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Principals of Implementing Early Mobilization in Patients in Intensive Care Units

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ABSTRACT

Early mobilization is a series of light activities carried out after surgery starting in bed until being able to get out of bed, mobilize to the bathroom and walk out of the bathroom. Advances in intensive care allow more patients to survive acute critical illness. The use of mechanical ventilation is one of the advances in the care of critically ill patients that can have a negative impact on long-term use. The aim is to provide information about the benefits and application of early mobilization in patients undergoing treatment in the ICU and using mechanical ventilation. Results: early mobilization has an effect on physiological responses, reduces delirium scores, reduces the length of use of mechanical ventilation, reduces length of stay in the ICU and hospital and reduces treatment costs, and prevents VAP. One of the obstacles to early mobilization is the mindset of ICU staff. The conclusion is that early mobilization is one of the items for ICU patients and what hinders its implementation is the mindset of the ICU staff.

Keywords : Implementation Principles, Early Mobilization, Patients, Investigational Treatment Units, Hospitals

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1. Introduction

Patients treated in the Intensive Care Unit often experience muscle weakness that is not related to the diagnosis of the main disease when entering the Intensive Care Unit. This muscle weakness is known as a clinical syndrome, namely ICU-Acquired Weakness. ICUAW is defined as clinically detectable weakness in critically ill patients where there is no possible etiology other than the critical illness itself. ICU-AW syndrome is associated with disturbances in body structure and function as well as significant activity limitations. There are long-term impacts that persist in patients with ICU-AW after the patient is discharged from the ICU, resulting in a decrease in the patient's quality of life and burdening the health care system.

Advances in intensive care allow more patients to survive acute critical illness. The use of mechanical ventilation is one of the advances in the care of critically ill patients that can have a negative impact on long-term use. Long-term use of mechanical ventilation increases the cost of care and disproportionate use of health resources. (Kahn, Benson, Appleby, Carson, & Iwashyna, 2010; Loss et al., 2015).

The research results of Kahn et al. (2015) described the epidemiology of intensive care unit (ICU) patients in the United States from 2004 – 2009 in hospitals in Massachusetts, North Carolina, Nebraska, New York and Washington, the total number of ICU patients was 3,235,741. Patients using long-term mechanical ventilation were 72%, sepsis was 63.7 %, nosocomial infections were 51.5% and in-hospital mortality was 30.9%. Extrapolating to the entire United States in 2009 there were estimates of 380,001 cases, hospital mortality of 107,880 and hospital costs of approximately $26 billion.

The prevalence of ICU patients in Indonesia is not recorded statistically, but from medical record data from the ICU of RSPAD Gatot Soebroto DITKESAD in 2009, it was recorded that the number of patients admitted to the ICU was 1,172 people, with 600 people using ventilators (51.19%) (Herlina, 2013).

Mechanical ventilation dependence ≥ 21 days identifies complications during ICU stay, length of stay, mortality rate and increased costs. Some complications during

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treatment in the ICU include muscle weakness, pressure ulcers, bacterial nosocomial sepsis, candidemia, pulmonary embolism, and hyperactive delirium (Loss et al., 2015).

Prevention of complications during treatment in the ICU is carried out by implementing the ABCDE Bundle (Airway, Breathing, Control sedation, Delirium, and Early mobilization) which involves multidisciplinarity. The ABCDE bundle consists of 3 interconnected components, namely coordination of awareness and breathing exercises, monitoring and management of delirium, and early mobilization (Balas et al., 2012; Urden, Stacy, & Lough, 2014).

Research has shown that early mobilization is safe and feasible in critical patients, preventing the occurrence of Ventilation Associated Pneumonia (VAP), reducing delirium scores, use of mechanical ventilation, length of stay in the ICU and hospital. Implementation of early mobilization involves multidisciplinarity, namely, nurses, occupational therapists, and doctors (Hunter, Johnson, Willis, & Coustasse, 2014; Vanderbilt University Medical Center, 2013).

This study aims to provide information about the benefits and application of early mobilization in patients undergoing treatment in the ICU and using mechanical ventilation. This research is structured into two parts, namely early mobilization of patients in the ICU consisting of five parts which discuss the benefits of early mobilization from several specific aspects, namely the patient's physical function, delirium score, dependence on the use of mechanical ventilation, length of stay in the ICU and hospital and efficiency. maintenance costs, and prevention of VAP. The second part contains the implementation of early mobilization in the ICU.

2. Research Methods

In the search process, the author used several databases including Cocrane, Proques, Pubmed, Hindawi Publishing Coorportion, and Wiley Online Library. The keywords entered are "Early mobilization and ICU", "Early mobilization + ICU", "ABCDE Bundlein ICU". To be more specific, the limitation is on the year of publication with a minimum of 5 years back (2011-2016) and only using the language English. And there are several journals obtained from the journal bibliography list

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obtained from the database.

