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POTENTIAL REVERSIBILITY OF PULMONARY HYPERTENSION IN PEDIATRIC OBSTRUCTIVE SLEEP APNEA-A CASE REPORT

Paediatrics

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ABSTRACT

Obstructive sleep apnea secondary to adenotonsillar hypertrophy is one of the rare causes of pulmonary hypertension in children. We hereby report a case of OSA secondary to adenotonsillar hypertrophy, managed at AIIMS Rishikesh with remission of pulmonary hypertension following adenotonsillectomy. A 4year old male child presented with cough, difficulty in breathing, noisy breathing, day time somnolence from last 1 year. Grade 4 adenoid hypertrophy with grade 3 tonsillar hypertrophy was seen on ENT evaluation. A 2D-echocardiography showed severe pulmonary artery hypertension with moderate Tricuspid regurgitation with good biventricular function. His final diagnosis was severe pulmonary artery hypertension with right-sided heart failure due to OSA secondary to adenotonsillar hypertrophy. He had complete remission of cardiopulmonary symptoms with resolution of pulmonary hypertension after adenotonsillectomy. Children with OSA with cardiopulmonary involvement could benefit from routine screening for pulmonary hypertension. Adenotonsillectomy should be considered for remission of OSA due to adenotonsillar hypertrophy with cardiopulmonary symptoms.

KEYWORDS

INTRODUCTION:

Childhood Obstructive sleep apnea (OSA) is characterized by episodic upper airway obstruction occurring during sleep. The major components associated with OSA include episodic hypoxia, intermittent hypercapnia and disturbed sleep[1]. The incidence of obstructive sleep apnea in children has been reported to be between 1.5% -2.5percent in healthy non-obese children. The incidence increases in children with obesity and risk factors (Adenotonsillar hypertrophy, Down's syndrome or Pierre Robin anomaly). There is no sex predilection during childhood and boys and girls are affected with equal frequency. The affected age group usually belongs to 2-10 years of age but there are case reports that describes OSA even in infancy[2]

The risk factors associated with OSA in children include Obesity, adenotonsillar hypertrophy, allergic rhinitis, nasal polyps, thyroid disorders, sickle cell disease and syndromes like Downs, Pierre Robin, Crouzon and Marfans syndrome. Irrespective of the associated risk factors the basic mechanism remains either anatomic narrowing or airway muscle weakness, neural dysregulation or a disrupted link between muscles responsible for airway dilatation and airway itself. OSA remains an under-diagnosed and under-treated condition because of its varied symptomatology. Not all children present with similar complaints and it is important to bear this fact in mind while taking history of a child with OSA. A high index of suspicion on the part of pediatrician is needed while examining a child with symptoms like snoring, disturbed sleep and daytime somnolence. The other signs and symptoms which needs to be specifically asked include daytime fatigue, irritability, delayed development, poor weight gain and morning headache. The complications associated with untreated obstructive sleep apnea in pediatric age group may include poor growth, developmental delay, daytime hyperactivity, behavioral problems, undue daytime fidgety and somnolence and cardiovascular complications[3]. In severe untreated cases ultimately complications like pulmonary hypertension and corpulmonale may develop[4]. In contrast to adults, there is relative paucity of literature regarding OSA and Pulmonary hypertension in children.

Pulmonary hypertension is an often feared potential complication of OSA. Although the body of literature examining this association in children is sparse, available studies to date provide evidence for an increased risk of OSA among children with PH (estimates ranging from 6 to 24%), as well as increased risk of PH among children with OSA (estimates ranging from 0% to 85).

Case Report:

A 4 year old male child was brought to us with the complaints of recurrent episodes of fever, cough, and difficulty in breathing from last 1 year. On careful questioning additional history of symptoms like excessive snoring and parents complained that child never slept for more than 2 hours at a stretch and daytime somnolence from last 1 year. On examination: Weight was 10.4kg (<-3 SD), Height-88 cm (<-3SD), weight/height-(-2SD to -3SD), Head circumference-48cm (-1SD to -2SD).MUAC-11.5cm.On admission vitals- HR-130 /min, RR- 48/min pulses good volume. BP 80/52mmHg with tender hepatomegaly. CXR showing B/L infiltrates, so patient initially managed on the lines of congestive heart failure and Pneumonia with Lasix , ivf, antibiotics and Oxygen via nasal prongs. On ENT examination- Patient found to have chronic adenotonsillitis with grade4 adenoid hypertrophy with grade 3 tonsillar hypertrophy.With supportive management patient clinically improved but during hospital stay had multiple episodes of desaturation mainly during night associated with difficulty in breathing, episodic apnea and excessive sweating. Patient kept on CPAP on which patient was symptomatically better. Multiple attempts were made to wean off from CPAP, but patient had episodes of desaturation and apnea at night so CPAP support was continued.

Echocardiography was done which showed moderate TR, severe pulmonary artery hypertension with good biventricular function. So Provisional diagnosis based on clinical findings and examination kept was severe pulmonary artery hypertension with congestive heart failure secondary to Adenotonsillar hypertrophy. For pulmonary artery hypertension sildenafil and amlodipine was started as advised by pediatric cardiologist and advised tonsillectomy for definitive management. Surgery done on 5/2/19(Tonsillectomy with coblation Adenoidectomy). Post surgery patient was kept on Oxygen via nasal prongs, did not require CPAP. 5th postoperative day Echocardiography repeated which showed resolution in PULMONARY ARTERY HYPERTENSION to mild form (initially it was severe PULMONARY ARTERY HYPERTENSION). Patient clinically improved and oxygen weaned off completely on 4th postoperative day.

DISCUSSION:

Severe pulmonary hypertension as a complication of adenotonsillar hypertrophy is reported rarely in children but may be more common than previously realized. The index case report aimed to describe reversible cardiopulmonary complications of OSA secondary to adenotonsillar hypertrophy in a 4 year old male child. Our patient presented with recurrent history of mouth breathing, excessive snoring, and apnoeic spells when sleeping which are typical symptoms OSA secondary to adenotonsillar hypertrophy. This indicates the possibility of the chronic airway obstruction which may have led to persistently elevated pulmonary vascular resistance resulting in pulmonary artery hypertension. Diagnosis of severe PULMONARY ARTERY HYPERTENSION In our patient was made on the basis of echocardiography. Though our patient had clinical signs of cardiopulmonary involvement, previous studies have demonstrated the role of routine echocardiography in clinically stable children with adenotonsillar hypertrophy[6]. For instance, 65.7% of clinically normal children with adenoid hypertrophy were found to have abnormalities in the pulmonary function [7]. Another study reported that 3% of the 92 children who were scheduled for adenotonsillectomy had signs of right heart involvement on echo without clinical signs[8]

We therefore recommend that every child with adenotonsillar

hypertrophy should be clinically evaluated for pulmonary artery hypertension and that the Doppler echocardiography be done in those with symptoms of right-sided heart dysfunction in settings with limited cardiac catheterization facilities before and after surgical intervention.

Adenotonsillectomy which was done in our patient was the definitive treatment for Adenotonsillar hypertrophy and reversed signs of severe pulmonary artery hypertension in our patient.

CONCLUSION:

Upper airway obstruction due to adenotonsillar hypertrophy can cause severe pulmonary hypertension in children with complete remission of cardiopulmonary symptoms after adenotonsillectomy.

Performing echocardiograph examination in children with adenotonsillar hypertrophy is beneficial for assessing the cardiopulmonary status of the patient and may be useful in prioritizing patients for adenotonsillectomy.

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