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Obstructive sleep apnea in psychiatric outpatients. A clinic-based study

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ABSTRACT

Psychiatric diseases and symptoms are common among patients with obstructive sleep apnea (OSA). However, only a few studies have examined OSA in psychiatric patients. At the outpatient clinic of the Uusikaupunki Psychiatric Hospital, Finland, we used a low referral threshold to a diagnostic sleep study. An ambulatory cardiorespiratory polygraphy was performed in 114 of 221 patients. 95 patients were referred by the psychiatric clinic and 19 were examined in other clinical settings. We reviewed the medical files and retrospectively assessed the prevalence of OSA and the effect of gender, age, obesity, hypertension, type 2 diabetes, alcohol abuse, and symptoms suggesting OSA. 58 of the 221 patients (26.2%), 30 of 85 men (35.3%) and 28 of 136 women (20.6%), had OSA as determined by an apnea −hypopnea index (AHI) of 5/h or more. 20 patients (12 men and 8 women) had moderate or severe OSA (AHI $\geq$ 15/h). 46 patients (including 11 patients with moderate or severe OSA) were identified in the psychiatric clinic. In univariate analysis, a high body mass index, male gender, hypertension, snoring, and a history of witnessed apneas during sleep were associated with the presence of OSA. In multivariate analysis, a history of witnessed apneas did not remain significant. Age, type 2 diabetes, alcohol abuse, excessive daytime sleepiness (EDS), and fatigue did not associate with the presence of OSA. Our findings suggest that in psychiatric outpatients OSA is common but underdiagnosed. Presentation is often atypical, since many patients with OSA do not report witnessed apneas or EDS.

1. Introduction

Obstructive sleep apnea (OSA) is a breathing disorder characterized by recurrent episodes of complete or partial obstruction of the upper airway during sleep (Ioachimescu and Collop, 2012). Manifestations of OSA include fatigue, mood symptoms, non-refreshing sleep, witnessed apneas during sleep, and excessive daytime sleepiness (EDS) (Ioachimescu and Collop, 2012). The Epworth Sleepiness Scale (ESS) is commonly used as a screening test for EDS. A score of 11 or more suggests EDS (Johns and Hocking, 1997), but cutoffs at eight (Rosenthal and Dolan, 2008), or nine for males but six for females (Zou et al., 2013) have also been suggested. The increased prevalence of depression and anxiety in OSA patients is well established (Millman et al., 1989; Ohayon, 2003; Sharafkhaneh et al., 2005; Peppard et al., 2006; Saunamäki and Jehkonen, 2007; Ishman et al., 2010; Wheaton et al., 2012; Chen et al., 2013). The prevalence of OSA based on sleep studies in psychiatric patients ranges from 4.7 to 59.4% (Reynolds et al., 1982; Takahashi et al., 1998; Ancoli-Israel et al., 1999; Winkelman, 2001; Hattori et al., 2009; Ong et al., 2009; Nasr et al., 2010; Shirani et al., 2011; Van Liempt et al., 2011; Anderson et al., 2012; Kelly et al., 2013).

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Since some symptoms of OSA are common also in psychiatric disorders, OSA may stay undiagnosed in psychiatric patients (Ohayon, 2003; Deldin et al., 2006; Harris et al., 2009; Ishman et al., 2010; Nasr et al., 2010; Shirani et al., 2011; Soreca et al., 2012; Chen et al., 2013; Haynes, 2013; Naqvi et al., 2014). An atypical presentation of OSA in trauma patients with significant sleep symptoms has been reported (Krakow et al., 2001, 2004, 2006). There are no studies on the effects of comorbid alcohol abuse on the risk of OSA in psychiatric patients, and little is known on the effects of hypertension (Ohayon, 2003; Farney et al., 2004; Shirani et al., 2011; Anderson et al., 2012) and diabetes mellitus type 2 (Shirani et al., 2011).

In an outpatient psychiatric clinic, we have used a low-threshold approach by referring for a cardiorespiratory polygraphy also patients that did not report witnessed apneas or EDS. We report the prevalence of OSA and the effects of age, gender, hypertension, type 2 diabetes, alcohol abuse, obesity, daytime sleepiness, fatigue, snoring, and witnessed apneas on the risk of OSA.

2. Material and methods

2.1. Subjects and study design

The study was performed at the outpatient clinic of the Uusikaupunki Psychiatric Hospital, Finland, which provides psychiatric services to the city of Uusikaupunki and surrounding counties. Most of the patients were referred by their primary care physician and the rest by the hospital's psychiatric wards, private psychiatrists, or by other specialist physicians. One of the authors (GN) worked as a psychiatrist at the clinic from November 15, 2008 to August 31, 2010, and treated more than 90% of all patients ($n = 222$).

