

# Obesity hypoventilation syndrome: A different beast



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A seven-and-a-half-year-old boy was referred for a paediatric evaluation because of concentration difficulties, daytime drowsiness and sleepiness in school, which have been increasing over the past two months, leading to bullying from his classmates at recess.

He was born at 35 weeks' gestation, weighing 2.13 kg. His mother had insulin-dependent gestational diabetes, and both parents are overweight. Rapid catch-up growth occurred in infancy. He has been snoring at night since nine months of age. He underwent an adenotonsillectomy at two years of age, followed by a second adenoidectomy at four years of age. Due to eating habits, multiple dental restorations under local anesthesia were required at three years of age.

Presently, his bedtime is 7:30 pm, with loud snoring during sleep and mouth-breathing when awake. He is easily short of breath and does not participate in any physical activities.

The physical examination confirmed generalized obesity: weight 40 kg (>99th percentile); height 122 cm (50th percentile); body mass index 27 (>98th percentile), using WHO growth charts. His supine blood pressure was 130/80 mmHg. He did not have other signs of metabolic syndrome (1). Laboratory investigations revealed normal fasting blood sugar, and normal thyroid and liver function tests; however, triglycerides, total and low-density lipoprotein cholesterol levels were raised. Cardiac assessment revealed suggestion of ventricular strain. Daytime baseline saturation in room air was 94%, and a blood gas test taken while awake revealed a capillary pCO<sub>2</sub> of 54 mmHg and a pH of 7.37 (2). Referral to a tertiary paediatric centre was made, where other causes of central hypoventilation were excluded and obesity-hypoventilation syndrome (OHS) was confirmed on formal polysomnogram. His treatment included bi-level positive airway pressure (BiPAP) ventilation support during sleep (with normalization of his daytime blood gases), healthy lifestyle management, including reduced screen time, with dietary interventions and a tailored physical activity program aimed at long-term weight loss.

## LEARNING POINTS

- Obesity rates among children and adolescents have almost tripled in the past 25 years. Approximately 26% of Canadian children two to 17 years of age are overweight or obese.
- Obesity-associated complications, such as type-2 diabetes mellitus, hypertension, metabolic syndrome, heart disease and polycystic ovarian syndrome, have been well documented in the paediatric population.
- OHS, or cardiopulmonary syndrome, is almost certainly under-recognized and under-reported in the paediatric age group.
- Children with OHS have severe obesity and experience sleep-disordered breathing (usually obstructive sleep apnoea and/or nocturnal hypoventilation), resulting in excessive daytime drowsiness, with decreased attention and intellectual functioning adversely affecting their learning ability, as well as compounding the metabolic consequences of obesity.

- If nocturnal hypoventilation is untreated, major complications can include polycythemia, cor pulmonale, congestive heart failure, respiratory failure and even death.
- Children identified with OHS should be referred to a paediatric sleep centre, where available, for confirmation of diagnosis and initiation of management; otherwise, consultation with a paediatric respirologist is recommended.
- OHS treatment mainly consists of weight reduction plus BiPAP non-invasive ventilation support, taking into account that compliance is difficult in the paediatric population (3-6).
- The long-term success rate for adenotonsillectomy in obese children is low in the absence of effective weight loss; this therapy should still be considered if there is some degree of hypertrophy but should not be the default treatment (3-6).
- The CPSP study on OHS in the paediatric population is collecting national epidemiological data on this important complication of obesity with the goal of raising awareness, estimating the incidence and informing on more timely management.

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## RECOMMENDED READINGS

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