



## OSA Masquerading as Failure to Thrive and Developmental Delay: A Case Report

Katia El Taoum\* and Supriya Jambhekar

Department of Pediatrics, Pulmonary and Sleep Division, University of Arkansas for Medical Sciences, Little Rock, Arkansas

### Abstract

An 8-month-old girl was admitted to the hospital for failure to thrive with significant developmental delays. Snoring and hypoxia during sleep were noted and she was started on heated high-flow nasal cannula at 21% FiO<sub>2</sub>. She continued to have drops in her oxygen saturation down to 68%, in addition to retractions and tracheal tugging during sleep. Adenoidectomy was performed, removing 100% obstructing adenoids, but snoring and oxygen desaturations while sleeping continued. Polysomnography revealed severe obstructive sleep apnea (OSA) (apnea/hypopnea index (AHI) 160.8/hour, 236.6/hour in active sleep), and oxygen saturation nadir was 65%. Other surgeries were thought neither possible nor safe at that time. Auto titrating continuous positive airway pressure (autoCPAP) 4-6 cmH<sub>2</sub>O was started and later increased to 4-10 cmH<sub>2</sub>O. Oxygen saturation normalized on CPAP. Eleven days after initiation of treatment, the patient was able to hold her head up, reach for and play with toys, sit up and pull to stand with minimal assistance. She had a 1 kilogram weight gain during the hospital stay. By 14 months of age, she was standing with support and trying to speak. By 17 months, she had grown from below the 1st percentile to almost the 50th percentile for BMI. A tonsillectomy and uvulopalatopharyngoplasty were performed at that time resolving the OSA (AHI 0.4/hour, oxygen nadir 91% per PSG), and CPAP was discontinued. This case is interesting for pediatricians because it highlights the importance of having a high index of suspicion for OSA in children with failure to thrive or developmental delay, it points out the role of noninvasive ventilation for OSA treatment in infants, and It highlights the importance of follow up and continued re-evaluation for availability of surgical options in young children with OSA.

### OPEN ACCESS

#### \*Correspondence:

Katia El Taoum, Department of Pediatrics, Pulmonary and Sleep Division, Arkansas Children's Hospital, 1 Children's Way, Little Rock AR, 72202, Slot 512-17, 501-364-1006, USA,  
E-mail: [Katiaataoum@hotmail.com](mailto:Katiaataoum@hotmail.com)

Received Date: 04 Jul 2017

Accepted Date: 30 Sep 2017

Published Date: 02 Oct 2017

#### Citation:

El Taoum K, Jambhekar S. OSA Masquerading as Failure to Thrive and Developmental Delay: A Case Report. *Ann Clin Case Rep.* 2017; 2: 1436.

ISSN: 2474-1655

Copyright © 2017 Katia El Taoum. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

### Abbreviations

ADHD: Attention Deficit Hyperactivity Disorder; AHI: Apnea Hypopnea Index; ALTE: Acute Life Threatening Event; Auto CPAP: Auto Titrating Continuous Positive Airway Pressure; CPAP: Continuous Positive Airway Pressure; FTT: Failure To Thrive; GERD: Gastro Esophageal Reflux Disease; NC: Nasal Cannula; NIV: Non Invasive Ventilation; OSA: Obstructive Sleep Apnea; PSG: Poly Somno Graphy

### Table of Content Summary

FTT can result from different etiologies. This article shows an unusual cause of FTT and the challenges to diagnose it and treat it appropriately.

### Contributors' Statement Page

Dr El Taoum drafted the initial manuscript and Dr Jambhekar reviewed and revised the manuscript. All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

### Introduction

Obstructive Sleep Apnea (OSA) is characterized by partial airway obstruction or intermittent complete obstruction that interrupts normal ventilation during sleep [1]. Infants are at high risk of severe OSA compared to older children and adults due to their upper airway anatomy, laryngeal chemoreceptors, and sleep-related breathing patterns [2]. The most common presenting symptoms of OSA in infants are snoring, nocturnal hypoxia, and acute life threatening event (ALTE). In children, OSA is known to be an important risk factor for development of behavioral dysfunction, attention deficit hyperactivity disorder (ADHD), failure to thrive (FTT), and developmental delay if not recognized and treated early [3].



ENT and Pulmonary, on day 20, continuous positive airway pressure (CPAP) treatment was initiated and then titrated progressively as patient started tolerating the interface. She had mildly enlarged tonsils, but surgery was postponed due to concern for postoperative complications in view of age of the patient and the severity of OSA.

## Course

Patient showed major clinical improvement with no more hypoxia at night. Her weight increased by 1 kilogram in 30 days. She also showed significant developmental gains: she was able to hold her head up independently, reach for and play with toys, sit up with minimal assistance, and pull to stand with minimal assistance (developmental age 6-7 months, developmental quotient 67%), all of which she was not able to do on admission (Figure 1). She was discharged on a CPAP of 10cmH<sub>2</sub>O after 30 days in the hospital.

Patient was followed in sleep clinic regularly after discharge. She was seen after 1 month, then every 3 months. Patient was doing better on CPAP and continued to improve her development and weight gain.

At the age of 14 months, she was standing with support and babbling (developmental age 11 months, developmental quotient 78%). At the age of 17 months, she had grown from below the 1st percentile to the 45th percentile for her age, her developmental age was 13-14 months, and developmental quotient 80%.

