Original Article

Apnoeic and Hypopnoeic Load in Obstructive Sleep Apnoea: Correlation with Epworth Sleepiness Scale

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Abstract

Introduction: Patients with obstructive sleep apnoea (OSA) often present with excessive daytime sleepiness (EDS) as measured by the Epworth Sleepiness Scale (ESS). However, the relationship between EDS and OSA severity as measured by the apnoea-hypopnoea index (AHI) remains inconsistent. We hypothesise that this may be due to the usage and equal weightage of apnoea and hypopnoea events used in determining AHI and that apnoea and hypopnoea load as measured by their total durations may be a better metric to use. We sought to investigate if apnoea or hypopnoea load can display better correlation with ESS. Materials and Methods: Retrospective analysis of 821 patients with AHI ≥5, who underwent in-laboratory polysomnogram for suspected OSA from January 2015 - December 2015, was performed. Objective factors on polysomnogram were correlated with ESS. Results: ESS was correlated with age (r = -0.148, *P* <0.001), number of apnoeas (r = 0.096, *P* = 0.006), apnoea load (r = 0.102, *P* = 0.003), apnoea index (r = 0.075, *P* = 0.032), number of desaturations (r = 0.081, *P* = 0.020), minimum SpO_2 (r = -0.071, *P* = 0.041), time SpO_2 <85% (r = 0.075, *P* = 0.031) and REM sleep duration (r=0.099, *P* = 0.004). Linear regression analysis found age (*P* <0.001), apnoea load (*P* = 0.005), REM (*P* = 0.021) and stage 1 sleep duration (*P* = 0.042) as independent factors correlated to ESS. The apnoea load calculated using duration in apnoea correlate with ESS in patients with severe OSA by AHI criteria compared to the mild category. Conclusion: AHI does not correlate with ESS. Younger age, longer apnoea, stage 1 and REM sleep were independently related to higher ESS though the correlations were weak. Apnoea load should be taken into account when determining OSA severity.

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Key words: Apnoea duration, Epworth sleepiness scale

Introduction

Obstructive sleep apnoea (OSA) is a common disorder, estimated to affect up to 15-30% of the Singaporean population.[1,2] It is characterised by recurrent collapse of the upper airways during sleep, resulting in transient airflow cessation, intermittent nocturnal hypoxaemia and sleep fragmentation, factors linked to increased day time sleepiness.[3,4]

The Epworth Sleepiness Scale (ESS) was developed in 1991 to quantify daytime sleepiness.[5] Since its inception, it has gained in popularity and is commonly used to assess excessive daytime sleepiness (EDS) and OSA. EDS is known to contribute to increased motor vehicular accidents, impaired social functioning and reduced quality of life.[6-8] Although a prominent symptom of OSA patients,[9] studies have failed to find a consistent relationship between EDS and OSA severity as measured by the apnoea-hypopnoea index (AHI) or respiratory disturbance index (RDI).[10-12]

We postulate that this could be the result of criteria set for scoring apnoea or hypopnoea and that respiratory events are

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