Review Article

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Exercise-Induced Childhood Asthma: The Available Guidelines, Mechanism and Hypothesis

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Abstract

Childhood asthma (CA) is a growing problem affecting the respiratory health of children. Physical activity (PA) plays a role in the relationship between asthma and respiratory health. Information on factors associated with cardiorespiratory fitness levels among the children with CA is limited. Here we summarize the list of guidelines available for the management of the children with CA and the role of paediatric physiotherapist in assisting children for better living.

Keywords: Asthma; Children; Guidelines; Physical Activity.

Introduction

Childhood asthma (CA) is a heterogeneous disease characterised by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable respiratory airflow limitation. If the children is left untreated, they may end up have less aerobic and anaerobic capacity when compared to their peers.

Guidelines for the Childhood Asthma

The causative agents responsible for childhood asthma is still not yet understood. Hence, we are idiots and the children with CA are pathetic, So, rightly can be called as an idiopathic disease. At present, there are four famous guidelines available for the management of asthma. They are Guidelines for the Diagnosis and Management of Asthma by the Expert Panel Report 3 (EPR-3) of National Asthma Education and Prevention Programme (NAEPP) Coordinating Committee (CC) coordinated by the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health [1], American Academy of Allergy, Asthma & Immunology/ European Academy of Allergy and Clinical Immunology/PRACTALL consensus report [2], 2017 GINA Report, Global Strategy for Asthma Management and Prevention [3] and British Thoracic Society/Scottish Intercollegiate Guidelines Network (BTS-SIGN: 2016, SIGN 153) [4]. Onset of CA is earlier in males than females. Atopy is present in majority of children aged above 3 years of age and allergen-specific sensitization is one of the most important risk factor for the development of CA. However, no known medical intervention has yet shown to prevent the development of CA or helpful in modifying its natural long-term natural course. So, the only option left in management of childhood asthma is improving the quality of life by increasing their physical activity (PA).

Exercise Induced Childhood Asthma

The decrease in PA may be linked to the increased prevalence and severity of CA [5]. In contrary to that, increase in PA leads to increase diagnosed of CA [6]. There exists diverse results on PA and CA. But the recent systematic review and meta-analysis on PA and CA confirms the statement that the children who were physically inactive may have a higher risk of asthma/or wheezing compared with active children [7]. Paediatric physiotherapy plays an important role in improving their endurance and strength by guided PA. But at the same time, exercise could end up in exercise induced asthma. Exercise-induced asthma

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(EIA) is known as a transitory airways obstruction with shortness of breath, cough and wheeze immediately after vigorous exercise [8]. EIA may be supported by two hypotheses (Figure 1), osmotic hypothesis and thermal hypothesis. According to the osmotic hypothesis, asthmatic attacks may be triggered by inhaling of dry air during exercise through the dehydration of the airways generated by the water loss by the respiratory tract stimulated by increases the osmolarity of the periciliary liquids. Such process releases hence chemical mediators (histamine, prostaglandins and leukotrienes) which increase the contraction of the bronchial straight musculature, causing obstruction. The second hypothesis is thermal hypothesis which explains that, EIA is initiated by the thermal effect in the airways caused by exercise. Warming-up the cooled airways following by exercise causes a reactive hyperemia of the bronchial vasculature and edema on the airways wall [8].

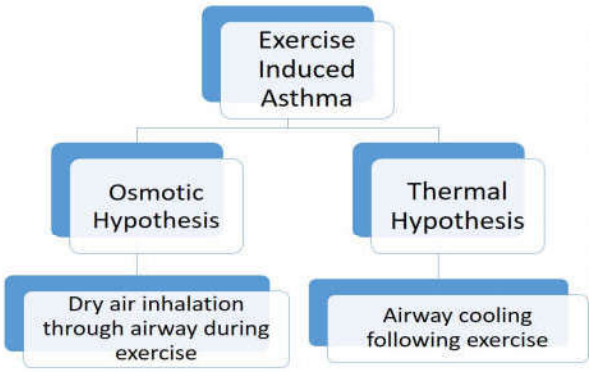

Fig.1: Hypothesis Supporting Exercise Induced Asthma

Monitoring Physical Activity by Physiotherapist

The role of physiotherapist is crucial in identifying the child with asthmatic symptoms and breathlessness due to physical activity when the child is physically active. Paediatric physiotherapist train the child with CA according to ACSM's criteria. Paediatric physiotherapist assist the children to choose appropriate kind and duration of exercise along to medication according to their fitness level. They also encourage to perform pre-exercise warm-ups and cool-downs. The available evidence suggests that PA is a possible protective factor against the children with asthma development.

Conclusion

The available evidence recommends regular PA among children with CA to minimize the recurrence of asthmatic symptoms. It also suggests that children who were physically inactive may have a higher risk of asthma/or wheezing compared with active children and PA is a possible protective factor against the children with asthma development.

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Conflict of Interest

None of the authors have competing interest declared

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References

1. Guidelines for the Diagnosis and Management of Asthma (EPR-3) [Internet]. [cited 2017 Nov 1];Available from: https://www.nhlbi.nih.gov/health-pro/guidelines/current/asthma-guidelines
2. Bacharier LB, Boner A, Carlsen KH, Eigenmann PA, Frischer T, Götz M, et al. Diagnosis and treatment of asthma in childhood: A PRACTALL consensus report. Allergy Eur J Allergy Clin Immunol 2008;63(1):5–34.
3. 2017 GINA Report, Global Strategy for Asthma Management and Prevention [Internet]. [cited 2017 Nov 1];Available from: http://ginasthma.org/2017-gina-report-global-strategy-for-asthma-management-and-prevention/
4. British Thoracic Society/Scottish Intercollegiate Guidelines Network (BTS -SIGN: 2016, SIGN 153) [Internet]. [cited 2017 Nov 1];Available from: https://www.brit-thoracic.org.uk/document-library/clinical-information/asthma/btssign-asthma-guideline-2016/
5. Eijkemans M, Mommers M, de Vries SI, van Buuren S, Stafleu A, Bakker I, et al. Asthmatic symptoms, physical activity, and overweight in young children: a cohort study. Pediatrics 2008;121(3):e666-72.

6. Ownby DR, Peterson EL, Nelson D, Joseph CCL, Williams LK, Johnson CC. The relationship of physical activity and percentage of body fat to the risk of asthma in 8- to 10-year-old children. J Asthma 2007;44(10):885–9.
7. Lochte L, Nielsen KG, Petersen PE, Platts-Mills TAE. Childhood asthma and physical activity: a systematic review with meta-analysis and Graphic Appraisal Tool for Epidemiology assessment. BMC Pediatr 2016;16:50.
8. Laitano O, Meyer F. Exercise-induced asthma/ : current aspects and recommendations. Rev Bras Med 2007;13(1):58–61.