



Service Priorities and Programmes
Electronic Presentations

Convention ID: 1139

Submitting author: Mr Chun Kit LEE

Post title: Physiotherapist I, Queen Elizabeth Hospital

Preserving the limb muscle bulk for patients with critical illnesses on mechanical ventilation in ICU

Lee DCK (1), Yu DTW (1), Ng GYF (2)

(1) Physiotherapy Department, Queen Elizabeth Hospital, (2) Department of Rehabilitation Sciences, The Hong Kong Polytechnic University

Keywords:

Neuromuscular electrical stimulation

Mechanical ventilation

ICU

Introduction

Immobilization contributed to the development of ICU acquired weakness and hindering the rehabilitation of the patients. Neuromuscular electrical stimulation (NMES) has been proposed as a suitable rehabilitation option for patients with severe illnesses for minimizing muscle wasting during their stay at the ICU.

Objectives

To (1) examine the effect of early NMES on quadriceps and biceps muscles size in patients who are mechanically ventilated in ICU, (2) elevate the quality of life and functional status of those patients receiving NMES at ICU discharge, (3) quantify the ICU and hospital length of stay (LOS) and the number of patients who were diagnosed with ICU acquired weakness.

Methodology

49 patients who were on mechanical ventilation in the ICU were recruited within 48 hours after ICU admission. All of them received 30 minutes of NMES on 5 consecutive days over the quadriceps and biceps muscles on either the left or right limbs with random assignment. The limbs received no NMES served as self-control.

Cross-sectional diameter and area of quadriceps femoris and biceps muscle were measured with high-resolution real-time ultrasonography on Day 1 and 5 of intervention and one week after cessation of treatment. Functional Status Score for the Intensive Care Unit (FSS-ICU) and Short-Form Health Survey (SF-36) were used to evaluate the functional status.

Result

On Day 5, the thickness of the quadriceps and biceps muscles was 14.07% ($p=0.04$)

and 15.01% ($p=0.047$) greater on the intervention limbs than the control limbs. The cross sectional area of quadriceps was 8.65% ($p=0.014$) greater whereas the biceps was 9.63% ($p=0.011$) larger on the intervention limbs than the control limbs. On Day 12, the mean cross-sectional diameter and area of quadriceps and biceps muscle were still larger on the limbs received NMES than without ($p=0.051-0.151$). The FSS-ICU scores were significantly ($p=0.00$) lower at ICU discharge with the median (interquartile range) of 35 versus 24 (11.5-27).

The mean of Physical Component Summary and Mental Component Summary of SF-36 were 35.45 ± 6.72 and 35.34 ± 4.11 respectively.

Conclusion

Early application of NMES for patients on mechanical ventilation in ICU could delay the muscle atrophy and prevent the development of ICU acquired weakness