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THE INCIDENCE OF SLEEP APNEA IN PATIENTS WITH STROKE OR TRANSIENT ISCHEMIC ATTACK

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Disorders of breathing during sleep are defined as cessation or reduction of air flow thorough the upper airway, accompanied by a decrease of oxygen saturation. The results of many studies underline the association between sleep-disordered breathing (SDB) and cerebrovascular disorders. SDB, mostly obstructive sleep apnea syndrome (OSAS), is believed to be an independent risk factor of stroke and is related to poor outcome and increased long-term stroke mortality. The present study evaluated the frequency of SDB in patients with stroke or transient ischemic attack transient ischemic attack. We studied 43 patients (mean age 68.5 ±11.0), which included 35 males and 8 females, with acute stroke (n=37) and transient ischemic attack (n=6). The assessment included body mass index (BMI), age, cardiovascular risk factors, and localization of stroke. All patients underwent all-night screening for SDB with a portable 8-channel recorder. The apnea/hypopnea index (AHI) for the whole group was 13.3 ±15.2. AHI <5 was found in 16 patients. Overall, SDB was present in 27 (62.8%) patients with stroke and transient ischemic attack, stratified into those with AHI 5-10, (10 patients), 10-20 (8 patients), and AHI>20 (9 patients). In 15 patients, there was an increase in AHI ≥5 on assuming the supine position. The patients' mean BMI was 27.8 ±4.7. The analysis of BMI, age, and localization of stroke was not sufficient to identify patients with high risk for SDB. We submit that overnight screening for SDB should be routinely performed in every patient after stroke and transient ischemic attack and it should become a diagnostic tool in neurological departments.

Key words: *risk factors, sleep apnea, stroke, transient ischemic attack*

INTRODUCTION

Sleep disordered breathing (SDB) refer to cessation (apnea) or reduction (hypopnea) of air flow at the nose and mouth with an accompanying decrease in arterial oxygen saturation during sleep. The majority of apneas are caused by an obstruction along the upper airway. When the number of apneas exceeds five per hour of sleep (apnea index, AI >5) the obstructive sleep apnea syndrome (OSAS) is usually diagnosed. Another example of SDB is the central sleep apnea syndrome (CSAS) where apnea is secondary to the lack of inspiratory muscle contraction. Mixed apneas are a combination of both apnea types. A frequent occurrence in clinical practice is overlapping syndromes, in which SDB accompany other respiratory disorders such as chronic obstructive pulmonary disease or asthma (1-4).

SDB has increasingly been recognized as a serious health problem in the community. The prevalence of OSAS is at least 2% in women and 4% in men in the general population. In selected populations, e.g. in men aged 30-60 years the prevalence of OSAS exceeds 10% or even 20% according to some authors (5). The prevalence is still higher in patients suffering from cardiovascular diseases such as arterial hypertension, heart attack, and stroke. OSAS is believed to be an independent risk factor of stroke and is related to poor outcome and increased long-term stroke mortality (2-4, 6). Epidemiological studies point to ischemic stroke as the leading cause of high mortality or permanent disability in the aging population. Health organizations put emphasis on primary prevention of stroke through the determination of risk factors of cardiovascular diseases. Identification of certain risk factors, such as arterial hypertension, hyperlipidemia, diabetes, various abnormal cardiac conditions, smoking enables their modifications to prevent stroke or minimize its consequences (7, 8). OSAS seems another risk factor that is a treatable and therefore its existence should be searched for by neurologists.

We herein report the results of a study whose aim was to evaluate the frequency of SDB in a group of Polish patients with stroke or transient ischemic attack.

