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SLEEP-DISORDERED BREATHING: A NEW RISK FACTOR OF SUSPECTED FATTY LIVER DISEASE IN OVERWEIGHT CHILDREN AND ADOLESCENTS?

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WINNING ABSTRACT: Sleep-disordered breathing (SDB) in childhood obesity is associated with hyperinsulinemia, dyslipidemia and inflammation and by these mechanisms, SDB could contribute to development of non-alcoholic fatty liver disease. We, therefore, investigated if SDB was an independent predictor of suspected fatty liver disease in a clinical sample of overweight and obese children and adolescents.

Retrospective case study of consecutive overweight or obese children and adolescents attending a paediatric obesity clinic. Suggestive fatty liver disease was defined as a serum alanine aminotransferase >40 U·L^{-1} and/or a hyperechoic liver on abdominal ultrasound.

Subjects with suggestive fatty liver disease presented with higher waist circumference, more circulating peripheral leukocytes and a lower % of total sleep time with SaO2 ⩾95% than their peers with a normal liver evaluation. Multiple logistic regression (stepwise forward) selected waist circumference (odds ratio=1.05; 95% confidence interval=1.00–1.10; p=0.06) and SaO2nadir (odds ratio=0.87; 95% confidence interval=0.76–0.99; p=0.03) as predictors of suggestive fatty liver disease.

This study suggests an association between the severity of SDB and suspected fatty liver disease in a clinical sample of overweight and obese children and adolescents. We strongly recommend more and carefully designed research on the influence of SDB on the development of fatty liver disease and on the effect of treating sleep apnoea on liver function parameters.

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SYNOPSIS OF MY JOB AND THE ROLE OF THE UNIT IN WHICH I WORK

I am a fellow in paediatrics and have spent the last 3 yrs in full-time research to complete a PhD thesis. The work I have presented has been the product of an ongoing collaboration between the Paediatric Sleep Centre (Antwerp University Hospital, Antwerp, Belgium), under the supervision of Prof. Kristine Desager, and the Depts of Respiratory Medicine and Diabetology, Metabolism and Clinical Nutrition (both Antwerp University Hospital), which are led by Prof. Wilfried De Backer and Prof. Luc Van Gaal, respectively.

The Paediatric Sleep Centre is one of the largest in Belgium, performing ~150 diagnostic sleep studies per year in children >2 yrs of age. The centre manages not only patients referred for suspected sleep-disordered breathing (SDB), but also children with other sleep problems, such as dyssomnia (disorders of initiating and maintaining sleep) and parasomnia (*e.g.* night terrors, sleep walking, *etc.*). Since 2003, our research activities have focused on the diagnostic aspects of obstructive sleep apnoea syndrome in children and on the complications and mechanisms of SDB in obese children and adolescents.

SYNOPSIS OF MY RESEARCH AND HOW MY WINNING POSTER IS PART OF THIS

My PhD is entitled ''Sleep-disordered breathing in obese children and adolescents: mechanisms and complications'', which I started in October 2004. Obese children and adolescents are at risk of presenting with SDB [1]. Our hypothesis is that the intermittent hypoxia resulting from repetitive apnoeas and hypopnoeas during sleep forms an additional risk factor, besides the obesity itself, for the development of metabolic and cardiovascular morbidity. We have already shown that the severity of desaturation during sleep is a risk factor of the metabolic syndrome (the clustering of obesity, hypertension,

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dyslipidaemia and insulin resistance) and its components in overweight children [2]. These findings have also been confirmed by other studies [3–5]. In this abstract, we retrospectively investigated the association between SDB and suspected nonalcoholic fatty liver disease, considered to be the hepatic manifestation of the metabolic syndrome.

HOW MY RESEARCH WILL IMPACT ON CLINICAL OR RESEARCH PRACTICE

We hypothesise that, by aggravating the obesity-related hyperinsulinaemia, dyslipidaemia and/or hypertension, SDB could be an additional risk factor for developing metabolic syndrome and its related complications, such as fatty liver disease, in later life. Several mechanisms by which sleep apnoea may disturb metabolic control include: increased sympathetic activity [6]; higher serum cortisol [7]; the formation of reactive oxygen species [8] and oxidative stress [9] resulting in increased inflammation [10]; and impaired glucose tolerance and appetite regulation resulting from secondary sleep debt [11].

Our cross-sectional data emphasises the need for longitudinal and interventional studies to further examine the influence of sleep-disordered breathing on the development of cardiovascular morbidity in this high-risk population. In view of the high prevalence of sleep apnoea in obese children and adolescents and of the influence of sleep apnoea on metabolic control, obese children should be screened for the presence of sleep-disordered breathing and should be adequately treated as a means of preventing cardiovascular and metabolic disease in early adulthood.

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