ORIGINAL RESEARCH

Low Quality of Life and Depressive Symptoms as an Independent Risk Factor for Erectile Dysfunction in Patients with Obstructive Sleep Apnea

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ABSTRACT

Introduction. Accumulating evidence indicates that obstructive sleep apnea (OSA) is associated with a high prevalence of erectile dysfunction (ED), but the factors that predict the risk of ED in OSA patients have yet to be defined clearly.

Aims. The aims of the present study were to investigate the clinical characteristics of OSA patients with ED and to identify plausible predictors of ED.

Methods. The present cross-sectional analysis included 713 male patients who visited Seoul National University Hospital for snoring and/or daytime sleepiness from 2006 to 2014. An in-laboratory polysomnography procedure was conducted to obtain objective recordings of OSA and other sleep parameters.

Main Outcome Measures. The demographic data of all patients were obtained, and each patient completed all requirements of the following questionnaires: the Calgary Sleep Apnea Quality of Life Index (SAQLI), the Korean version of the International Index of Erectile Function (KIIEF-5), the Beck Depression Inventory (BDI), and the Epworth Sleepiness Scale (ESS). ED and OSA were defined as a KIIEF-5 < 21 and a respiratory disturbance index (RDI) ≥ 5, respectively. Depressive symptoms were defined as a BDI ≥ 10.

Results. The frequency of ED did not differ significantly according to OSA severity. In Spearman's correlation analysis, the BDI and the ESS were inversely correlated with the KIIEF-5, whereas the SAQLI was positively correlated with the KIIEF-5. The RDI and the lowest oxygen saturation (SaO_2) did not exhibit significant correlations with the KIIEF-5. A multivariate logistic regression analysis adjusted for possible confounding factors showed that ED was independently associated with the SAQLI and depressive symptoms, but there was no significant association of ED with either the RDI or the lowest SaO_2.

Conclusions. The present study demonstrated that depressive symptoms and a low quality of life specific to sleep apnea are independent risk factors for ED in OSA patients. **Jeon YJ, Yoon DW, Han DH, Won T-B, Kim D-Y, and Shin H-W. Low quality of life and depressive symptoms as an independent risk factor for erectile dysfunction in patients with obstructive sleep apnea. J Sex Med 2015;12:2168–2177.**

Key Words. Obstructive Sleep Apnea; Erectile Dysfunction; Calgary Sleep Apnea Quality of Life Index; International Index of Erectile Function; Beck Depression Inventory; Epworth Sleepiness Scale; Polysomnography

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Introduction

Obstructive sleep apnea (OSA) is a highly prevalent condition observed in 9% of women and 24% of men over 30 years of age that is characterized by repetitive upper airway obstructions during sleep [1]. Accumulating evidence has consistently demonstrated a significant association between OSA and chronic conditions such as cardiovascular disease, diabetes mellitus (DM), and depression, as well as a decreased quality of life (QOL; [2–6]).

Erectile dysfunction (ED) can be defined as the inability to achieve or maintain a penile erection sufficiently rigid for performing satisfying sexual intercourse [7]. ED is a common and important health issue affecting nearly 50% of men over 40 years of age that may result in a significant negative impact on the satisfaction and QOL of the affected individuals [8,9]. The prevalence of ED varies widely according to country and age distribution. For example, in the United States, the prevalence of ED in individuals 20 years of age and over was 18.4% when ED was assessed by a computer-assisted self-interview [10], while in France the prevalence rate of ED was found to be 31.6% in men over 40 years of age [11]. A meta-analysis that investigated the prevalence of ED in Asia found that the overall prevalence rate of this disorder ranges from 2% to 88% [12]. Additionally, according to a prospective population-based study conducted in Australia, the 5-year incidence of ED in 810 randomly selected men aged 35–80 years was 31.7%, and old age, low income, alcohol intake, high abdominal fat mass, and the high probability of OSA, DM, and depression were predictors of incident ED [13].

ED may be the result of various psychological, neurological, hormonal, and vascular problems as well as drugs and systemic diseases, or a combination of these factors [14]. ED is frequently comorbid in patients with OSA [6,15,16], but the exact mechanisms underlying the development of ED in OSA patients are not yet fully understood. Endothelial dysfunction caused by oxidative stress, intermittent hypoxia, sleep fragmentation, and/or rapid eye movement (REM) sleep disturbances are regarded as the most plausible mechanisms that link OSA and ED [17], because these factors can impair the ability of endothelial cells to secrete nitric oxide, which, in turn, leads to inhibition of smooth muscle relaxation and, subsequently, inadequate endothelial vasodilation in the corpora cavernosa. In addition to endothelial dysfunction, depression may also play an important role in the relationship between OSA and ED, as evidenced by the high prevalence of ED in OSA patients. Additionally, depression is commonly comorbid in men with ED [18], and according to the Massachusetts Male Aging Study [8], subjects with depression have a 1.82-fold greater risk of experiencing ED than those who have not been diagnosed with depression. Depression may cause ED via reduction in the level of sexual desire and/or the inhibition of parasympathetic nerve activities, which decrease the blood volume entering the penis and lead to the impairment of penile smooth muscle relaxation [14].

Although a number of studies have identified an association between ED and OSA, the independent predictors of ED in patients with OSA remain unclear. This may be due, at least in part, to the well-known risk factors of ED, including hypertension (HTN), DM, obesity, age, and depressive symptoms, are frequently comorbid in OSA patients, but are often neglected in studies [15,19], or the main focus of the studies is the severity of OSA or sleep parameters. Thus, the primary aims of the present study were as follows: (i) to investigate the association between ED and OSA; (ii) to examine the differences in clinical characteristics between patients with ED and those without ED; and (iii) to identify any plausible predictors of ED, such as lifestyle or psychiatric conditions (e.g., daytime sleepiness, depression, and QOL), in OSA patients.

Materials and Methods

Study Sample

The present study adopted a cross-sectional design and analyzed data acquired from male patients who visited Seoul National University Hospital between December 2006 and November 2014 for snoring and/or daytime sleepiness. All participants completed a questionnaire concerning demographic information, medical history, sleepiness, mood status, and ED at the time that they visited the sleep clinic for a nocturnal polysomnography (PSG) examination.

Patients were excluded from the present study if they had psychiatric disorders, including anxiety disorders, and/or were taking antipsychotics. However, patients diagnosed with depression, whether or not they were taking antidepressants, were included in the final analyses if they had not been diagnosed previously with another psychiatric disorder. Patients who had the following symp-