Evidencias en Pediatría

Critically Appraised Article

Children and adolescents with obesity frequently have respiratory problems during sleep and a different pattern of sleep depending on whether they are overweight or obese

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Structured abstract:

Objective: to determine the prevalence of sleep-disordered breathing (SDB) in a clinical sample of overweight or obese children and adolescents, and to examine the contribution of fat distribution.

Design: descriptive study with consecutive selection of cases.

Location: Pediatric Obesity Clinic (University Hospital of Antwerp, Wilrijk, Belgium).

Study population: all patients (40 boys and 51 girls) with ages 6 to 16 years old with obesity or overweight, referred the majority from primary care between February 2002 and July 2005. Exclusion criteria: chronic lung disease, neuromuscular disease, laryngomalacia, and any genetic or craniofacialsyndrome.

Risk factor evaluation: anthropometric data (height, weight, neck and waist circumference and waist-to-hip ratio were measured by standardised techniques), Fat mass was measured by bioelectrical impedance analysis, using the Deurenberg formula for children. Body mass index (BMI) was calculated as weight (kg)/height2 (m2), and was further analysed as z scores. Overweight and obesity were defined according to the International Obesity Task Force criteria., Patients were classified as prepubertal or pubertal due to th fact that puberty affects body composition The Tonsillar size was rated. A history of adenoidectomy was also registered.

Outcome measures: computerized nocturnal polisomnographic study during at least 6 hours (registering electroencephalogram,electro-oculogram,electromyogram,and electrocardiogram) as well as the inspiratory effort,oxygen saturation, oro-nasal air flow, snoring and videotaping. Principal concepts: Obstructive apnoea, central apnoea and hypopnoea were defined according to standard criteria .Obstructive apnoea index was defined as the number of obstructive apnoeas lasting ≥ 2 respiratory cycles per hour of sleep. The central apnoea index was defined as the number of central apnoeas lasting for ≥ 10 s or of any duration, but associated with 4% desaturation per hour of sleep : The obstructive apnoea–hypopnea index (OAHI) was defined as the number of obstructive apnoeas and hypopnoeas per hour of sleep. The central apnoea–hypopnea index was defined as the number of central apnoeas and hypopneas associated with 4% desaturation per hour of sleep.

Diagnostic criteria for SDB: Obstructive apnoea index ≥ 1 or OAHI ≥ 2, further classified as mild (2 ≤ OAHI ≥ 5) or moderate-to-severe (OAHI ≥ 5), were used as diagnostic criteria for OSA. Central sleep apnoea was diagnosed when central apnoeas/hypopneas ≥ 10 s were present and accompanied by > 1 age-specific bradytachycardia event, or >1 event of desaturation < 89%. Subjects with desaturation < 85% after central events of any duration were also diagnosed with central sleep apnoea. Primary snoring was diagnosed when snoring was detected by a microphone and all of the following: (1) obstructive apnoea index ≤ 1, (2) OAHI ≤ 2 and (3) ≤ 1 desaturation between 85% and 89%. A patient without snoring but with all of the mentioned criteria was diagnosed as normal.

Main outcome measures: 47 % obese children (n = 64) had SDB, classified as mild OSA in 11 %,moderate to severe OSA in 8 %, central sleep apnoea in 17 % (half of them with desaturations < 85%) and primary snoring in 11 %. 44 % of overweight children (n = 27) had SDB, with a prevalence of 19 %,22%,4%, and 0 % in successive groups. None of the anthropometric variables was a significant predictor of the presence of mild OSA. The presence of enlarged tonsils was the only variable associated with moderate to severe OSA (odds ratio [OR]: 8.3; 95%CI: 1.4 -51.2). CSA could be predicted by the z score of BMI (OR: 8.1; CI 95%: 2.0-33.3), % fat mass (OR: 1.4; CI 95%: 1.1 – 1.9), waist circumference (OR 1.1; 95% CI 1.0 to 1.2), waist-to-hip ratio (OR 1.2; 95% CI 1.0 to 1.5).

Author conclusion: SDB is very frequent in the paediatric population with obesity or overweight. CSA is more frequent en the group of children and adolescents with obesity (17% versus 4%) and is correlated with abdominal adiposity and % fat mass. OSA is more frequent en the group with overweight (41% versus 19%) and in its moderate to severe forms is correlated with the tonsilar size but not with central adiposity, in contrast with OSA in adults.

Competing interests: none declared.

Financial source: none declared.

Commentary:

Justification: obesity is a risk factor for sleep disorders especially SDB. The actual epidemic of obesity in the general population, and in children and adolescents in particular is going to be a cause of an increment in SDB. The published frequency of SDB in obese children and adolescents, detected by polisomnography, is very variable (between 13 and 66%), in part due to varying inclusion criteria and methodologies[1,2]. In adults the strong correlation between central adiposity and OSA is well known, but it has not been studied in childhood.

Validity: this study has an evidence level of 4, with a strength of recommendation of C (Centre of Evidence Based Medicine, Oxford), one of the basic limitations being its descriptive design. A positive. aspect of this study is the lack of selection byass due to consecutive case inclusion and the use of explicit diagnostic criteria It has an adequate internal validity, but it is difficult to establish general conclusions. There is no control group, this being a limitation of the study.

Clinical relevance: this study describes a high frequency of SDB and a different pattern in children or adolescents with obesity (CSA is more frequent) and overweight (OSA more frequent). Central adiposity is correlated to CSA, but not with OAS (in contrast with adults).This stresses the need for further studies on quantitative and qualitative characteristics of sleep in obese children and the relation to tonsillar hypertrophy as an associated risk factor.

The authors find a clear relation between tonsillar enlargement and OSA, which is similar to other studies in normal children. Other studies with a more adequate design[3] (use of a control group) find that obese children have more frequent OSA (but not CSA) and in the logistic regression analysis they find a relation between SDB and the size of tonsils > 2 (range 0-4), (OR;12.67; CI 95%: 2.14 – 75.17) and with BMI (OR: 1.2; CI 95% 1.08 -1.33), but no relationship between obesity and tonsillar size was found, thus it is not possible to reach conclusions about obesity and size of linfoid tissues[4]. A recent study of cases and controls executed in Spain investigates this relation[5].

Applicability in clinical practice: the primary care paediatrician deals with great frequency with SDB problems in his daily practice. It seems adequate to establish a focused clinical anamnesis and a clinical screening on the existence of SDB in children and adolescents with obesity-overweight. This study stresses two important points: a) that in overweight children and adolescents we must address principally the possibility of OSA and decide on amigdallectomy in those cases with important hypertrophy.; b) that in those cases with important obesity we must pay attention to CSA and think of doing a polisomnographic study, due to the elevated percentage of important desaturation episodes. The relation between obesity and CSA is a new fact that needs further studies.

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