



**Figure 1 (abstract A550) Random forest Area Under the Curve scores for accurate discrimination of real alerts vs. artifact in vital sign abnormalities developing in online continuous monitoring data.**

**Introduction:** Patients in the intensive care unit (ICU) are exposed to prolonged immobility, which leads to loss of muscle mass. One resource that has proved to be of great utility in hospitals is the cycle ergometer, which is a stationary piece of equipment designed to enable cyclical rotations of lower and/or upper extremities and can be used to perform passive, active and resisted exercises.

**Objective:** To evaluate and compare the effects of early ambulation using a bedside cycle ergometer with conventional physical therapy on the thickness and architecture of the quadriceps muscle in critically ill patients receiving invasive mechanical ventilation (IMV).

**Methods:** Single-blind randomized controlled trial was conducted at Hospital de Clínicas de Porto Alegre (Brazil) ICU. Forty-two patients receiving IMV for 24 to 48 hours who were hospitalized for no longer than 1 week and had no restriction of lower limb movements. Interventions: After randomization, passive cycling exercise for the lower extremities was performed once daily for 20 minutes, at 20 revolutions per minute, until extubation or day 7 of the protocol plus conventional physical therapy in the intervention group. Bronchial hygiene maneuvers and passive exercises for the upper and lower extremities were performed twice daily for 30 minutes in both groups.

**Results:** Thirty-two patients were included in the final analysis: 18 in the intervention group ( $52.3 \pm 22.7$  years) and 14 in the conventional group ( $56.1 \pm 23.0$  years). The interaction group\*time showed no difference in the cross-sectional thickness of the quadriceps muscle ( $p = 0.100$ ) or in the vastus lateralis fascicle length ( $p = 0.712$ ), pennation angle ( $p = 0.603$ ) and muscle thickness ( $p = 0.552$ ) as assessed by ultrasound before and after the protocol.

**Conclusion:** There was preservation of muscle thickness and architecture in the acute phase of ICU stay. However, the addition of exercise using a cycle ergometer to conventional physical therapy did not change the outcomes analyzed.

#### References

- Burtin C, Clerckx B, Robbeets C, Ferdinande P, Langer D, Troosters T, Hermans G, Decramer M, Gosselink R: **Early exercise in critically ill patients enhances short-term functional recovery.** *Crit Care Med* 2009, **37(9)**:2499-2505.
- Camargo Pires-Neto R, Fogaça Kawaguchi YM, Sayuri Hirota A, Fu C, Tanaka C, Caruso P, Park M, Ribeiro Carvalho CR: **Very early passive cycling exercise in mechanically ventilated critically ill patients: physiological and safety aspects—a case series.** *PLoS One* 2013, **8(9)**:e74182.

#### A552

##### Use of electrical neuromuscular stimulation to preserve the morphology of abdominal and chest muscles of critical patients: randomized clinical trial

LJ Santos, AM Dall'Acqua, A Sachetti, FA Lemos, T Bianchi, WS Naue, G Sbruzzi, AS Dias, SR Vieira, MoVe-ICU Group

Hospital de Clínicas de Porto Alegre, Porto Alegre, Brazil

*Intensive Care Medicine Experimental* 2015, **3(Suppl 1)**:A552

**Introduction:** Neuromuscular electrical stimulation (NMES) has been used as an early therapeutic modality at intensive care units (ICUs) to treat

patients on invasive mechanical ventilation (IMV) to compensate and/or decrease loss of muscle mass.

**Objective:** To evaluate and compare the effects of NMES combined with conventional physical therapy on muscle thickness of critically ill patients on IMV.

**Methods:** Double blind randomized controlled trial conducted at the ICU of the Hospital de Clínicas de Porto Alegre, Brazil. Twenty-five patients who had been in hospital for at most 15 days and were receiving IMV for 24 to 48 hours were included in the study. Patients were randomized to the intervention group (NMES + conventional physical therapy) or conventional group (conventional therapy + placebo NMES). Interventions were conducted daily for 30 minutes until the seventh day or upon extubation.

**Results:** The primary outcome was thickness of the transverse rectus abdominis and chest muscles of the dominant side assessed by ultrasound before and after the intervention. Eleven patients were included in the intervention group ( $56 \pm 13$  years) and fourteen in the conventional group ( $61 \pm 15$  years). After NMES administration, rectus abdominis muscle thickness ( $0.47 \pm 0.08$  before vs.  $0.51 \pm 0.08$  after,  $p = 0.505$ ) and chest muscle thickness ( $0.44 \pm 0.08$  before vs.  $0.49 \pm 0.08$  after,  $p = 0.083$ ) were preserved in the intervention group, whereas there was significant reduction of thickness in the conventional group (rectus abdominis:  $0.43 \pm 0.05$  before vs.  $0.36 \pm 0.04$  after,  $p = 0.001$ ; chest:  $0.42 \pm 0.05$  before vs.  $0.35 \pm 0.04$  after,  $p = 0.001$ ), with a significant difference between the groups. There was statistically significant difference between the groups in terms of length of ICU stay, with shorter length of stay in the intervention group ( $10 \pm 4$ ,  $p = 0.045$ ). We found no significant difference related to the other secondary outcomes between the groups.

**Conclusion:** There was no change in the rectus abdominis and chest muscle thickness in the intervention group; however, we found a significant decrease in the measures in the conventional group.

#### References

- Maffiuletti NA, Roig M, Karatzanos E, Nanas S: **Neuromuscular electrical stimulation for preventing skeletal-muscle weakness and wasting in critically ill patients: a systematic review.** *BMC Med* 2013, **11**:137.
- Parry SM, Berney S, Granger CL, Koopman R, El-Ansary D, Denehy L: **Electrical muscle stimulation in the intensive care setting: a systematic review.** *Crit Care Med* 2013, **41(10)**:2406-18.
- Wageck B, Nunes GS, Silva FL, Damasceno MC, de Noronha M: **Application and effects of neuromuscular electrical stimulation in critically ill patients: systematic review.** *Med Intensiva* 2014, **38(7)**:444-454.

#### A553

##### Is the manchester mobility score a valid and reliable measure of physical function within the intensive care unit

D McWilliams, G Atkins, J Hodson, M Boyers, T Lea, C Snelson  
 Queen Elizabeth Hospital, Birmingham, United Kingdom

*Intensive Care Medicine Experimental* 2015, **3(Suppl 1)**:A553

**Introduction:** Early and structured rehabilitation programmes have been shown to decrease both critical care and hospital length of stay (LOS) [1] as well as improve functional ability at the point of critical care discharge [2]. At present there is no general or universally accepted method for measuring mobility within the critical care unit or to track rehabilitation progress [3]. The Manchester Mobility Score was developed in 2005 as one such tool to describe the levels of mobility seen within critical care. Since development, the MMS has been used and adapted in several large critical care units within the UK, but has not previously been investigated in terms of validity and reliability.

**Objectives:** Our aim was to test the validity and reliability of the Manchester Mobility Score (MMS) as a quick and simple tool for monitoring rehabilitation within critical care.

**Methods:** This prospective observational study was performed within a large 75 bed, UK based mixed dependency critical care unit. The study was divided into 2 stages: stage one was the inter-rater reliability testing of the MMS and stage 2 was to assess for correlation with another validated measure of function within critical care and explore any relationship with hospital length of stay post critical care discharge.

**Results:** Stage 1 - MMS were collected for 111 patients over a 2 day period. All participating physiotherapists and nursing staff reported that the MMS took less than 1 minute to complete and was easy to use. The