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Dyspnea Scores May be a Better Predictor of Hospital Admissions than FEV1 for Patients with Acute Asthma Exacerbations

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BACKGROUND

•The NAEPP Expert Panel Report 3 suggests that repeated lung function measures (FEV1 or PEF) 1 hour after initiation of treatment is the strongest single predictor of hospitalization.

•It is also stated that signs and symptoms scores may improve the ability to predict subsequent hospitalization

OBJECTIVES

•To compare repeated FEV1 to a repeated Modified Borg Dyspnea Scale (DS) as a predictor of subsequent hospitalization.

METHODS

•Interim, sub-analysis of an interventional, randomized, double blind, placebo-controlled trial of an intravenous beta agonist performed in an academic, urban-based ,adult ED.

•Inclusion criteria:

- Adult subjects with acute exacerbation of asthma (and no Hx of COPD)
- $FEV_1 \leq$ 50% predicted 30 minutes following initiation of "standard care" (including a minimum of 5 mg nebulized albuterol; 0.5 mg nebulized ipratropium; and 50 mg corticosteroid) were eligible.

•FEV1 was measured using a bedside Nspire spirometer,

•DS was calculated using a Modified Borg Dyspnea score (see figure).

•Delta FEV1 is defined as Hr 3 FEV1 - Baseline FEV1. Delta DS is defined as Baseline DS - Hr 3 DS.

•Spearman's rho was used to measure correlation between FEV1, DS (at baseline, hr 1, hr 2, and hr 3), and delta FEV1 and delta DS and subsequent hospitalization.

• A 1.5 point improvement in delta DS was compared to a 10% improvement in delta FEV1 for predicting subsequent hospitalization using Fisher's exact test.

FIGURE:

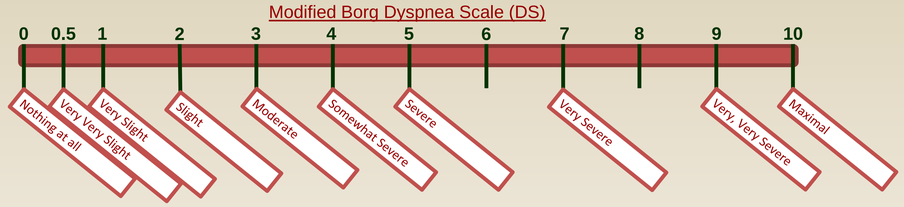

TABLE:

Outcome variable		BSLN FEV1	BSLN DS	H1 FEV1	H1 DS	H2 FEV1	H2 DS	H3 FEV1	H3 DS	Delta FEV1	Delta DS
Admit to hospital	Correlation Coefficient	-.199	.191	-.347*	.405**	-.374*	.499**	-.367*	.541**	-.299*	-.337*
P value	Sig. (2-tailed)	.195	.215	.021	.006	.012	.001	.014	.000	.049	.025

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RESULTS

•44 patients were included for analysis.

•Rho is negative for FEV_1 (higher FEV1 correlates to lower rate of hospitalization) and positive for DS (higher DS correlates to higher rate of hospitalization).

•At each time point, except for baseline, DS was more highly correlated to hospitalization than was FEV1 (table).

- Delta DS ≤ 1.5 showed 73.3% admission rate vs. 27.5 admission rate for delta DS>1.5 (p=0.0089)
- Delta FEV1< 10% showed 51.6% admission rate compared to 23.1% admission rate for delta FEV1>10%. (p=0.1048)

CONCLUSION

- Dyspnea score at 1, 2 and 3 hours was more highly correlated with hospital admission than was FEV1 . Delta DS ≤ 1.5 as well as delta FEV1 < 10% was associated with a significant increase in admission rate.
- In this set of subjects with moderate to severe asthma exacerbation, a standardized subjective tool appears somewhat superior to FEV1 for predicting subsequent hospitalization.

DISCUSSION

- This data highlights the potential limitations of the FEV1 as a prognostic indicator for hospital admission.
  - This may be due to a number of factors:
    - FEV1 may be effort and technique dependent
    - FEV1 may be abnormal at baseline in these patients, thus low FEV1 may not correlate with acute exacerbation
- Continued dyspnea scores may be more important in the decision making process for emergency physicians than FEV1