3. Results and Discussion

a. Results

1) Mobilization of patients in the intensive care unit (ICU)

In the study "Very Early Passive Cycling Exercise in Mechanically Ventilated Critically Ill Patients: Physiological and Safety Aspects - A Case Series" it was concluded that early passive cycling exercise in sedated, critical and mechanically ventilated patients was considered safe and there were no significant changes in hemodynamic variables, respiratory and metabolic even in patients using vasopressores (norephineprine dose ≥0.2 µg/kg/min; maximum dose = 0.47µg/kg/min) (Neto et al., 2013). Another research by Amidei & Sole (2013) used a quasi-experimental method with the results of research on decreasing Behavior Pain Score (BPS) values showing that passive exercise decreased pain during and after exercise and reduced IL-6 levels. This research panel is in line with research by Winkelman et al. (2012) which presented the results that there were no significant changes in vital signs (HR, RR, SBP, SPO2), biomarkers (IL 6 and IL 10) during exercise and rest.

Before mobilization, the nurse carries out an assessment of the feasibility and stages of mobilization that will be carried out by the ICU patient. The assessment includes hemodynamics, activity history, strength and the patient's ability to participate in exercise. The entire multidisciplinary team monitors the patient during activities and gradually increases the patient's activity. The mobilization stages consist of six levels, namely (ICU Liberation, 2016).

a) Stage 1 : Outline and create slack in the lines, connect the monitor portable.
b) Stage 2: Begin bedside exercises, observing the patient, monitors, and lines.
c) Stage 3: The patient sits on the edge of the bed, assesses pain and blood pressure orthostatic.
d) Stage 4: Help the patient from sitting to standing.
e) Stage 5: Walk, move the chair away from the patient. Take advantage of

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helpers, volunteers, and students to push chairs.

f) Stage 6: Sit and rest if necessary.

2) Influences physiological responses

Prevention of muscle atrophy is the main goal of patient care in the ICU, because it reduces the length of stay in the ICU and improves the patient's quality of life (Koukourikos, Tsaloglidou, & Kourkouta, 2014). In the study "Effect of Early Rehabilitation during Intensive Care Unit Stay on Functional Status: Systematic Review and Meta-Analysis" it was explained that of the 5733 journals screened that met the inclusion criteria, there were 6 narrative synthesis articles and 7 meta-analysis articles. It was concluded that the effect of early mobilization not significant for functional status, muscle strength, quality of life or health status, although it improves walking ability compared to usual care (Avila, Serón, Fan, Gaete, & Mickan, 2015).

In contrast to research by Fraser, Spiva, Forman, & Hallen (2015) which used a retrospective longitudinal study method on 66 ICU patients and the results showed that early mobilization reduced delirium scores, the patient's condition improved and functional status increased. This research is supported by Balas, Devlin, Verceles, Morris, & Ely (2016) who summarized several studies on the application of the ABCDE Bundle, one of the studies assessed 14 patients' functional functions using measurements of strength (handgrip), physical performance battery (SPPB), mobility (gait speed).), balance and coordination (walking for 6 minutes). This weakness and disability is treated with a mobilization protocol, the improvement in results is shown not only in functional (basic mobility activities, namely rolling, sitting and standing) but also from a clinical perspective such as reducing the length of ventilator use and increasing the success of weaning.

3) Reduces delirium scores

Delirium is an acute brain dysfunction syndrome characterized by inattention, fluctuations in mental status, altered level of consciousness, or

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disorganized thinking. The pharmacological interventions most frequently used in the ICU to treat delirium are sedatives, analgesics, and hypnotics to achieve comfort in patients who are too often deliriogenic, resulting in longer duration of ICU and hospital stay, and increased costs. To reduce these side effects, pharmacological therapy must be combined with a non-pharmacological approach which refers to the ABCDE Bundle, including early mobilization which has been proven to be able to reduce delirium scores (Fraser et al., 2015; Hipp & Ely, 2012).

4) Reducing the length of use of mechanical ventilation

The study "Rehabilitation, weaning and physical therapy strategies in chronic critically ill patients" concluded that early mobilization and maintenance of muscle strength can reduce the risk of weaning difficulties, limited mobility and ventilator dependence (Ambrosino, Venturelli, Vagheggini, & Clini, 2012; Fraser et al., 2015).

5) Reducing the length of stay in the ICU and hospital and reducing treatment costs.

