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Obstructive sleep apnoea syndrome presented as failure to thrive in a Down's syndrome child

H N T Hui 許寧達，D K K Ng 吳國強，H Yau 許燕，K L Kwok 郭嘉莉，K W Chau 周健健

Summary

Children suffering from Down's syndrome are prone to develop obstructive sleep apnoea syndrome (OSAS) due to craniofacial abnormalities, small upper airway, adenotonsillar hypertrophy and muscular hypotonia. OSAS will lead to various complications including failure to thrive. We report a Down's syndrome boy whose main presenting feature of OSAS was failure to thrive. He was successfully treated initially with nocturnal continuous positive airway pressure (CPAP) ventilation and subsequently with adenotonsillectomy.

Introduction

Children with Down's syndrome are prone to develop obstructive sleep apnoea syndrome (OSAS) due to craniofacial abnormalities, small upper airway, adenotonsillar hypertrophy and muscular hypotonia. Paediatric patients with severe OSAS may not present with snoring. On the contrary, many of them will present with poor feeding and failure to thrive.

Case report

HWH was born at full term with birth weight of 2.76 kg (10th-25th centile). He had patent ductus arteriosus (PDA) and perimembranous ventricular septal defects (VSD) with congestive heart failure. He was treated medically with fluid restriction, concentrated caloric feeding and diuretics. His growth remained along 10-25th centile. Cardiac operation (PDA ligation and patch repair of VSD) was performed at 7 months of age. At the same time, he was diagnosed to have congenital hypothyroidism and was put on thyroxine replacement after the operation. Thereafter, his growth improved gradually to 8.9 kg (50-75th centile) at 13 months (Figure 1).

At 13 months, he suffered 2 episodes of upper respiratory tract infection and one episode of acute bronchiolitis. His feeding became poor and his body weight dropped to 8.5 kg (25th centile) at 15 months. He had poor appetite, difficulty in swallowing and vomiting. Milk scan did not reveal significant gastro-esophageal reflux. Thyroid function tests were normal. During a routine check-up, he was noted by the attending paediatrician to have respiratory distress during sleep with subcostal recession and tachycardia. Pulse oximetry showed readings of 91% and 99% during sleep and when awake, respectively. Restless sleep and frequent
awakening were noted. However, no definite snoring was noted by both parents. Supplementary O$_2$ at 1 L/min delivered via nasal cannula was able to abolish desaturation during sleep. He was also found to have tonsillar hypertrophy but there was no past history of tonsillitis noted. Sleep study was performed for suspected OSAS. Overnight polysomnography (PSG) demonstrated persistent tachycardia during sleep with prolonged episodes of hypoventilation. Obstructive apnoea/hypopnea index was found to be 8.8 episodes per hour. A diagnosis of OSAS was made based on PSG findings. His blood pressures were normal. Electrocardiogram and echocardiogram did not reveal any pulmonary hypertension. Flexible bronchoscopy revealed enlarged adenoids obstructing more than 80% of nasopharyngeal passage and inspiratory collapse at the tonsillar level due to enlarged tonsils.

He was treated with nocturnal continuous positive airway pressure (CPAP) ventilation via facemask. The required pressure at which apnoeic and hypopnoeic episodes were abolished, was found to be 10 cm H$_2$O. Supplementary oxygen was not required after initiation of CPAP. He tolerated CPAP well with improvement in quality of sleep. His feeding also improved, nausea and vomiting became less. His weight gain improved subsequently with body weight of 10.3 kg at 20 months (50-75th centile) (Figure 1).

Definitive surgical treatment of OSAS with adenotonsillectomy was carried out at 22 months when his body weight reached 10.5 kg. He tolerated the surgery well and made a smooth recovery. Post-op PSG showed no desaturation during sleep. Snoring and laboured breathing were not noticed. CPAP was therefore no
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Key messages

1. Obstructive sleep apnoea syndrome (OSAS) is common in Down’s syndrome children (31-45%).
2. OSAS may not be associated with snoring.
3. Adenotonsillectomy is the definitive treatment in most childhood OSAS and will eliminate the need for continuous positive airway pressure.

Discussion

Down’s syndrome children are prone to develop OSAS for various reasons including midfacial and mandibular hypoplasia, macroglossia, glossoptosis, hypoplastic trachea, adenotonsillar enlargement, increased secretion, lower respiratory tract abnormalities, obesity and muscular hypotonia with resultant collapse of the airway during inspiration. The high prevalence of increased risk of OSAS amongst Down’s syndrome children was supported by population studies. Marcus et al found OSAS in 24 out of 53 Down’s syndrome children. Stebbens VA et al found sleep related upper airway obstruction a common problem in children with Down’s syndrome, occurring in 31% of their studied population. In contrast OSAS only occurs in 2% of normal children.

OSAS may have adverse effects on neurological and cardiac function as well as growth. Growth impairment is one of the unique features of childhood OSAS. Early reports of children with severe OSAS were almost always associated with failure to thrive. Reports from the 1980s found failure to thrive in 27% to 56% of children with OSAS. Poor caloric intake may result in inadequate growth. Brouillette et al reported significantly higher incidence of poor appetite, swallowing difficulty, nausea and vomiting in children with OSAS compared to control (26-30% vs 2-9%). Poor growth described in some children with OSAS may be secondary to increased energy expenditure from increased work of breathing during sleep rather than decreased caloric intake.

Although most patients with OSAS presented with snoring and difficulty in breathing during sleep, it is important to be aware of other less common presenting symptoms such as failure to thrive, poor appetite, nausea and vomiting. In fact, our patient presented with poor appetite and failure to thrive rather than snoring. Snoring is produced by vibration of the soft palate and faecal pillars. In patients suffering from severe OSAS, the absence of snoring may be related to the inadequate airflow through the obstructed upper airway that produces little vibration of the soft palate and faecal pillars. Medical doctors need to be aware of the less common presentations of OSAS especially in high risk patients such as children with Down’s syndrome, otherwise appropriate treatments will be delayed.

Adenotonsillectomy is the definitive treatment in children with OSAS with tonsillar and adenoid enlargement. Adenotonsillectomy in children with OSAS was documented by some studies to have a positive impact on growth. Brouillette et al and Williams et al found significant catch-up growth after adenotonsillectomy in children with OSAS, that may be related to the normalisation of IGF-1 axis. Application of CPAP ventilation is also helpful to overcome the obstruction. Not surprisingly, our patient showed improved feeding, decrease gastrointestinal symptoms and improved growth after applications of nocturnal CPAP and adenotonsillectomy.

Conclusion

Medical practitioners should be aware of the many different presentations of OSAS, especially in high-risk patients such as in Down’s syndrome, so that the disease can be diagnosed at an early stage. Early and appropriate treatments can lead to a major impact on the outcome. Paediatric patients with severe OSAS may not present with snoring. Early diagnosis and appropriate treatment is possible only if medical practitioners keep the diagnosis in mind.

References


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