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, in all airways, 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.

Aims

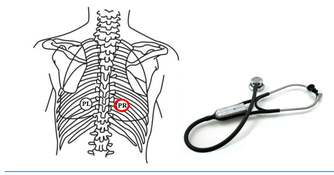
This study explored the convergent validity of ARS and PEF in patients with COPD.

Methods

24 stable patients (3 ♀; 66±9 years; FEV_1 71±19% predicted) participated in a PR program.

Assessments were conducted immediately before one PR session (Figure 1).

Presence of ARS (crackles and/or wheezes)	Resting dyspnea	Peak Expiratory Flow (PEF)
Digital stethoscope (ds32a, ThinkLabs, CO, USA)	modified Borg scale	Peak flow meter (Micro I, Carefusion, UK)



0	None
0.5	Very, very light
1	Very light
2	Light
3	Moderate
4	Not very intense
5	Intense
6	
7	Very intense
8	
9	Very, very intense
10	Maximum

Figure 1. Measurements taken in the study.

REFERENCES: 1. Lacasse Y, Goldstein R, Lasserson TJ, Martin S. Pulmonary rehabilitation for chronic obstructive pulmonary disease. Cochrane Database Syst Rev 2006;(4):CD003793.

Results

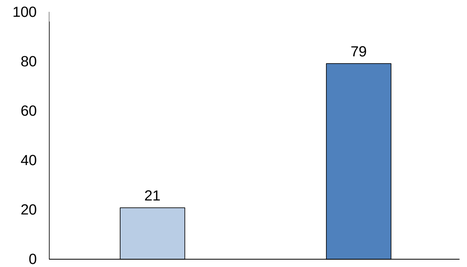


Figure 2. Percentage of participants with or without ARS (n=24).

ARS were present in 5 participants (21% - Figure 2).

Figure 3 shows that patients with ARS had a lower PEF than patients without ARS (294±62 l/min vs. 419±128 l/min; p=0.048).

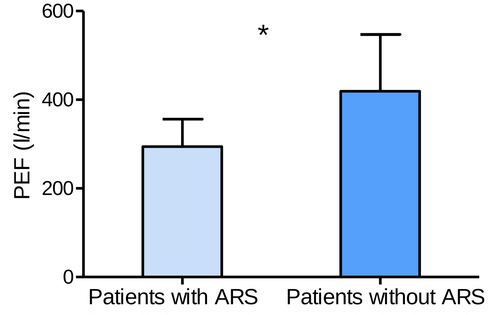


Figure 3. Peak Expiratory Flow in patients with or without ARS (n=24).

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).

Conclusion

Findings suggest that both ARS and PEF offer complementary information before a PR session, but that ARS provide additional information on patents' 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.

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