

Maximal Voluntary Ventilation Should Not Be Estimated From the Forced Expiratory Volume in the First Second in Healthy People and COPD Patients

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Purpose: To evaluate the concordance between the value of the actual maximum voluntary ventilation (MVV) and the estimated value by multiplying the forced expiratory volume in the first second (FEV1) and a different value established in the literature. **Methods:** A retrospective study was conducted with healthy subjects and patients with stable chronic obstructive pulmonary disease (COPD). Five prediction formulas MVV were used for the comparison with the MVV values.

Agreement between MVV measured and MVV obtained from five prediction equations were studied. FEV1 values were used to estimate MVV. Correlation and agreement analysis of the values was performed in two groups using the Pearson test and the Bland-Altman method; these groups were one group with 207 healthy subjects and the second group with 83 patients diagnosed with COPD, respectively. **Results:** We recruited 207 healthy subjects (105 women, age 47 ± 17 years) and 83 COPD patients (age 66 ± 6 years; 29 GOLD II, 30 GOLD III, and 24 GOLD IV) for the study. All prediction equations presented a significant correlation with the MVV value (from 0.38 to 0.86, $p < 0.05$) except for the GOLD II subgroup, which had a poor agreement with measured MVV. In healthy subjects, the mean difference of the value of bias (and limits of agreement) varied between -3.9% (-32.8 to 24.9%), and 27% (-1.4 to 55.3%). In COPD patients, the mean difference of value of bias

(and limits of agreement) varied between -4.4% (-49.4 to 40.6%), and 26.3% (-18.3 to 70.9%). The results were similar in the subgroup analysis. Conclusion: The equations to estimate the value of MVV present a good degree of correlation with the real value of MVV, but they also show a poor concordance. For this reason, we should not use the estimated results as a replacement for the real value of MVV. © Copyright © 2020 Otto-Yáñez, Sarmiento da Nóbrega, Torres-Castro, Araújo, Carvalho de Farias, Dornelas De Andrade, Puppo, Resqueti and Fregonezi.

COPD

forced expiratory volume in the first second

maximal voluntary ventilation

prediction equation

prediction formulas

adult

aged

Article

chronic obstructive lung disease

clinical evaluation

controlled study

disease association

female

forced expiratory volume

forced vital capacity

human

major clinical study

male

maximal expiratory pressure

maximal inspiratory pressure

maximal voluntary ventilation

prediction

retrospective study

sex ratio