

## **<sup>99m</sup>Tc-sestamibi muscle scintigraphy to assess the response to neuromuscular electrical stimulation of normal quadriceps femoris muscle**

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**Objectives:** Neuromuscular electrical stimulation (NMES) is widely used for improving muscle strength by simultaneous contraction in the prevention of muscle atrophy. Although there exist many clinical methods for evaluating the therapeutic response of muscles, <sup>99m</sup>Tc-sestamibi which is a skeletal muscle perfusion and metabolism agent has not previously been used for this purpose. The aim of our work was to ascertain whether <sup>99m</sup>Tc-sestamibi muscle scintigraphy is useful in the monitoring of therapeutic response to NMES in healthy women.

**Methods:** The study included 16 women aged between 21 and 45, with a mean age of  $32.7 \pm 6.4$ . Both quadriceps femoris muscles (QFM) of each patient were studied. After randomization to remove the effect of the dominant side, one QFM of each patient was subjected to the NMES procedure for a period of 20 days. NMES was performed with an alternating biphasic rectangular current, from a computed electrical stimulator daily for 23 minutes. After measurement of skinfold thickness over the thigh, pre- and post-NMES girth measurements were assessed in centimeters. Sixty minutes after injections of 555 MBq <sup>99m</sup>Tc-sestamibi, static images of the thigh were obtained for 5 minutes. The thigh-to-knee uptake ratio was calculated by semiquantitative analysis and normalized to body surface area (NUR = normalized uptake ratio).

**Results:** The difference between the pre and post NMES NUR values was significant ( $1.76 \pm 0.31$  versus  $2.25 \pm 0.38$ ,  $p = 0.0000$ ). The percentage (%) increase in NUR values also well correlated with the % increase in thigh girth measurements ( $r = 0.89$ ,  $p = 0.0000$ ).

**Conclusion:** These results indicated that <sup>99m</sup>Tc-sestamibi muscle scintigraphy as a new tool may be useful in evaluating therapeutic response to NMES.

**Key words:** neuromuscular electrical stimulation, <sup>99m</sup>Tc-sestamibi scintigraphy, muscle