MATERIAL AND METHODS

The study was conducted in accordance with the Declaration of Helsinki and was approved by an institutional Ethics Committee. We investigated 43 patients (mean age 68.5 ±11.0), F/M – 8/35, hospitalized at the First Department of Neurology in Institute of Psychiatry and Neurology in Warsaw with the diagnosis of acute ischemic stroke (n=37) or transient ischemic attack (n=6). The inclusion criteria for the patients also included the state of consciousness and the willingness to cooperate with the study protocol. All patients gave written consent to the study. The assessment included body mass index (BMI), age, cardiovascular risk factors, and localization of stroke. All patients underwent all-night screening for SDB with a portable 8-channel recorder (Embletta Medcare, Iceland). The recorded variables were the following: nasal flow, respiratory effort of the

thorax and abdomen, snoring, oximetry, pulse, and body position. These variables were analyzed with Somnologica Software (Medcare, Iceland) and the apnea/hypopnea (AHI; a sum of apneas and hypopneas lasting ≥10 s divided by the recording time in hours) and desaturation indexes (DI; a sum of arterial blood oxygen desaturation dips ≥4% divided by the recording time in hours) were calculated. The examination was performed in the acute phase of disease, within the first week of stroke or transient ischemic attack. Non-parametric Kruskal-Wallis test with post-hoc tests and the Wilcoxon matched pair test were used to compare countable variables and χ^2 test for categorical variables. The level of significance was set at a $P<0.05$.

RESULTS

The mean AHI for the whole group was 13.3 ±15.2. In 16 of the 43 patients the index was within the normal range of <5. Overall, sleep apneas were present in 27 (62.8%) patients with stroke or transient ischemic attack. These patients were stratified into three subgroups depending on the magnitude of the index: mildly increased AHI (5-10) – in 10 (37.0%) patients, moderately increased AHI (10-20) - 8 (29.6%) patients, and severely increased AHI (>20) - 9 (33.3%) patients (*Fig. 1*). The type of SDB diagnosed was: OSAS in 22 (81.5%) patients, CSAS in 3 (11.1%) patients, and mixed apneas in 2 (7.4%) patients.

The mean AHI in the patients suffering from sleep apneas was 17.7 ±20 in the supine position and was significantly higher than the 8.4 ±14.6 for other than supine positions ($P<0.001$). An increase in AHI of ≥5 in the supine position was found in 15 patients. The mean DI for the whole group amounted to 11.8 ±14.1. This index was within the normal range of <5 in 19 patients and its increases corresponding to the AHI disease stratification were as follows: mild – 7, moderate – 8, and severe – 9 patients.

The mean BMI of the patients with the normal AHI was 28.6 ±5.0. For the groups of sleep apnea patients stratified into those having mildly, moderately, and severely increased AHI, the mean BMI was: 25.7 ±2.1, 27.1 ±2.9, and 29.5 ±6.8, respectively; the differences were insignificant. The mean age of the patients with the normal AHI was: 63.2 ±12.2 yr and in those with sleep apnea it was 71.3 ±9.8

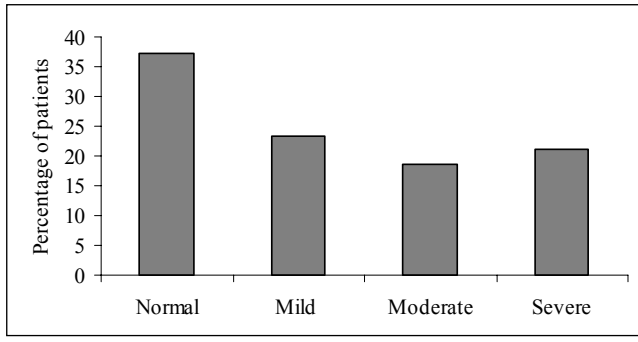

Fig. 1. Distribution of apnea/hypopnea index (AHI) in patients with stroke or transient ischemic attack. AHI: normal <5, mildly increased 5-10, moderately increased 10-20, and severely increased >20.

yr, 77.4 ±3.8, and 67 ±9.3 yr, respectively ($P<0.05$ for the difference between the age of patients with moderately increased AHI and those with normal AHI). Concerning the clinical brain damage assessment, the affliction of one hemisphere only was evidenced in 35 patients, among those the left side in 19 and the right side in 16 patients. In 3 other patients, ischemic damage was localized to the brainstem and in further 2 patients to one hemisphere and the brainstem. Neither the localization of stroke nor the diagnosis of stroke or transient ischemic attack differentiated the groups of patients with respect to the AHI score.

