Clinical prediction guide

A predictive model using pulmonary function markers identified snorers at low risk for sleep apnoea syndrome


QUESTION: In obese patients who snore, can a predictive model that uses pulmonary function markers identify those who are at low risk for sleep apnoea syndrome (SAS)?

Design
Development and validation of a predictive model by using logistic regression.

Setting
Sleep clinic in Créteil, France.

Patients
168 obese patients (80% men) who attended the sleep clinic for snoring and suspected SAS (development) and 101 similar patients for validation. Body mass index (BMI) was between 25 and 35 kg/m² (mean 29 kg/m²). Exclusion criteria were alcoholism, use of hypnotic medication, upper respiratory tract disorders, previous treatment for SAS, cardiopulmonary or neuromuscular disease, or airway obstruction.

Description of prediction guide
All patients received polysomnography (PSG) (SAS was defined as a combined apnoea plus hypopnoea index [AHI] of ≥ 15 events/h of sleep) and pulmonary function tests (spirometry, arterial blood gas analysis, flow volume curves, and measurement of specific respiratory conductance (sGrS) by the flow oscillation technique). The results were read independently. Logistic regression was used to model the probability of the presence or absence of SAS in the development group patients with AHI as the dependent variable and sGrS and daytime arterial oxygen saturation as the independent variables. The model was used to predict the presence or absence of SAS in the validation group patients.

Main outcome measures
Sensitivity and specificity and predictive values.

Main results
Logistic regression analysis showed that the p Value cut off that correctly classified the largest number of patients was 0.5. The table shows the diagnostic characteristics of the model (development and validation).

Conclusion
In obese patients who snore, a predictive model that used pulmonary function parameters identified those who were at low risk for sleep apnoea syndrome.

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**COMMENTARY**

PSG, the diagnostic standard for SAS, is expensive and time consuming, which limits its availability for the increasing numbers of patients referred to sleep laboratories. The cost and inconvenience of doing PSG, coupled with the high prevalence of apnoea suspects, make a screening test desirable. Clinical prediction models, the flow volume loop, oximetry, and cephalometric studies have been examined as possible predictors of SAS; however, none has proved both easily applicable and sensitive enough to supplant PSG.

Necessary criteria for a screening test to be useful include high sensitivity and NPV, availability, ease of application to the population in question, and low cost. In this study by Zerah-Lancner et al, sGrS has a high sensitivity and NPV for SAS in moderately obese snorers. However, this test is not widely available, and its applicability in this study is limited by broad exclusion criteria to a small subset of patients (ie, absence of cardiopulmonary disease and upper airway disorders, and a BMI of 25 to 35 kg/m²). Unfortunately, the excluded factors, commonly seen in patients suspected of SAS, alter sGrS. Measurement of pulmonary function, including sGrS, is effort dependent and associated with moderate cost. This model, applied in certain subgroups of patients, could reduce resource use in patients at low risk for SAS yet would increase cost and resource use in those still requiring PSG.

The breakpoint of an AHI > 15 used in this study may underestimate the prevalence of clinically significant sleep disordered breathing, especially in those with rapid eye movement specific apnoeas or hypopnoeas or those with the upper airway resistance syndrome. The association of sleep disordered breathing with cardiovascular morbidity has considerable implications for diagnostic efforts and treatment, even in those with low AHI.

This study is a valuable step in the search for a screening tool for SAS, and it is applicable to a subgroup of obese snorers with no associated cardiopulmonary or upper airway abnormalities. However, caution should be exercised in broadly applying this model. Patients with excessive sleepiness should go directly to PSG with or without a multiple sleep latency test to exclude SAS or sleep disorders.

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