Early mobilization can reduce the risk of sequential airway closure and lung atelectasis, reduce the incidence rate of lower respiratory tract infections and pneumonia, and reduce the duration of endotracheal intubation and length of hospital stay. Inhibitors to early mobilization are costs related to implementing early mobilization programs which can best be divided into three main categories, namely personnel, training and equipment. The estimated cost of implementing an early mobilization program with 900 patients per year is $ 358,475. increased costs include recruitment and training of personnel, but this increases the savings in reducing length of stay. The estimated savings in reducing length of stay is $ 1,176,312 so the net ICU cost savings is $ 817 836 (Ambrosino et al., 2012; Kahn et al., 2010; Loss et al., 2015).

Similarly, research by Ronnebaum, Weir, & Hilsalbeck (2012) which used a retrospective review method on 28 patients treated in the ICU with respiratory disorders showed that the length of stay for patients using the mobilization

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protocol was a mean of 13.3 ± 6.3 days in the ICU and the duration of ventilator use was 14.5 ± 8.7 days compared to patients using standard physical therapy protocols with a mean of 24.9 ± 13.7 days (p = 0.007, d = 1.11) and duration of ventilator use of 30.9 ± 20 .0 days (p = 0.007, d = 1.09).

Early mobilization with an interdisciplinary approach improves the quality of life of patients in the ICU, reduces length of stay and reduces costs of around $22,000 per patient in the ICU.

6) Prevent VAP

Structured early mobilization of ICU patients is carried out to improve respiratory function, reduce side effects from immobility, increase levels of consciousness, increase functional independence, increase cardiovascular fitness, improve psychological well-being, reduce the risk of delirium (Arjohuntleigh, 2013). This research is in line with research by Hendra & Huriani (2011) concluding that it is necessary to increase the implementation of mobilization (ambulation) and chest physiotherapy for patients on ventilators to prevent the occurrence of Ventilator Associated Pneumonia (VAP). Prevention of VAP is carried out by providing a semirecumbent position of 30 - 45◦ because it prevents aspiration when feeding through a nasogastric tube (Bassi & Torres, 2011)

7) Application of early mobilization in the ICU

One of the obstacles to early mobilization is the mindset of ICU staff. Castro, Turcinovic, Platz, & Law, (2015) examined changes in the mindset of ICU staff regarding early mobilization by using the Plan-Do-Study-Act method to guide planning, implementation, evaluation and intervention to change the mindset of ICU staff practice in mobilize mechanically ventilated patients. The mindset was validated using a questionnaire distributed 2 weeks before, 6 months and 1 year after implementation. The results found were that there was a significant change in the mindset of ICU staff in mobilizing mechanically ventilated patients. Interdisciplinary team collaboration, operational support and multi-modal education improve the quality of service and overcome the initial

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problem of early mobilization in critical patients. This research is in line with Bassett, Vollman, Brandwene, & Murray (2012) who concluded that ICU team collaboration improves culture, communication and resources in implementing early mobilization for ICU patients.

In sustaining clinical improvement any initiative requires a cultural change within the organization. There are three important elements to implement and maintain early mobilization initiatives in the ICU, namely (Vollman & Bassett, 2014):

1. Must understand and be able to articulate what is being proposed.
2. Team members must understand why the initiative is important to the patient, themselves, and the organization. Doctors usually respond well if they can relate it to real impact.
3. Initiative leaders must discover the roles of each team member and scientific discipline, understanding team roles creates a solid foundation for building culture in the organization.

The study "Addressing Cognition and Communication Within the Context of Early Mobilization in the Intensive Care Unit" explains that cognition and communication are barriers to ICU patient rehabilitation and can have a negative impact on patient outcomes. These barriers, coupled with varying levels of staff training and experience, reduce the quality and coordination of care. The basic step for incorporating evidence-based cognitive and communication practices into existing initial mobilization protocols is to educate physicians and the next step is to implement a pilot program of the new standardized protocol and assess therapists' ease of use and patient outcomes (Catchpole, Foster, & Manolopoulos, 2015).

4. Conclusion

1) Early mobilization is one of the items in the ABCDE bundle for ICU patients. Early mobilization is safe for mechanically ventilated patients even when using vasopressors and provides good results for patients, namely influencing functional response, reducing delirium scores, reducing the duration of use of mechanical

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ventilation, reducing length of stay in the ICU and hospital as well as reducing treatment costs and preventing VAP.

2) Barriers to implementing early mobilization are the mindset of ICU staff, cognitive and communication abilities, and varying levels of staff training and experience so that training and implementation of early mobilization protocols and collaboration between teams are needed.

5. Compliance with ethical standards

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Disclosure of conflict of interest

This research collaboration is a positive thing for all researchers so that conflicts, problems and others are absolutely no problem for all writers.

Statement of informed consent

Every action we take as authors is a mutual agreement or consent.

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