Objective: to analyze nurses’ knowledge about the nursing care of patients diagnosed with Acute Respiratory Distress Syndrome in PRONE position. Method: descriptive, exploratory study with a quantitative approach. The sample consisted of 18 nurses working in the intensive care units of a general hospital in the countryside of the State of São Paulo / Brazil. The collected data with a questionnaire were analyzed statistically by Microsoft Word, Microsoft Excel and Minitab. The project was approved by the Research Ethics Committee, protocol H199/CEP 2011. Results: to evaluate nurses’ knowledge about ARDS and PRONE position was created a variable << Knowledge about ARDS and PRONE position >>. Of the 18 nurses interviewed, ten (55.56%) received the note Fair Knowledge, and eight (44.44%) received the note Good Knowledge. Conclusion: nurses’ knowledge about the Acute Respiratory Distress Syndrome and the PRONE position is restricted since, when questioning depth was made, responses were incorrect. Descriptors: Respiratory Insufficiency; Respiratory Distress Syndrome of the Adult; Intensive Therapy; Nurses.
INTRODUCTION

The Intensive Care Unit (ICU) are for the reception of patients with severe chance of survival. They are places that provide specialized care, providing high-tech and complex techniques.1,2

The care in the ICU is complex in many ways. Performing procedures such as bed bath, a position change and oral hygiene considered fairly simple requiring further care, especially in view of the attention that these procedures do not affect patients, disconnecting them, for example, equipment that at the time, sustain life.3,4

The interest in the subject arose from the difficulties faced in direct critically ill patients whose survival depends on the support Intensive medical and mechanical support for the recovery of certain organ failure, such as the use of mechanical ventilator or dialysis machines. However, years of ICU work allowed the perception that there is a special challenge in the care of patients suffering from Acute Respiratory Distress Syndrome (ARDS).

ARDS was first mentioned in 1967, described with particular characteristics, triggered by a variety of insults, such as aspiration of gastric juice, sepsis, trauma, and others. However, in 1988, created a lung injury score in order to diagnose and evaluate its severity, taking into account: chest radiograph, hypoxemia through the relationship between the partial pressure of arterial oxygen (PaO₂) and inspired oxygen fraction (FiO₂), pulmonary compliance and pressure positive end-expiratory pressure (PEEP).5,6

The American-European Consensus Conference in 1994 established criteria defining ARDS as a syndrome of inflammation and increased pulmonary capillary permeability associated with clinical, radiological and physiological abnormalities not caused by pulmonary capillary hypertension. The Acute Lung Injury was defined as a clinical acute respiratory failure with bilateral infiltrates on chest radiograph, absence of left atrial hypertension and hypoxemia with a PaO₂/FiO₂ ratio less than or equal to 300, except that if this ratio is less than or equal to 200 to define ARDS.6-10

ARDS is characterized by rapid onset of severe dyspnea, which usually occurs 12-48 hours after the event begins. The patient has shallow and rapid breathing. Can be sounded out or crackling sounds in the lungs and wheezing due to low oxygen levels in the blood, central cyanosis may occur or extremities.8-10

The lack of ARDS caused by oxygen can produce complications in other organs after the onset of clinical or when no improvement occurs over days or weeks. The prolonged lack of oxygen can cause serious complications such as acute renal failure or advanced stages until the death of the patient.11

ARDS patients are treated in the ICU due to oxygen is essential for the correction of low oxygen levels. This support therapy almost always includes endotracheal intubation and mechanical ventilation, circulatory support, judicious administration of fluids, drug therapy, analgesia, sedation, and nutritional support. It is considered the therapy of position (PRONE) another strategy used in the management of ARDS.7-10

The ventilation PRONE position is not a new technique, but it was incorporated into the practice recently after studies have shown heterogeneity ARDS, in which the alveoli normal crowding committed to the alveoli. Some studies show that the PRONE position can offer improvement in the relationship between ventilation and perfusion, increased lung volume at the end of expiration and regional ventilation changes associated with mechanical changes in the chest wall.8

Studies have been conducted in order to assess the effects of changes of position on oxygenation in ARDS patients and many of them have revealed that the improvement in PaO₂ has been achieved when patients are placed in a position PRONE.10,2

The management of patients at this position is crucial for successful treatment. Thus, the nursing staff must be trained and knowledgeable about the care to the patient in the prone position in order to avoid complications such as accidental extubation, facial edema, skin ulceration, difficulty with enteral feeding, airway obstruction, displacement central venous catheters, among others.13-4

In this sense, caring for critically ill patients, especially those within the ICU requires a set of skills, knowledge and practices. The lack of knowledge, skill, individual competence or of expertise are important factors that may predispose to serious adverse events.

