

Using the ARES screener and the Berlin questionnaire to predict OSA

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Introduction: The purpose of this study was to compare the sensitivity and specificity of two questionnaires to identify patients with Obstructive Sleep Apnea (OSA).

Methods: 39 OSA patients (Apnea-Hypopnea Index [AHI]≥15) and 23 controls (AHI<15) based on ambulatory somnographic assessment were recruited through flyers and mail (Dr Clark's patients, IRB #HS-051050). Each patient answered the Berlin Questionnaire (11 questions about snoring/apnea) and the ARES screener. In this prospective case-control study, the cases were almost 10 years older, were 3.3 kg/m² heavier and had 2 inches thicker neck circumference. Cases had a mean AHI of 32.6 events/hour compared to 7.0/hr for the controls. Cases had a mean Apnea Index of 13.8 events/hour compared to 1.2 for the controls. The responses to the Berlin Questionnaire and the ARES questionnaire were analyzed and summarized in a dichotomous variable (predicted OSA) for each questionnaire. These dichotomous variables were compared for significant group differences between OSA and controls using paired McNemar's Chi-square test ($\alpha \leq 0.05$). Statistical analyses were performed with SAS software.

Results: The two groups did have significant differences in age ($p=.001$), gender ($p=.017$), neck circumference ($p<.0001$), BMI ($p=.0016$), AHI ($<.0001$) and Apnea Index ($p<.0001$). There were no significant differences in race, or ethnicity between the two groups. In this study, subjects having a "high risk" ARES questionnaire were 6.7 times as likely to have OSA (AHI>15 events/hr) as subjects with "low or no risk" score ($p=.003$). The ARES questionnaire had a sensitivity of 89.7%, specificity of 43.5%, a Positive Predictive Value [PPV] of 72.9% and Negative Predictive Value [NPV] of 71.4%, compared to 69.2%, 52.2%, 71.1% and 50% respectively for the Berlin Questionnaire using a cut-point of AHI≥15. If we use a cut-point of AHI≥10, we obtain an ARES sensitivity of 88.9%, specificity of 52.9%, a PPV of 83.3% and NPV of 64.3%, compared to 71.1%, 64.7%, 84.2% and 45.8% respectively for the Berlin Questionnaire. Berlin and ARES questionnaire were significantly associated (OR=6.07, [1.62, 22.6], $p=.0043$).

Conclusions: The ARES questionnaire performed better in most of the situations with higher sensitivity, similar PPV, higher NPV but lower specificity. This could be explained because the test has been tailored to screen patients with an AHI≥5, however we do not have enough patients below 5 to conduct that comparison. In conclusion, the ARES questionnaire is a better choice than the Berlin Questionnaire in most of the situations, but further research is necessary to generalize these results.

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