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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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# 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<sub>1</sub> ≤ 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:

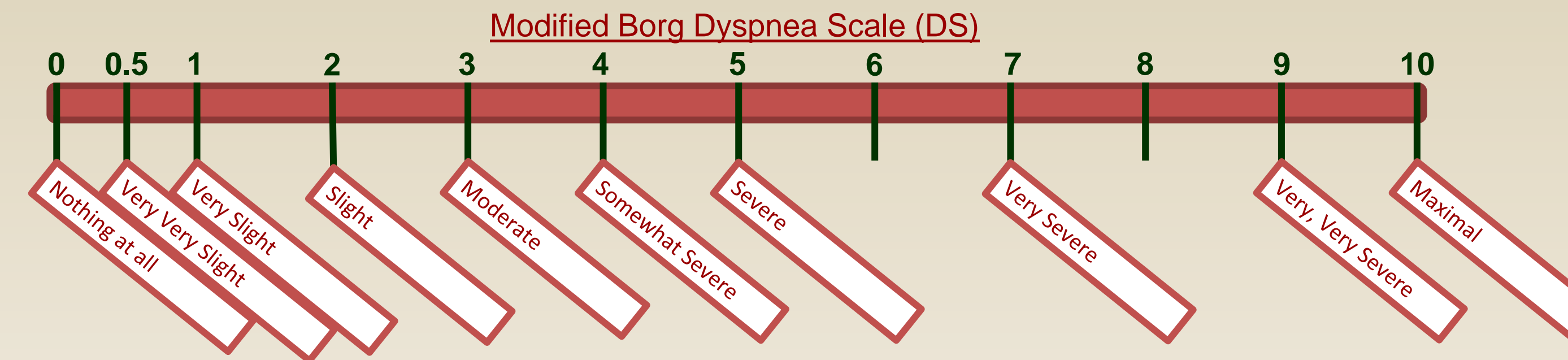


TABLE:

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

## RESULTS

- 44 patients were included for analysis.
- Rho is negative for FEV<sub>1</sub> (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