In some situations, there is a clear lack of technical knowledge and the lack of nursing staff regarding the care needed, since the technical installation decubitus PRONE to correct assistance as tracheal suctioning,
nutritional support and prevention of pressure ulcers.

**OBJECTIVES**

- To analyze the nurses’ knowledge about the nursing care of patient with ARDS in PRONE position.
- To develop a clinical tool to support nursing care to the patient in the prone position.

**METHOD**

This is a descriptive, exploratory study with a quantitative approach. Initially, the research project was submitted for approval by the Ethics Committee of the University of Vale do Paraíba, which was obtained by the protocol H199/CEP 2011.

The study was conducted in the Adult ICU and ICU of Emergency Department of a general hospital in the Vale do Paraíba. We included nurses working in these units who agreed to participate and signed the Informed Consent Form (ICF). The total sample consisted of 18 volunteers, for six subjects did not accept to participate in the survey, without the reason cited for non-compliance. Established themselves as exclusion criteria nurses not acted directly with patient care and who were on vacation, sick leave or off.

To extract data relevant to this research, we applied a self-explanatory and multiple choice questions prepared before the scientific literature. A literature search was conducted through the Descriptors in Health Sciences (MeSH) as respiratory failure, lung injury acute, respiratory distress syndrome in adults and nurse.

The instrument consisted of questions concerning the time of training, experience in the intensive care unit and factors inherent to the knowledge of nurses regarding the pathophysiology of ARDS and specific nursing care with alternative providing free response option to the professional participant.

The data collected were entered and tabulated with the aid of the Microsoft Excel © and Microsoft Word® versions of Office 2003. Descriptive statistics were used to represent the responses in the form of tables with frequencies and percentages.

To evaluate the nurses’ knowledge of ARDS and PRONE position, we created a variable called “Knowledge about ARDS and PRONE position,” the result of the sum of questions, with each correct answer worth one point. This variable aimed to classify the knowledge of nurses from poor, fair and good. Thus, it follows: when the nurse got score = 0-4, their “Knowledge about ARDS and PRONE position” was bad, when the nurse got score = 5-8, their “Knowledge about ARDS and PRONE position” was fair; when the nurse got score = 9-11, his “Knowledge and ARDS PRONE position” was good.

**RESULTS**

Relating to the time of formation of Nurses with knowledge about ARDS and PRONE position, it is observed that most trained more than 11 years received the note of good knowledge while most of those with training between 0-5 years were framed in group of fair knowledge. These data are presented in Table 1.

<table>
<thead>
<tr>
<th>Training time</th>
<th>Knowledge about ARDS and prone position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bad</td>
</tr>
<tr>
<td>0 to 5 years</td>
<td>0,0% (0)</td>
</tr>
<tr>
<td>6 to 10 years</td>
<td>0,0% (0)</td>
</tr>
<tr>
<td>Over 11 years</td>
<td>0,0% (0)</td>
</tr>
<tr>
<td>Total</td>
<td>0,0% (0)</td>
</tr>
</tbody>
</table>

Nurses considered to have fair knowledge, 44.4% (8) were able to characterize ARDS (severe hypoxemia, with PaO2/FiO2≤ 200; decreased lung compliance, absence of signs of the left atrial hypertension, bilateral pulmonary infiltrated on chest radiography). Nurses who did not hit the questioning were equally divided in two levels of knowledge (Table 2).

<table>
<thead>
<tr>
<th>Knew how to say what characterizes the ARDS</th>
<th>Knowledge about ARDS and prone position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bad</td>
</tr>
<tr>
<td>Yes</td>
<td>11,1% (2)</td>
</tr>
<tr>
<td>No</td>
<td>0,0% (0)</td>
</tr>
<tr>
<td>Total</td>
<td>0,0% (0)</td>
</tr>
</tbody>
</table>
When questioning about the position therapy used in the treatment of ARDS, only 11.0% (2) of the nurses could not answer the PRONE position assists in the treatment of disease. Both were included in the group of fair knowledge.

In Figure 2, we note that the highest percentage of nurses who could not say what the main purpose of PRONE position belongs to the group of fair knowledge. These effects are the improvement in the relationship between ventilation and perfusion, and increased lung volume at the end of expiration.

Figure 1. Representation for answers about the main effects of the PRONE position. São José dos Campos, 2011.

Upon questioning "What is prone and which primary care?", Only 11.0% nurses could not answer the prone position is when the patient is in the abdomen down, with the head laterally, and should be made change in head position every two hours.

Figure 2 allows us to observe that 61.1% of nurses interviewed could not answer the most common complication when using the PRONE position is facial edema.

