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Screening tools for identifying a high probability of obstructive sleep apnea

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Background. Obstructive sleep apnea (OSA) is a common medical problem that affects up to 5% of the population. The majority of OSA patients are undiagnosed and have a potential for perioperative complications. Our study was conducted to validate the most widely used screening tools for identifying high risk OSA patients and to find the most predictable physical signs and symptoms of OSA.

Materials and methods. At the Sleep Laboratory of Riga Stradins University, 100 patients with suspected OSA were asked to fill in patient questionnaires prior to the sleep study. The patients' anthropometric data, physical signs and medical history were collected. To confirm the diagnosis of OSA, all patients underwent a full night sleep study. To find the possible correlation, the data collected from the questionnaires were compared with the data from sleep studies.

Results. Patients (n = 100) at a mean age of 47 yrs. (23–73), 22 women, 78 men. No OSA was found in 17%, mild OSA in 23%, moderate OSA in 21%, severe OSA in 39% of the patients. A strong correlation between the body mass index (BMI; $p < 0.001$), neck circumference ($p < 0.01$), weight gain ($p < 0.01$), such patient complaints as nicturia ($p < 0.01$), snoring and witnessed apnea ($p < 0.003$, $p < 0.01$) and the severity of OSA were found.

Conclusions. Our study found that from the collected data the most reliable predictors of OSA were BMI, neck circumference, weight gain, snoring and apneas.

Key words: obstructive sleep apnea, perioperative risk

OBJECTIVES

Obstructive sleep apnea (OSA) is a common medical and social problem that affects up to 5% of the population (1). In the surgical patient group, the prevalence of OSA is estimated at up to 9%, in primary care practice, about 38% of men and 28% of women are at a high risk of having sleep apnea (2). OSA is a repetitive partial or complete obstruction of the upper airway and is characterized by episodes of cessation of breathing during sleep lasting for more than 10 seconds. Population-based epidemiologic studies have shown that frequent prevalence of undiagnosed OSA is associated with significant morbidity and mortality (3, 4). The American

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Society of Anesthesiologists (ASA) recently issued practice guidelines for the perioperative management of OSA patients (5). The purpose of the guidelines was to reduce the risk of adverse outcomes in patients with OSA and to improve their perioperative care. Our study was conducted to validate the most widely used screening tools for identifying high risk OSA patients in our selected patient group and to find the most predictable physical signs and symptoms of OSA.

MATERIALS AND METHODS

At the Sleep Laboratory of Riga Stradins University, 100 patients with suspected OSA prior to the sleep study were asked to fill in patient questionnaires (STOP, STOP-BANG and Berlin Questionnaire). The patients' anthropometric data, physical signs and medical history were collected. To confirm the diagnosis and severity of OSA, all patients underwent a full night sleep study. The severity of OSA was determined by the number of apneas and hypopneas per sleep hour, the AHI index. AHI ≤ 5 corresponds to no OSA, AHI 5–15 to mild OSA, AHI 15–30 to moderate OSA, and AHI > 30 to severe OSA. To find the possible correlation, the data collected from the questionnaires were compared with the data from sleep studies (AHI).

RESULTS

Patients (n = 100) at a mean age of 47 yrs (23–73), 22 women, 78 men. No OSA was found in 17%, mild OSA in 23%, moderate OSA in 21%, severe OSA in 39% of the patients. The Spearman's rank correlation shows the relationship between OSA severity (AHI) and patient anthropometric data and clinical signs and symptoms (Table 1). Our study also affirms that patient questionnaires can show a high degree of accuracy in our study group (Table 2).

Table 1. Spearman's rank correlation of the physical signs, symptoms and AHI

Parameters, clinical signs, symptoms	Spearman's r	p-value
Age (yrs)	0.20	0.04
Weight gain (kg/yr)	0.39	<0.001
BMI (kg/m^2)	0.63	<0.001
Neck circumference (cm)	0.53	<0.001
Mallampati class	0.02	0.9
Pharyngeal obstruction	0.20	<0.05
Coronary artery disease	0.17	0.08
Arterial hypertension	0.17	0.09
Type II diabetes	0.14	0.17
Gastro-oesophageal reflux disease	0.19	0.06
Snoring	0.30	0.003
Witnessed apneas at night	0.49	<0.001
Choking at night	0.21	0.06
Nicturia	0.26	<0.01
Daytime somnolence	0.30	0.003

DISCUSSION

According to numerous epidemiologic studies, anesthesiologists in our countries often anesthetize patients with OSA not knowing about that. Due to the association of OSA with other medical conditions such as hypertension, cardiovascular events, and cerebrovascular disease, OSA patients often have ASA physical status III which aggravates the situation. Better understanding of signs and symptoms of OSA would facilitate perioperative evaluation of the patients with OSA.

As it was suggested by a meta-analysis of the screening test (4, 5), in our patient group sleep questionnaires showed high predictive values and sensitivity in predicting OSA. It is still under discussion which clinical signs and symptoms or

Table 2. Sensitivity, specificity, PPV and NPV of patient questionnaires

AHI > 5	Berlin questionnaire	STOP questionnaire	STOP-Bang questionnaire
Sensitivity, %	82.5%	96.3%	95.0%
Specificity, %	70.0%	40.0%	45.0%
PPV, %	91.7%	86.5%	87.4%
NPV, %	50.0%	72.7%	69.2%

which combinations of them are the most characteristic; our study helped to find the clinical signs and symptoms that strongly correlate with the probability of OSA (6). They are as follows: BMI, neck circumference, weight gain, nicturia, snoring and witnessed apneas. However, to determine the prevalence of OSA patients in our population and develop methods for the identification of OSA, further studies are required.

CONCLUSIONS

Our study found that the most reliable predictors of OSA were BMI, neck circumference, weight gain, snoring and witnessed apneas.

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DIDELĘ OBSTRUKCINĖS MIEGO APNĖJOS TIKIMYBĘ IDENTIFIKUOJANČIOS ATRANKINĖS PATIKROS PRIEMONĖS

Santrauka

Obstrukcinė miego apnėja (OMA) yra dažna medicininė problema, paveikianti iki 5 % populiacijos. Dauguma OMA pacientų nediagnozuojami, todėl jiems gresia perioperacinės komplikacijos. Mūsų atliktos studijos tikslas buvo įtvirtinti plačiausiai naudojamas atrankinės patikros priemones, padedančias išskirti didelės OMA rizikos pacientus, ir nustatyti labiausiai nuspėjamus OMA fizinius požymius.

Raktažodžiai: obstrukcinė miego apnėja, perioperacinė rizika