Evaluation of muscle oxidative capacity using near infrared spectroscopy in patients with osteoarthritis of the knee and rheumatoid arthritis

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Introduction: Oxidative capacity of vastus lateralis muscle (VL) was evaluated by near infrared spectroscopy (NIRS) in patients with osteoarthritis of the knee (knee OA) and rheumatoid arthritis (RA), and its clinical situation was studied.

Materials and Methods: The subjects were 40 patients with knee OA (40 knees) and 10 patients with RA (10 knees) who underwent total knee arthroplasty (TKA). To confirm preoperative oxygen consumption by the muscle tissue measurements were also performed in 40 healthy subjects (40 knees) in the same age group as a control group for comparison. The maximum voluntary contraction on isometric extension of the knee (100% MVC) was measured immediately before, and 1 and 3 months after surgery using Biodex®, and the intramuscular oxygenated hemoglobin recovery time (HbO2-Tr) was measured using NIRS.

Results: In the postoperative course of the OA group, no improvement was noted in 100% MVC 1 month after surgery, but significant improvement was noted after 3 months. In contrast, linear improvement was noted in HbO2-Tr 1 month after surgery. Both 100% MVC and HbO2-Tr were improved after 1 month, and the early improvement rate of HbO2-Tr was higher, as in the OA group, showing that HbO2-Tr recovered earlier than 100% MVC in both groups.

Discussion: Muscle oxidative capacity evaluated by NIRS is a good parameter of muscle tissue recovery, and it may become a useful evaluation method of exercise therapy for skeletal muscle in the future.

References:

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