

LIVES 2017: Do muscle activating measures prevent muscle atrophy?



The effect of protocol-based physiotherapy and additional muscle activating measures on the balance between muscular protein synthesis and degradation and muscle function in intensive care unit (ICU)-acquired weakness was presented at LIVES 2017 by Julius Grunow, Charité Universitätsmedizin Berlin.

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The study included patients with a SOFA score of ≥ 9 , with multiple organ dysfunction and at high risk for ICU-acquired weakness. There were 4 groups:

- Control group (no intervention): 6 healthy controls undergoing orthopaedic surgery
- sPT: physiotherapy as prescribed by the intensivist: 33 patients
- pPT: early mobilisation < 72 hours, individualised by the physiotherapist, and developed by an interprofessional exchange between physicians, respiratory therapists, nurses as well as physiotherapists regarding mobilisation, for 7 days a week and 30 minutes at least twice a day: 17 patients
- Intervention group: pPT + adMeas (additional measures) of 7 days a week 20 minutes session electrical muscle stimulation and/or whole body vibration: 33 patients

The researchers analysed 65 muscle biopsies. They took an open surgical vastus lateralis muscle biopsy on day 15 after ICU admission and analysed gene expression analysis (relative mRNA expression analysis via qPCR) and protein content analysis (quantification via Western Blot). Patients receiving the protocol were sicker than patients receiving standard physiotherapy, and had a SOFA score reading between 12 and 14. Biopsy specimens from the 6 healthy controls were included for baseline values.

The results showed that myosin expression increased significantly with pPT + adMeas compared to sPT for *MYH1/2/4* and for *MYH1/4* in comparison to the control group. The increase in myosin expression was accompanied by a significantly increased myosin total/fast/slow protein content for pPT + adMeas as opposed to sPT.

Protocol-based physiotherapy does not suppress muscle protein degradation, but it increases myosin synthesis, concluded the researchers, and muscle mass is maintained. Additional muscle activating measures intensified these effects. The researchers suggest that in pPT + adMeas treated patients protein synthesis outbalances its degradation resulting in higher myosin protein contents preventing muscle atrophy. Regarding function, all patients increased in strength between first awakening and discharge, but no differences were observed between the groups and there was no impact on short-term function.

Reference

The full abstract with detailed figures is available at <http://www.professionalabstracts.com/esicm2017/iplanner/#/presentation/1316>

Published on : Mon, 2 Oct 2017