010

Evaluation of the thigh sonographic index in patients with copd in a public hospital in Mato Grosso, Brazil: a cross- sectional study

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Introduction: Musculoskeletal dysfunction results in disability and mortality in patients with Chronic Obstructive Pulmonary Disease (COPD). [1] Body mass, weight and height influence quadriceps muscle thickness. Thus, the thigh sonographic index (IST) becomes a reliable parameter in the assessment of muscle mass by ultrasound in COPD. [2]

Objective: Analyze anterior thigh muscle thickness from the adjusted thigh sonographic index in patients with COPD.

Methods: Cross-sectional, observational study carried out at the Pneumology Outpatient Clinic of the *Hospital Universitário Júlio Muller* (HUJM). This study was approved by the Human Beings Ethics Committee of the HUJM under CAAE number: 58263722.0.0000.5541, all participants signed the free and informed consent form. The study included 27 patients, 12 males and 15 females, divided into two groups: Group A (participants with COPD) and Group B (patients without COPD). Patients were evaluated regarding: Spirometry (FEV1, FEV1/FVC); Analysis of Body Mass Index (BMI) and Quadriceps Thickness Measurement (QME) by ultrasound. In measurement of the QME the protocol by Braga et al.,[3] was adopted, measuring the middle of the thigh and 2/3 between the anatomical points of the iliac crest and the upper edge of the patella of the dominant limb. The images were obtained with a TUS-A 300 model device (aplio 300) in B mode, with a linear transducer (14L5) and variable frequency between 5 and 10 MHz. Two evaluators (E.A.B vs A.P.C.B.A) performed three measurements each, at different times, considering the best image obtained. The thigh sonogram index was calculated by the anterior thigh muscle thickness divided by the BMI. All date were collected and the statistical analysis was performed using the statistical program Statistical Package for Social Sciences (SPSS), version 22.0. Data were expressed as the mean±standard deviation and $p < 0.05$ was taken as the criterion of significance.

Results: The studies by Kara et al.[2] defined IST-adjusted cut-off values by gender, with an index ≤1.0 in females and ≤1.4 in males, indicating loss of muscle strength. In our study, a good correlation of IST was observed in both groups, and in relation to males, the COPD Group had IST (1.0±0.3) *versus* the Group without COPD, IST (0.9±0.1), with statistical difference p= 0.020. The female gender in the COPD Group had IST as mean and standard deviation (0.8±0.2) *versus* Group without COPD, IST (0.9±0.2), with statistical difference p=0.037. Regarding the reproducibility of the QME, the Person correlation was analyzed, which showed a good correlation between the evaluators (R2=0.90; p>0.001) with 95%CI:0.89-0.9).

Conclusion: IST suggests to be a reliable index, with good accuracy and clinical relevance. The good correlation for the reproducibility of the QME by ultrasonography,

infers that this index can serve as a parameter to evaluate the loss of muscle mass in patients with COPD, based on the cutoff values for both sexes.

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