Figure 2. Representation for answers about the most common complication of PRONE position. São José dos Campos, 2011.

Investigated also by how long the patient should remain in position PRONE and 77.7% of the nurses responded that there is no set time to stay in the position mentioned. The remaining erroneously that said time would be 1 hour or 8 hours.

In questioning the main adverse effect caused by the association of PEEP to high tidal volume, only a nurse could not answer that this effect is barotrauma.

In patients with ARDS, choose by closed suction system. A nurse could not answer the closed suction system should be used in patients who are being ventilated with high PEEP value.

Regarding the mode of ventilation used in patients with ARDS, the option is controlled by the way. In Figure 03, we note that all nurses good knowledge of the group answered correctly. Only 11.0% of nurses have fair group could answer the question.
ARDS is described as a framework of acute lung injury, whose basic criteria that define it are: severe hypoxemia refractory to oxygen therapy, with \( \text{PaO}_2 / \text{FiO}_2 \leq 200 \); decreased lung compliance, absence of clinical or echocardiographic left atrial hypertension; bilateral pulmonary infiltrates on chest radiography,\(^5\),\(^15\)

It was noticed that 50% of respondents included in the period 0-5 years of training in nursing, 33.3% they were classified in the group of fair knowledge about the care patients with ARDS PRONE position, and 22.2% the period above 11 years of training, most
PRONE position in acute respiratory...

were part of the group of good knowledge (16.7%). Therefore, the data shown may imply that knowledge may have been acquired through years of practice and experience with ongoing support to critically ill patients. The experience also guides the caregiver how to care. The quality of care is on the nurse's experience, in his feeling, ie something that takes care professional life teaching.

Learning should be continuous in order to allow for upgrading and improvement of knowledge, and the promotion of new professional profiles. The workers' education is essential for building the desired changes and the quality of services provided.

The research shows that the majority of nurses could answer about the features of ARDS. Therefore, the position of the therapy used most of the respondents answered correctly. The literature emphasizes the PRONE position as an adjunct to therapy for ventilatory support, promoting better oxygenation through the expansion of the dorsal region of the lungs, increasing expiratory lung volume and better ventilation-perfusion ratio.

In the supine position, the weight exerts compressive forces on the dorsal regions of the lungs, however, in the prone position, the cardiac moves to the ventral position, thereby increasing the volume ventilation. Thus, a small area of the lungs from the heart undergoes compression, which improves ventilation in this region.

The improved oxygenation characterizes the most significant physiological effect PRONE position by providing factors that contribute to the reduction of alveolar collapse, the redistribution of alveolar ventilation and perfusion redistribution. However, 55.5% of nurses interviewed could not answer what the main effects of this therapy position. Another mechanism that may contribute to the improvement of arterial hypoxemia is the drainage of secretions becomes much greater PRONE position.

Importantly PRONE position or prone, the patient remains lying on his abdomen, arms and legs in the longitudinal body, with the head turned to one side. Attention should be paid on the position of the head, which should be lateralized, with alternating sides every two hours. Above all, only two nurses could not answer what is and what prone primary care.

We should use pillows of various sizes and gel pads to prevent the formation of pressure ulcers in the shoulder region, iliac crests and back feet. The use of cushions enables decompression of bony prominences, facilitates lung expansion and prevents compression of neck vessels, in addition, allows the correct positioning of the feet, avoiding its distention, and compression. Satisfactorily 17-8, 89% of respondents answered correctly on which sites should be placed cushions.

The length of stay of patients in the PRONE position is not defined and the strategy to switch the ventilation periods in this position and supine is not clearly established. The study showed that 78% of respondents answered that there is no set time to stay in PRONE position, the remaining 22% split between the responses "only one hour" and "six to eight hours."

Despite the benefits mentioned position, this treatment can cause complications. The most serious complications, such as accidental extubation, severe hypotension and arrhythmias, are low. However, the most common complication is facial edema, which occurs in virtually all patients who remain even for a few hours in this position. Other complications such as displacement of central venous catheters, airway obstruction and baro-trauma are rare.

However, it was observed that 61.1% of nurses did not know which answer the most common complication of PRONE position. Another disadvantage of the position is the biggest need for sedation and muscle relaxants, which can lead to increased occurrences of neuromuscular paresis.

The deep sedation and paralysis of patients PRONE position is disturbing and at the same time, absolutely necessary, since the ventilatory mode of choice for therapy of ARDS is the pressure controlled ventilation, with or without inversion of the inspiratory / expiratory. Ventilation in a controlled manner, the ventilatory movements are generated by the device. The patient must be fully sedated or unable to perform respiratory efforts spontaneous. All nurses good knowledge of the group answered correctly on the ventilatory mode used in patients with ARDS.

