

Sleep-disordered breathing in male subjects with a history of nose-throat surgery

Tulburări respiratorii în timpul somnului la subiecți cu istoric de chirurgie nazo-faringiană

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Abstract

The question addressed in this study was: could a history of nose-throat surgery represent a risk factor for sleep-disordered breathing? Three hundred and fifty French male employees answered a sleep / respiration questionnaire and had anthropometric measurements. A history of nose and/or throat surgery—mostly tonsillectomy or tonsillectomy plus adenoidectomy—was given by 69 (19.7%) of the subjects (“at risk” group). The prevalence of snoring, breathing pauses during sleep or grasping was similar in “at risk” and control (no history) subjects, but the prevalence of two symptoms: excessive daytime sleepiness and “waking up with headaches”, was significantly higher in the group at risk. The present results suggest the persistence of minor (residual?) airway obstruction in subjects with a history of nose/throat surgery. This obstruction could be responsible for an alteration of declared sleep quality, although not severe enough for eliciting breathing pauses.
Keywords: nose-throat surgery, sleep disordered breathing, daytime sleepiness, morning headache

Rezumat

Studiul de față evaluează ipoteza: antecedentele de chirurgie nazo-faringiană ar putea reprezenta un factor de risc pentru tulburările respiratorii din timpul somnului? Au fost studiați trei sute cincizeci de salariați bărbați, care au răspuns la un chestionar somn / respirație și la care s-au practicat măsurători antropometrice. 69 subiecți au declarat că au suferit o amigdalectomie sau adenoidectomie plus amigdalectomie („grup la risc”, -19,7% din total). Frecvența apneilor în somn și a sforăitului obișnuit nu a fost crescută comparativ cu grupul martor. În schimb, grupul „la risc”, a declarat semnificativ mai frecvent o somnolență diurnă excesivă și prezența de cefalee matinală. Rezultatele obținute sugerează persistența unei obstrucții minime (reziduale?) la subiecții cu istoric de chirurgie nazo-faringiană. Această obstrucție ar putea fi responsabilă pentru o alterare a calității somnului declarat, cu toate că este insuficientă pentru a induce apnee în somn.
Cuvinte-cheie: chirurgie nazo-faringiană, tulburări respiratorii în timpul somnului, somnolență în timpul somnului, cefalee matinală

Introduction

Obstructive sleep apnoeas (OSA) are due to repetitive closures of the collapsible pharyngeal airway; any increase in the upstream airways resistance represents a promoting factor⁽¹⁾. In children the most frequent cause of OSA is an adenotonsillar hypertrophy; therefore surgery is able to cure the condition in most⁽²⁾, but not all patients^(3,4). In adults, tonsillar hypertrophy can be responsible for OSA⁽⁵⁾ and tonsillectomy was demonstrated to reduce the number of apneas⁽⁶⁾. The present study tested the hypothesis that residual, minor upper airway obstruction persisting in adults with a history of adeno-tonsillectomy or nose surgery could represent a risk for sleep-disordered breathing.

Methods.

Subjects. A personal letter was sent to the male employees of an urban transport company of an eastern France city, aged 18 years or more, explaining the purpose of the study, the protocol, the anonymous treatment of the data and the right of the subject to deny participation. The study protocol received approval of the Regional Medical Research Ethical Committee.

Data collection. A French translation of the Wisconsin Sleep Questionnaire was distributed to the employees by the industrial medical nurse.

The subjects were instructed to answer the 32-item form with help of his spouse or bed partner avoiding blanks (in doubt, tick “do not know”).

The frequency of a symptom was described as rarely; sometimes; at least once a week; 3 to 5 nights per week and almost every night. Snoring loudness was graded from only louder than heavy breathing to extremely loud. The original form of the Wisconsin questionnaire was translated to French [under agreement of the US team (Terry Young-personal communication) and its internal consistency and reproducibility evaluated by our team⁽⁷⁾. We were not interested in evaluating the severity of somnolence- no scale of this was included. Our form included one supplementary question: “Did you ever had nose or throat surgery?”; if yes “What type?”.

Anthropometry. Age was recorded from the medical files; height and weight; neck, waist and hip girths were measured by the same technician with the usual methods. The body mass index (kg/m²) and the waist-to-hip ratio (W/H) were computed from primary data.

Table 1 Demographic characteristics in 338 French males in respect to a history of nose-throat surgery

	Nose-throat surgery		P =*
	YES	NO	
Number of subjects	69	269	–
Age (years)	40.3 ± 8.3	40.1 ± 8.9	0.86
Height (cm)	177.8 ± 6.0	176.4 ± 6.5	0.09
Weight (kg)	83.3 ± 12.1	81.7 ± 11.3	0.30
BMI (kg/m²)	26.4 ± 3.6	26.3 ± 3.5	0.86
Neck girth (cm)	40.6 ± 2.5	40.2 ± 2.6	0.29
Waist girth (cm)	96.1 ± 10.4	95.0 ± 9.8	0.60
Hip girth (cm)	104.0 ± 6.5	103.6 ± 6.3	0.41
Waist/hip ratio	0.92 ± 0.06	0.92 ± 0.06	0.43

* p from analysis of variance

Table 2 Sleep disturbance and medical history according to a history of nose-throat surgery