One year later, she continued to improve but with symptoms of OSA when off the CPAP. Tonsillectomy and uvulopalatopharyngoplasty were performed. After surgery, PSG was repeated. The patient was 2 years old at that time. PSG without intervention showed normal breathing with an AHI of 0.4/hour. Her swallow study was also normal and she had no GERD symptoms. CPAP and reflux medications were stopped and she was allowed to drink liquids of thin consistency. She was then discharged from sleep clinic due to resolution of her OSA (Figure 1).

## Discussion

Prematurity, GERD, aspiration, tracheobronchomalacia and laryngomalacia are well known risk factors for OSA and in our patient could be contributing to the severity of her symptoms [5]. Adenotonsillar hypertrophy is a common cause of OSA in children between the ages of 2 and 8 years. In our patient, adenotonsillar hypertrophy lead to OSA at a much younger age and this may be related to the presence of the other contributing causes. Infants with OSA are at increased risk of FTT, and developmental and behavioral compromise.

OSA comorbid adenotonsillar hypertrophy is thought to contribute to FTT by (1) feeding disorder including feeding fatigue [6] (2) increased sleep energy expenditure [7,8] and (3) Reduced Growth Hormone [9,10]. In our patient, it is very likely that the OSA comorbid adenotonsillar hypertrophy also contributed to the dysphagia and may have caused reduced feeding which in turn may have contributed to the FTT.

Adenotonsillectomy alone can lead to major improvement in growth and development in infants with OSA [11]. But infants, like our patient, that have more than one factor leading to their upper airway obstruction will not improve with surgery alone if appropriate work-up and treatment of these factors is not implemented [12,13].

Some patients with OSA do not respond to surgery, and may

require more intervention like non-invasive ventilation (NIV) or occasionally tracheostomy tube placement. Each of these interventions has their own limitations. NIV with mask carries an inherent problem of poor adherence and a risk of facial mal development in children with adequate adherence. Tracheostomy placement has the potential risk of obstruction and asphyxia in the absence of immediate intervention, a risk of increased infections and difficulty with care of the tracheostomy.

NIV is used and studied widely in adults and older children with OSA. The main problem with NIV is the poor adherence with treatment. In our patient, we could successfully use NIV for an infant who was thought to have a greater risk/benefit ratio for surgery at the time until she could grow and undergo successful surgical intervention safely.

Our patient also benefitted significantly from being followed in a sleep clinic on a regular basis where she was re-evaluated for possibility and safety of surgical intervention that was curative and led to discontinuation of NIV.

## Conclusion

This case report illustrates several important points. First, it underscores the importance of suspecting OSA in infants presenting with FTT and developmental delay. Second, it highlights the possibility of successful use of NIV for treatment of OSA at a very young age. Third, it proves that a close follow-up, a multidisciplinary approach, and repeated evaluation for alternative treatment plans are imperative for long term management of OSA in infants.

## Acknowledgements

We would like to acknowledge the sleep team at Arkansas Children's Hospital for their contribution.

## References

- [No authors listed]. Standards and indications for cardiopulmonary sleep studies in children. American Thoracic Society. *Am J Respir Crit Care Med.* 1996; 153: 866-878.
- Katz ES, Mitchell RB, D'Ambrosio CM. Obstructive sleep apnea in infants. *Am J Respir Crit Care Med.* 2012; 185: 805-816.
- Chang S, Chae K. Obstructive sleep apnea syndrome in children: epidemiology, pathophysiology, diagnosis and sequelae. *Korean J Pediatr.* 2010; 53: 863-871.
- Chan J, Edman JC, Koltai PJ. Obstructive sleep apnea in children. *Am Fam Physician.* 2004; 69: 1147-1154.
- Ramgopal S, Kothare SV, Rana M, Singh K, Khatwa U. Obstructive sleep apnea in infancy: a 7-year experience at a pediatric sleep center. *Pediatr Pulmonol.* 2014; 49: 554-60.
- Bonuck K, Parikh S, Basilla M. Growth failure and sleep disordered breathing: A review of the literature. *International Journal of Pediatric Otorhinolaryngology.* 2006; 70950: 769-778.
- Stenlof K, Grunstein R, Hedner J, Sjoström L. *Am J Physiol.* 1996; 271 (6 Pt 1), E1036-E1043.
- Li A, Yin J, Chan D, Hui S, Fok T. Sleeping energy expenditure in paediatric patients with obstructive sleep apnoea syndrome. *Hong Kong Med. J.* 2003; 9: 353-356.
- Selimoglu E, Selimoglu M, Orbak Z. Does adenotonsillectomy improve growth in children with obstructive adenotonsillar hypertrophy?. *J Int Med Res.* 2003; 31: 84-87.
- Bar A, Tarasiuk A, Segev Y, Philip M, Tal A. The effect of adenotonsillectomy

- on growth in young children. *Otolaryngol. Head Neck Surg.* 1991; 104:509-516.
11. Freezer NJ, Bucens IK, Robertson CF. Obstructive sleep apnoea presenting as failure to thrive in infancy. *J Paediatr Child Health.* 1995; 31: 172-175.
  12. Mitchell RB. Adenotonsillectomy for obstructive sleep apnea in children: outcome evaluated by pre- and postoperative polysomnography. *Laryngoscope.* 2007; 117: 1844-1854.
  13. Friedman M, Wilson M, Lin H, Chang H. Updated systematic review of tonsillectomy and adenoidectomy for treatment of pediatric obstructive sleep apnea/hypopnea syndrome. *Otolaryngol Head Neck Surg.* 2009; 140: 800-808.