The presence of other, well-established risk factors for stroke was evaluated in all patients. The most frequent disorders diagnosed were: arterial atherosclerosis, usually accompanied by hyperlipidemia, in 32, arterial hypertension in 29, coronary heart disease in 22, cardiac arrhythmias in 13 patients. Diabetes was found only in 5 cases and smoking was declared by 11 subjects. Differences in the frequency of those risk factors between the groups with and without SDB were insignificant.

DISCUSSION

The study demonstrates that SDB was a frequent accompaniment of stroke and transient ischemic attack in neurological patients. A 63% incidence of SDB noted in this study corresponds well to the 44-80% occurrence of SDB reported in other studies worldwide (9-11). The high frequency of SDB in stroke patients raises the question of whether SDB precedes stroke, being a risk factor for it, or is a consequence of stroke. Current evidence strongly supports the former. While CSAS is mostly related to metabolic and cardiovascular disturbances caused by damage to the central nervous system, OSAS is present with similar frequency in patients suffering from transient ischemic attack or ischemic stroke (6, 12). Furthermore, longitudinal studies prove OSAS to be not only an independent risk factor of stroke but also for arterial hypertension, which, in turn, is a well-established risk factor for cardiovascular events. Thus OSAS is the predominant type of SDB in both stroke patients and general population (2-4).

Current guidelines for treatment of stroke stress the importance of preventive actions aimed at eliminating all treatable risk factors of it (8). However, daily clinical practice shows that physicians pay much less attention to SDB than to other risk factors. This is rather surprising in view of the SDB occurrence in stroke patients which is almost as frequent as generalized atherosclerosis and arterial hypertension and is commoner than diabetes, cardiac arrhythmias, and coagulation disturbances. Such a situation has presumably two explanations. Firstly, SDB is still frequently not considered as a serious disorder, but depreciated as a benign loud snoring. Secondly, even if physicians are aware of negative consequences of untreated SDB, they frequently do not start diagnostic and therapeutic procedures in stroke patients due to therapeutic nihilism. Indeed, it is commonly assumed that

stroke patients poorly adhere to treatment with continuous positive airway pressure (CPAP) (13). CPAP is currently the first line treatment option for OSAS as it is not invasive, safe for the patients and usually well-tolerated (14, 15). It is commonly argued that stroke patients are mostly unable to put on and off their CPAP masks and to perform daily activities to keep their CPAP devices in the working condition without external help. However, substantial improvements in rehabilitation techniques of stroke patients in the last years and the settlement of rehabilitation wards in the proximity of stroke units should revise this negative attitude. Well performed neurological rehabilitation and careful instructions given to the patient and his family by experienced personal of rehabilitation units should allow treating life-threatening SDB adequately in many such patients (10, 16). For patients who poorly respond to CPAP treatment, surgical procedures should be considered. It is recommended each patient with SDB be consulted by a laryngologist. Even a small improvement of nose patency or tonsillectomy may substantially improve SDB severity. However, due often to advanced age, general medical condition, and frequent comorbidities, intensive surgical procedures such as uvulopalatopharyngoplasty are not suitable for stroke patients. It should to be stressed that making the diagnosis of SDB in stroke patients is worthwhile even if adherence to CPAP would be poor or surgical intervention unfeasible. Some patients may benefit from such simple actions as weight reduction or avoidance of sleep in the supine position and alcohol consumption before bedtime (15). The diagnosis of SDB also may be important for pharmacologic treatment, for some medicines commonly used in stroke patients such as benzodiazepine hypnotics or analgesics with muscle relaxing properties are strongly contradicted in SDB. Finally, it is worth noting that this study, and also others, showed that the evaluation of BMI, age, and localization of stroke are not sufficient measures to identify patients with high risk for SDB, and the prediction of SDB based on the presence of the male gender and habitual snoring is only slightly better (17, 18). As diagnosing SDB by means of portable recorders is safe and relatively inexpensive, we submit that screening for SDB is worth being established as a routine diagnostic examination in neurological departments in Poland.

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