Item	History of surgery		Relative risk	95% confidence limits
	Yes (%)	No (%)		
Disruptive movements during sleep	10.9	12.9	0.84	0.37 – 1.94
Wake up repeatedly	21.2	18.4	1.15	0.63 – 2.09
Not feeling rested during daytime	30.8	24.6	1.25	0.77 – 2.02
Wake up with headaches	10.3	3.0	3.47	1.21 – 9.94
Excessive daytime sleepiness	24.1	11.1	2.18	1.17 – 4.03
Nose congestion/discharge at night	12.1	10.9	1.10	0.51 – 2.43
History of sleep apnea	1.5	1.9	0.79	0.10 – 6.65
History of asthma	6.1	3.9	1.54	0.50 – 4.75
Hypertension	11.9	6.3	1.89	0.84 – 4.22
History of allergy	18.5	19.8	0.94	0.53 – 1.65
History of sleep apnea -father	8.3	5.4	1.54	0.50 – 4.70

Statistical analysis. Differences between mean values of the continuous variables were evaluated by analysis of variance- using a non-parametric assessment when variances differed significantly. Pearson or Spearman tests were used to assess the correlations. The statistical analysis employed the 5.0 version of the STATA software⁽⁸⁾.

Results.

Of 644 male employees, aged 22 to 65 years, 132 refused participation – an acceptance rate of 79.5%. After exclusion of 43 females, analysis was limited to the 350 males corresponding to the age criterion and giving complete answers. The question on previous nose-throat surgery had a positive answer in 69 subjects, and a negative one in 269; the 12 subjects answering “don’t know” were excluded from further analyses. The affirmative answer to a history of surgery included 29

subjects with tonsillectomy, 6 with adenoidectomy, 18 with tonsillectomy plus adenoidectomy and 16 with nose surgery. Anthropometric data were not significantly different between the “at risk” and the control subjects (*table 1*); the proportion of current smokers was almost identical (40 vs. 41.4%) between the two groups. The prevalence of symptoms corresponding to a clinically identified sleep-disturbed breathing was not significantly different between the two groups: the relative risks (RR) and confidence intervals (in brackets) of the operated subjects were 1.03 (0.69-1.56) for habitual snoring, 1.15 (0.25-5.42) for gasping or choking during sleep and 1.53 (0.30-7.69) for breathing stops during sleep. The questions on further sleep disorders indicated a significant elevation of waking up with headaches (threefold) and of excessive daytime sleepiness (twofold) in the group “at risk” (*table 2*).

Discussion

The present survey tested the hypothesis that a history of nose-throat surgery, possibly resulting, over years, in a residual upper airway obstruction, could be a risk factor for sleep-disordered breathing. To the best of our knowledge, this hypothesis has never been tested previously. The 20% percent of our subjects giving a history of nose-throat surgery were compared to the remaining 80% with no history, representing the control group. We were happy to see that no anthropometric differences existed between the groups: no corrections for age or weight excess were necessary. Robin⁽⁹⁾ reported satisfactory results in curing snoring of adults by nasal septal repair; Heimer et al. noted a beneficial effect on sleep apnea⁽¹⁰⁾. Adenotonsillar hypertrophy is the principal cause of upper airway obstruction and sleep-disturbed breathing in children⁽²⁾. A large majority of children benefit from surgery, but symptoms persist in part of them, leading Nieminen et al. to consider a history of upper airway surgery as a risk factor for obstructive sleep apnoea in childhood⁽¹¹⁾. Aubert-Tulkens et al. found no polysomnographic improvement after surgery in adults with sleep apnea⁽¹²⁾. An interesting result was published by Polo et al.⁽¹³⁾: in their patients, surgery reduced significantly the apnoeic episodes (from 56 to 18%), while the frequency of airway increase resistance episodes increased (from 4 to 20%)! These results suggest that apnoeas and airway resistance increase may evolve independently of each other. The present study came to a negative result concerning sleep apnoeas or habitual snoring in subjects with a history of nose-throat surgery. On the other hand, the group "at risk" complained significantly more frequently of waking up with headaches (10.3 vs 3.0%) and of excessive daytime sleepiness (24% vs 11.1%). Both are non-specific symptoms requiring extensive clinical and laboratory investigations for clarification; our protocol did not include polysomnography nor an extensive neurological evaluation.

The validity of the answers to the sleep questionnaire may be questioned in this active middle-aged population, but we believe improbable that a history of

nose-throat surgery could influence the accuracy of the answers to our questionnaire. We did not ask for the age at the surgical procedure, thus we ignored the interval from it.

We wish to stress several limitations of the present study. *First*, the upper airway obstruction was not objectively checked-even with simple methods, such as those used by us in a previous study⁽¹⁴⁾. *Second*, to detect sleep apnoeas, today some authors use home records in epidemiologic context, but these were not available to us at the moment of this study. *Third*, the questionnaire did not include information about alcohol consumption-a known risk factor for obstructive sleep apnoeas. Such a question figured in the preliminary version of our questionnaire, but was considered "too invasive" by the trade union representatives (who were asked to evaluate the questions) and therefore cancelled. *Fourth*, our data could not exclude daytime sleepiness from non-respiratory causes, such as depression. *Fifth*, the form included no question on the date of surgery, (and thus we ignored the interval from it), nor of its indication. Last but not least, the prevalence of sleep apnoeas was low in this sample of active males, limiting the validity of statistical evaluations.

Conclusions

With these limitations, we provisionally conclude that in this sample of middle-aged active men, a history of nose-throat surgery was not associated with self-declared sleep disordered breathing symptoms, but appeared associated with excessive daytime sleepiness and morning headache, indirectly suggesting the persistence of a residual minor increase in upper airway obstruction. Testing this hypothesis require further investigation, including an objective evaluation of upper airways permeability by a ENT specialist, addition of further questions about risk other factors and complete recordings of sleep quality.

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