



The Effects of Using the Persian Weaning Tool on Mechanical Ventilation Outcomes Among Patients with Head Trauma: A Clinical Trial

Leili Yekefallah¹, Sareh Mohammadi^{2,*}, Siamak Yaghoubi² and Maryam Mafi²

¹Metabolic Diseases Research Center, Faculty of Nursing and Midwifery Qazvin University of Medical Sciences Qazvin, Qazvin, Iran

²Qazvin University of Medical Sciences, Qazvin, Iran

*Corresponding author: M.Sc. Student of Intensive Care Nursing, Qazvin University of Medical Sciences, Qazvin, Iran. Email: sareh_mohammadi@gmail.com

Received 2019 February 06; Revised 2019 April 05; Accepted 2019 July 07.

Abstract

Background: Patients with head trauma need mechanical ventilation in order to protect airway and prevent complications. However, due to the lack of well-developed weaning protocols, weaning failure rate among them is high and hence, they may need mechanical ventilation and stay in hospital for long time, resulting in heavy costs on healthcare systems and high risk of death.

Objectives: The aim of the present study was to evaluate the effects of using the Persian weaning tool on patient outcomes among patients with head trauma under mechanical ventilation.

Methods: This clinical trial was conducted in 2018 on sixty patients with head trauma who were receiving mechanical ventilation in the intensive care unit of Shahid Rajaei Hospital, Qazvin, Iran. Participants were randomly allocated to an intervention and a control group. Weaning from mechanical ventilation in these groups was performed using the Persian Weaning Tool and routine physician-directed method, respectively. Groups were compared with each other concerning weaning outcomes through the Mann-Whitney U and the chi-square tests conducted using the SPSS software (version 23.0).

Results: Weaning success rate in the intervention group was significantly greater than the control group (83.3% vs. 56.6%; $P = 0.024$) and the length of hospital stay in the intervention group was significantly shorter than the control group (19.9 vs. 28.9 days; $P = 0.05$). However, there were no significant between-group differences concerning extubation success rate (80.0% vs. 63.3%; $P = 0.252$) and mechanical ventilation duration (7.5 vs. 8.7 days; $P = 0.3$).

Conclusions: The use of the Persian Weaning tool is effective in increasing weaning success rate and shortening hospital stay but has no significant effects on extubation success rate and mechanical ventilation duration. Specific weaning assessment tools and protocols need to be developed for patients with neurologic conditions.

Keywords: Head Trauma, Brain Injury, Mechanical Ventilation, Weaning, Intensive Care Unit

1. Background

Brain injuries are one of the major health problems in the world (1). The mortality rate of brain injuries is 20% - 50% (2). Head trauma is a major mechanism for brain injuries and is the second leading cause of death in intensive care units in Iran (3). Brain injuries caused by head trauma are among the leading causes of hospitalization in intensive care units (4). Most patients with head injuries need mechanical ventilation to prevent aspiration, hypoxia, and hypercapnia (4) and reduce brain metabolic activity (5). Each year, around 200000 people with neurologic injuries undergo mechanical ventilation (2).

Mechanical ventilation is associated with different problems and side effects (6). It may increase intracra-

nia pressure (7), cause damages to throat, vocal cords, and lung tissue, and result in immobility-related complications such as urinary tract infection, pneumonia, and clot formation in the lower extremities. Therefore, early weaning is of great importance (8). Of course, too early weaning may result in weaning failure, raise the probability of reintubation, increase the risks of tracheal and pulmonary injuries, aspiration, and pneumonia by eight times, and increase mortality rate by 6 - 12 times (9).

Patients with head trauma usually need mechanical ventilation for longer periods of time compared with other patients hospitalized in intensive care units (10). This is due to risk factors such as altered consciousness, impairments of brain stem reflexes (such as cough, gag, and swallow reflexes), and muscular problems (such as muscular