None of the patients had been referred for a sleep study in the psychiatry clinic before the study period. Sleep studies done elsewhere ($n = 19$) were identified from patients' charts, which include a detailed history of all outpatient visits and hospitalizations due to somatic disorders. During the study period, there was an effort to integrate assessment of OSA to standard psychiatric treatment by evaluating risk factors and symptoms of OSA. We took into account obesity, upper airway structure, retro- or micrognathia, non-refreshing sleep, fatigue, nocturia, EDS, snoring, and a history of witnessed apneas. The referral threshold to a cardiorespiratory polygraphy was kept low by not requiring a history of witnessed apneas, snoring, or EDS. There were no resource restrictions affecting referral and all examinations were scheduled for the next three months.

OSA was diagnosed with an ambulatory cardiorespiratory polygraphy (Embletta PDS, Embla Systems LLC) including recording of oxygen saturation by finger probe pulse oximetry, heart rate, thoracic and abdominal movements, nasal airflow and pressure, snoring, and body position. The patients who underwent a sleep study completed the ESS and a questionnaire on weight, height, snoring, witnessed apneas during sleep, daytime fatigue, and daytime dozing. The questionnaire items had five categories of event occurrence: every or almost every night, 3–5 nights per week, 1–2 nights per week, less often than once per week, and less often than once per month or never.

For the purpose of the study, all sleep studies for which polygraphy data were available were reread by an expert (IV) using the alternative criteria of the AASM 2007 guidelines (Iber et al., 2007). Because there were no EEG data available, respiratory effort related arousals could not be scored (Iber et al., 2007). The questionnaire answers were dichotomized, with a frequency of at least 1–2 times per week indicating symptom occurrence. Missing values were much more common for snoring and witnessed apneas (16 and 23, respectively) compared to fatigue and dozing (4 and 5, respectively). Since the clinical utility of these variables relies on event occurrence, we recoded missing values on snoring and witnessed apneas as negative for patients who had answered to the questions on fatigue and dozing but we left them missing if the questions on fatigue or dozing were not answered. Body mass index (BMI) was calculated from reported weight and height. Information on diagnosis of hypertension and type 2 diabetes mellitus was extracted from the medical files. Study subjects were considered alcohol abusers if they were diagnosed with alcohol abuse or alcohol dependence, if they were offered treatment for alcohol problems, if they had an abnormal carbohydrate deficient transferrin value, or if their plasma concentration of gamma-glutamyl transferase or alanine amylotransferase was at least twice the upper limit of normal in the absence of non-alcoholic liver disease.

Cardiorespiratory polygraphy was recommended in the psychiatric clinic for 110 patients, of which 96 agreed (Fig. 1). Thus, including the 19 patients examined elsewhere, 115 of the 222 patients (58.1%) were examined. For four patients examined elsewhere, the sleep study recording was missing. Because these patients had been treated for severe OSA with continuous positive airway pressure (CPAP) for several years, they were included in the analysis and the apnea–hypopnea index (AHI) was retrieved from the study report or the patient's chart. One sleep study was of poor quality and could not be rescored, and therefore this patient was excluded from the analysis. A total of 114 of the 221 patients (51.6%) underwent a cardiorespiratory polygraphy, including 95 of the 202 patients (47%) evaluated for OSA in the psychiatric clinic and included in the analysis.

Table 1 shows the psychiatric diagnoses of the patients according to the ICD-10 disease classification system. The most frequent diagnoses were major depressive disorder, bipolar disorder, and anxiety disorder.

2.2. Statistical analysis

Data were analyzed using the SPSS statistical software version 20 (IBM corporation, USA). AHI < 5/h was considered normal. AHI of 5/h to less than 15/h was considered mild OSA, 15/h to less than 30/h moderate, and 30/h or more severe OSA. The Chi-square test and unpaired t-test were first used to compare patients who were examined and not examined by cardiorespiratory polygraphy. Univariate and multivariate binary logistic regression models were then used to study the effects of risk factors on the occurrence of OSA. Risk factor variables included age (continuous), BMI (categorical: <30 kg/m^2, 30–35 kg/m^2, ≥35 kg/m^2), and as binary variables gender, having a domestic partner, examination setting, hypertension, type 2 diabetes, alcohol abuse, snoring, witnessed apneas, fatigue, and daytime dozing. In addition, ESS was examined separately as a continuous, and as binary (0–10 vs. 11–24 points, 0–8 vs. 9–24 points, and 0–9 vs. 10–24 points for males but 0–6 vs. 7–24 points for females) variables. A p-value of less than 0.05 was considered significant, but a p-value of less than 0.20 in univariate analysis was used as a threshold to include the variable in 2-way interaction and multivariate analyses. Two-sided tests were used.

2.3. Ethical issues

Review of patients' medical files was approved by the Turku University Hospital. According to the Finnish legislation, patient consent is not needed in a retrospective study using routine clinical data.