

EFFECT OF NEUROMUSCULAR ELECTRICAL STIMULATION OVER QUADRICEPS TENDON ARCHITECTURE IN CRITICALLY ILL PATIENTS

Autores

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Afiliação

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Introduction: It is well known that patients in the intensive care unit (ICU) imposed to bed rest develop muscle atrophy. The major treatment for preventing it in sedated patients is neuromuscular electrical stimulation (NMES). However, there are no studies about the impact of the disuse and NMES over tendons architecture of critical ill patients. **Objective:** to assess the impact of disuse, as well as the NMES effect, over tendinous architecture of critical ill patients. **Methods:** We carried out a prospective, single blinded, randomized clinical trial in mechanical ventilated traumatic brain injury patients in ICU. Our study was approved by FEPECS ethical committee under the n° 1107517. Patients were randomized to control group (CG) or NMES group (NG). The CG has undergone conventional physiotherapy (passive motion, stretching and functional positioning). The NG, beyond conventional physiotherapy, it has undergone NMES on quadriceps femoris muscle. NMES protocol was applied daily during the first 14 days of internship in ICU. Quadriceps tendon was assessed by B-mode ultrasonography over days 1, 3, 7 and 14. Structural tendon characteristics were evaluated by thickness, cross-sectional area (CSA) and echogenicity. Data were expressed in mean and \pm standard deviation. We used ANOVA Two Way corrected for multiple comparisons with Bonferroni test to compare differences between the groups. **Results:** Sixty-nine patients were enrolled in the study and twenty-seven completed 14 days of follow-up, fifteen in the NG. General baseline characteristics were mean age of 32 ± 9.5 years, 81,5% male, APACHE II score of 14 ± 4 and diffuse axonal injury grade III in the majority of subjects, 20 (75%). Quadriceps tendon thickness decreased significantly in the CG when compared with NG in 14th day: -0.13 ± 0.08 cm vs. 0.02 ± 0.04 cm respectively, $p < 0.0001$. Quadriceps tendon CSA demonstrated the same pattern in 14th day: CG, -0.37 ± 0.24 cm² vs. NG, 0.24 ± 0.65 cm², $p < 0.006$. There was no statistical difference in the echogenicity between groups: CG, 3.41 ± 15.3 au vs. NG, -2 ± 12.4 au, $p < 0.72$. **Conclusion:** We showed that even short-term disuse promotes deleterious effects on the quadriceps tendon architecture in critical ill patients. Moreover, NMES applied daily can prevent quadriceps tendon architecture dysfunctions in that population.

Keywords: Electric Stimulation. Atrophy. Intensive Care Units.