 alive at discharge

- Post-Policy Sample
  - 6 alive at discharge

Comparison of Survival Rates

- Chi-square statistic = 1.818
- P-value = .178

Which Means...
Correlation Factors

- Mean age:
  - Pre-policy: 58.9
  - Post-policy: 60.3
- Mean number of comorbidities:
  - Pre-policy: 4.5
  - Post-policy: 3.1

When comparing the pre and post ages of the two groups, a significance of .828 was produced.

When comparing the pre and post comorbidities of the two groups, a significance of .100 was produced.

Discussion

- The results of this study add to the inconclusive data of many of the previously completed studies, showing no significant difference in the survival rates between patients with ARDS who were proned and those who were left supine.
Recommendations for Practice

- Further research needs to be completed in order to make these recommendations.

Limitations and Strengths

**Limitations**
- Sample size
- Limited timeframe
- Narrow range of variables
- Retrospective study

**Strengths**
- One location
- Uniform protocol
- Objective measures
- Similar samples

Recommendations for Future Research

- A possible explanation for differences in mortality could be related to the point in the progression of an illness that treatment is sought.

Role of the APN

- Have the ability to identify risk factors for ARDS, in order to prevent the progression of this syndrome.
- Be able to recognize the condition if it does occur and its standard of treatment.
- Encourage and take part in future research.
Conclusions

References


