

Adventitious respiratory sounds to monitor lung function in pulmonary rehabilitation

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Background: Peak expiratory flow (PEF) has been traditionally used to monitor lung function in patients with chronic obstructive pulmonary disease (COPD) before pulmonary rehabilitation (PR) sessions. However, PEF mainly reflects changes in large airways and it is known that COPD primarily targets small airways. Adventitious respiratory sounds (ARS - crackles and/or wheezes), are related to changes within lung morphology and are significantly more frequent in patients with acute exacerbations of COPD. Thus, ARS may be also useful for the routine monitoring of lung function during PR programs.

Objective: This study explored the convergent validity of ARS and PEF in patients with COPD.

Methods: 24 stable patients (66±9y; FEV1 71±19% pred) participating in a PR program were included. Assessments were conducted immediately before one PR session. Presence of ARS (crackles and/or wheezes) at posterior right chest was first assessed by a physiotherapist using a digital stethoscope (ds32a, ThinkLabs, CO, USA). Resting dyspnea was collected using the modified Borg scale (0-10) and PEF with a peak flow meter (Micro I, Carefusion, UK). Independent t-tests, Pearson and point-biserial correlations were used.

Results: ARS were present in 5 participants (20.8%). Patients with ARS had a lower PEF than patients without ARS (294±62 l/min vs. 419±128l/min; p=0.048). PEF was negatively correlated with presence of ARS (r=-0.41; p=0.048). Resting dyspnea was negatively correlated with PEF (r=-0.41; p=0.039), but not with ARS (r=0.21; p=0.32).

Conclusions: Findings suggest that both ARS and PEF offer complementary information before a PR session, but that ARS provide additional information on the patients' respiratory status. Further research correlating ARS and PEF with patients' performance and progression during PR is needed to strengthen the usefulness of assessing these parameters in PR.

Keywords: peak expiratory flow, adventitious respiratory sounds, crackles, wheezes, pulmonary rehabilitation