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JOURNAL CLUB

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ARTICLE

Discriminative Accuracy of FEV1:FVC Thresholds for COPD-Related Hospitalization and Mortality
https://jamanetwork.com/journals/jama/fullarticle/2736562

CLINICAL QUESTION

When used as a diagnostic criterion for COPD, what FEV1/FVC cutoff is most accurate?

SUMMARY

Despite being common and associated with significant morbidity and mortality, there is much controversy and confusion surrounding the diagnosis of chronic obstructive pulmonary disease (COPD). A significant proportion of those suffering from COPD remain undiagnosed and at the same time many patients that have received a diagnosis of COPD do not meet established criteria. Multiple factors contribute to diagnostic uncertainty. The diagnosis of COPD requires demonstration of airflow limitation though there is a lack of consensus regarding how this should be accomplished. Post bronchodilator spirometry is the standard and many argue that a fixed FEV1:FVC threshold of 70% should be used to define airflow limitation. Others recommend using the lower limit of normal to avoid false positives and false negatives among older and younger populations respectively.

Bhatt et al studied 24,207 patients pooled from four US based studies that included spirometry and subsequent surveillance of COPD related clinical events. The primary outcome was a composite of COPD related mortality and first hospitalization. Events were defined “COPD related” by a committee or by ICD codes when a review was not available. The diagnostic accuracy of a fixed FEV1:FVC cutoff versus the lower limit of normal (LLN) was assessed. Prevalence of airflow limitation was 15% using lower limit of normal versus 26% using a fixed ratio threshold. Over a median 15-year period of subsequent surveillance incidence of COPD related events was inversely proportional to FEV1:FVC ratio. Participants with an FEV1:FVC > 0.77 were very unlikely to suffer COPD related events. However, below this ratio there was no inflection point identifying a dramatic difference in risk above or below a certain threshold. Predictive strength of each FEV1:FVC threshold was compared using an estimate of area under the curve for a receiver operator characteristic curve adjusted for censoring (Harrell C Statistic). Using this model, the fixed threshold model was more predictive of future COPD related events than the LLN (0.74 vs 0.66). The LLN threshold was more specific (89% versus 79%) but less sensitive (52% versus 66%).

GROUP OPINION

The COPD group met and discussed this and other similar articles. There was consensus on two key points. First, airflow obstruction exists on a spectrum and there is no single cutoff that can accurately distinguish those with/without abnormal physiology. This is true whether a line is drawn using a fixed 70% ratio or the lower limit of normal based on reference values. As such, a diagnosis of COPD can still be made (or excluded) even in the setting of discordant spirometry. The degree of deviation between the measured ratio and the diagnostic cutoff should, however, affect pretest probability accordingly.

Second, COPD is a clinical diagnosis and cannot be made based on spirometry alone. A diagnosis of COPD should be made in the setting of typical attributable symptoms and history of exposure to at least one risk factor for the disease. Spirometry is used to confirm abnormal physiology. The reason this is felt to be important is that an emphasis on the clinical diagnosis prevents over-diagnosis of COPD among patients with a physiologic FEV1:FVC <70% which can be a normal consequence of aging. It similarly would prevent under diagnosis of COPD among younger patients with a pathologic reduction in FEV1:FVC that is above 70%. Finally, the group discussed shortcomings of reference data sets used to calculate the LLN that predispose certain demographics to diagnostic inaccuracy. This is especially true for ethnicities underrepresented in these data sets.

For these reasons the group agreed that a fixed 70% FEV1:FVC ratio is a preferred spirometric criterion over the LLN but should be used only in the appropriate clinical setting to diagnose COPD. In addition, in the setting of sufficiently high or low pretest probability, a diagnosis of COPD can still be made or excluded even in the presence of a discordant FEV1:FVC above or below 70%.

COPD Journal Club dates and times ***njhealth.org/COPDJournalClub***