

Validation of the WristOx 3100™ oximeter for the diagnosis of sleep apnea/hypopnea syndrome

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Abstract

Objective To evaluate the diagnostic accuracy of the Nonin WristOx 3100™ and its software (nVision 5.0) in patients with suspicion of sleep apnea/hypopnea syndrome (SAHS). **Methods** All participants (168) had the oximetry and polysomnography simultaneously. The two recordings were interpreted blindly. The software calculated: adjusted O₂ desaturation index [ADI]-mean number of O₂ desaturation per hour of total recording analyzed time of ≥2%, 3%, 4%, 5%, and 6% (ADI2, 3, 4, 5, and 6) and AT90-accumulated time at SO₂<90%. The ADI2, 3, 4, 5, and 6 and the AT90 cutoff points that better discriminated between subjects with or without SAHS arose from the receiver operating characteristic curve analysis. The sensitivity (*S*), specificity (*E*), and positive and negative likelihood ratio (LR+, LR-) for the different thresholds for ADI were calculated.

Results One hundred and fifty-four patients were included (119 men, mean age 51, median apnea/hypopnea index [AHI] 14, median body mass index [BMI] 28.3 kg/m²). The best cutoff points of ADI were: SAHS=AHI≥5: ADI2>19.3 (*S* 89%, *E* 94%, LR+ 15.5 LR- 0.11); SAHS=AHI≥10: ADI3>10.5 (*S* 88%, *E* 94%, LR+ 15 LR- 0.12); SAHS=AHI≥15: ADI3>13.4 (*S* 88%, *E* 90%, LR+ 8.9, LR- 0.14). AT90 had the lowest diagnosis accuracy. An ADI2≤12.2 excluded SAHS (AHI≥5 and 10; *S* 100%, LR- 0) and ADI3>4.3 (AHI≥5 and 10) or 32 (AHI≥15) confirmed SAHS (*E* 100%).

Conclusions A negative oximetry defined as ADI2≤12.2 excluded SAHS defined as AHI≥5 or 10 with a sensitivity and negative likelihood ratio of 100% and 0%, respectively. Furthermore, a positive oximetry defined as an ADI3>32 (SAHS=AHI≥15) had a specificity of 100% to confirm the pathology.

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Introduction

Sleep apnea/hypopnea syndrome (SAHS) is a major health problem due to its prevalence rates of 2–4% in middle-aged people [1]. Significant morbidity [2, 3] and mortality [4] have been reported in patients with SAHS. The gold standard diagnostic test for SAHS is overnight polysomnography (PSG). Owing to the cost, the requirement for technical expertise and the accessibility to diagnosis [5], a number of alternatives to PSG have been proposed [6]. Nocturnal oximetry has been evaluated in patients with SAHS, as it analyzes arterial oxygen desaturation, one of