The heterogeneous distribution of lung disease in patients with ARDS makes mechanical ventilation a challenge. When ill-fitting, mechanical ventilation (MV) can further injure the lung, causing the patient persists in VM, exposed to the risk of other complications, such as infection, thromboembolism, or primarily baro-trauma.
Barotrauma is the alveolar rupture due to the application of positive pressure to the lungs with high values of mean airway pressure. It is manifested by pneumothorax, pneumomediastinum, pneumoperitoneum and/or subcutaneous emphysema. This complication can be prevented by controlling the peak airway pressure, maintaining optimal levels of positive end expiratory pressure (PEEP) and ensuring patient-timing ventilator.13,19 Only one nurse could not answer about the risks of the combination of PEEP high tidal volume.

It becomes difficult to ventilate a patient with ARDS due to the specificity of the treatment. Accordingly, should never occur to mechanical ventilator disconnection, since it would undermine the progress of therapy due to the risk of atelectasis, falls in oxygen saturation and hemodynamic instability. Accordingly, to perform bronchial hygiene of patients with ARDS, guided using closed suction system, because it eliminates the risk associated with the disconnection of the patient from the ventilator for suctioning.20

In the survey, only a nurse could not answer in what situations should be used closed suction system. Several studies13,20 comparing the open system suction with the closed system, as infection, hypoxemia, but the literature is scarce in relation to the cost / benefit of the two systems. However, a study conducted in order to evaluate the cost-benefit ratio, it was concluded that the closed system suction is cheaper and a lower rate of technical error during the procedure, also decreases the time spent for the implementation of technical.20

As for hemodynamic monitoring the patient in the prone position, it was demonstrated that most able to respond to the importance thereof. The monitoring of vital functions is one of the most important tools in the management of critically ill patients. The patient in this position should be maintained with the EKG monitor connected, whose electrodes can be placed on the shoulders and side areas of the trunk, the data provides continuous electrocardiographic monitoring heart rate and arrhythmias. 21 The presence of dialysis catheters or central venous cited s require increased attention from professionals, needing to be carefully stabilized.17-8

It is relevant to discuss that, among the main techniques for noninvasive monitoring of oxygen (O₂) and carbon dioxide (CO₂), highlight the pulse oximetry, which is based on the principle of light absorption by oxyhemoglobin and the reduced hemoglobin, therefore, measurements are made on variations in light transmission at each arterial pulse, aiming to record oxygen saturation. This method of verification is essential, taking into account the physiological indices by obtaining blood gas does not permit the early detection of deterioration sudden and rapid establishment of the therapy.21

The Brazilian Consensus on Monitoring and Hemodynamic Support refer the patient with ARDS should be monitored with a pulmonary artery catheter (PAC), as small and fast pressure increase pulmonary artery occlusion worsen edema due to increased pulmonary capillary permeability. It must be assumed that the use of the cap allows more secure guidance of the amount of fluid and the need for inotropes.21

Another question in the survey was done regarding the interviewees' opinion about the use of enteral nutrition in patients in PRONE position. Respondents were divided on the answers. One study showed that enteral feeding can be safely administered to the patient in the prone position.14

The need of therapy PRONE position for the patient with ARDS makes care a challenge for the team, since the techniques to be performed are specific, how to maintain enteral feeding or prevent pressure ulcers.

Realize that there is much to be researched on ARDS and PRONE position in nursing. Above all, care for these patients should be systematically considering the particularities of each situation and the constant search for knowledge.22

A study emphasizes that due to gaps in the scientific literature about complex issues in nursing, highlights the importance of nurses devise pipes and homogenize the service.23

CONCLUSION

For the evaluation of questions answered correctly in each interview, it was possible to define which of the 18 nurses interviewed, 55.6% received the note Fair Knowledge and 44.4% received a note Good Knowledge.

It was concluded that nurses' knowledge regarding the ARDS and the PRONE position is restricted, since when were done thorough questioning, the answers were incorrect. Perhaps this may be associated with low approach to the subject in the undergraduate years and the lack of updates after the completion of the same and continuous training in the workplace. Furthermore, the use of the PRONE position is not part of routine changes in position of various intensive care units, which leads to little
experience in the management of patients undergoing this position.

In order to meet the difficulties presented by the nurses interviewed based on literature created a tool to support nurses to care for patients with ARDS in PRONE position.

For the evaluation of correct answered questions in each interview, it was possible to define which of the 18 nurses interviewed, 55.6% received the note Fair Knowledge and 44.4% received a note Good Knowledge.

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