

Paediatric Asthma associated with passive smoking and garbage burning: A case report from Kedah, Malaysia

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ABSTRACT

Background

Combatting with childhood asthma is a global challenge. Exposure to allergens, air pollutants, tobacco smoke, cold air, viral infection, and family history, are the few major causative factors for asthma. An eleven years old boy from Kedah, Malaysia, had the first asthmatic attack at the age of eight. Possible causes behind the development of his asthmatic attack include passive smoking, environment pollutant created by open residential burning of rubbish practiced by his family members, repeated exposure to allergens such as pollen, house dust mite, animal dander, and eczema. The patient has been treated with inhaled salbutamol BP (100µg/day), oral montelukast Na (5 mg/day) and mometasone furoate (55mcg. once daily). In conclusion, episodes of asthmatic attacks were mainly correlated with passive smoking & burning garbages. Comprehensive approaches such as health education, avoidance of the allergen, cleaning, and maintaining these practices can prevent the development of this morbid illness.

Keywords

Allergen, asthma, burning bush, pollens, smoking

Introduction

Asthma is a chronic disorder, where bronchial airways are narrow and swell, produces increased mucous. It is characterized by entirely or partially reversible airway obstruction and inflammation, which causes swelling of the airways. A variety of stimuli, such as allergens, nonspecific triggers, infections are the primary cause of asthma. Globally 300 million asthma cases are reported [1]. Asthma is the most common chronic disease among children. Childhood asthma is associated with allergy and other atopic diseases. Allergic sensitization and childhood asthma are closely associated with allergic March paradigm [2]. This can be first observed with allergic reactions with cow's milk allergy at an early age, but 95% of cases, symptoms disappear. Unfortunately, in the later years, symptoms reappear involving other organ systems. Allergic asthma, allergic rhinitis, and allergic dermatitis are the standard form of them. While approximately 60–75% of school children with asthma have been sensitized to one or more allergens, asthma may also be present without allergic sensitization. According to the Academy of Medicine of Malaysia, environmental allergens include house dust mites (*D. pteronyssinus* and *D. farinae*), cat and other dander, cockroach, fungi and pollen. Food allergy contributes only 1-2% of the population. Non-IgE related food and drug sensitivity may play a significant role e.g. cold drinks, food additives, and certain drugs (aspirin, NSAIDs, beta blockers, and radiological dyes) [3]. Smoking and air pollutants have significant adverse effects on airway hyperresponsiveness in Malaysia [4]. The most common symptoms include recurrent wheezing, coughing, tightness of chest, and dyspnea [5]. Asthma is diagnosed by its clinical manifestations, physical examination of the patient, and spirometry. Laboratory findings in allergic asthmatic patients often show an increased number of eosinophils, exhaled nitric oxide, and positive immunoglobulin-E (Ig-E). [6]. The preferred first-line medication for bronchial asthma is inhaled corticosteroids. In chronic or persisting case long-acting beta agonist or a leukotriene agonist is preferred as a second line medicine together with a higher dose of the first line drug [7].

Case report

An eleven years old boy of Bedong, Kedah was diagnosed, with chief complains of a recurrent episode of breathlessness. Authors visited the village Jalan Kampung Baru, 08000, Bedong, Kedah, Malaysia for the purpose of community field survey. The symptoms worsened at night, and in the early morning. His mother told that his primary difficulty was a difficulty in breathing on exertion and wheezing. At eight years, his breathlessness lasted ~10 minutes. During first asthma exacerbations, he was admitted into the public hospital; based on the clinical finding and investigation report he was diagnosed with childhood asthma and since then on medication.

On further questioning, it was revealed that they dispose of garbage by open burning method, and the boy had been exposed to it since childhood. His father is a heavy smoker (20 cigarettes/day), which made him a passive smoker. Some other factors lead to a recurrent history of asthmatic attacks were exposed to allergens, such as house dust mite, pollens of flower plants, and animal such as cat. He had no family history of bronchial asthma or any types of allergy. On general examination the boy's body mass index (BMI) was normal (20.27 kg/m²); radial pulse rate was 82bpm with normal volume, rhythm and character; breathing pattern and rate were normal; palms were warm, pink and dry; had signs of allergy – dry red scaly skin over the right elbow and both ankles. He had no signs of respiratory distress, dehydration, palmar erythema, splinter hemorrhage, clubbing, central cyanosis, jaundice, anemia, or raised Jugular Venous Pressure (JVP).

Despite this, he has been suffering from eczema on his right elbow and both ankles for two years. His medical history was unusual for some session of gastroenteritis. His mother stated that he has a recurrent episode of cough with shortness of breathing two to three times per year, which subsides immediately after using an inhaler (salbutamol 100µg).

The respiratory system was also found normal. On inspection, there was no sign of the use of any accessory muscles, no hyperinflation, and no Harrison's sulcus. On palpation, the trachea was centrally placed with normal chest expansion. There was no enlarged lymph node over supraclavicular fossa. Percussion showed absence of dullness or hyper resonance and on auscultation breath sound felt normal and vesicular over the upper lobes. We had followed the evaluation of asthma control of paediatric protocols for Malaysian hospitals [6]. Informed consent was obtained from the patient's guardian for history taking and systemic examination.

Table 1: Evaluation of Asthma Control

Characteristics	Controlled	Partly Controlled	Uncontrolled
	All of the following:	Any measure present in any week	
Daytime Symptoms	None	>2 per week	≥ 3 features of partly controlled asthma present in any week
Limitations of activities	None	Any	
Nocturnal symptoms or awakenings	None	Any	
Need for reliever	None	>2 per week	
Lung function test	Normal	< 80% predicted or personal best	
Exacerbations	None	≥ 1 per year	One in any week

The patient has been treated with inhaled salbutamol BP (100µg/day), oral montelukast Na (5 mg/day) and mometasone furoate (55mcg once daily).

Discussion

This case report showed that the patient was well but suddenly developed breathlessness on exertion with wheezing at the age of 8 years and diagnosed as a case of bronchial asthma with an allergic origin. Allergic asthma is the most prevalent type of asthma, which usually starts in childhood.

Garbage burning and asthma

Our case report revealed that the possible causes behind the onset of illness were open burning of the rubbish. The research revealed that improper disposal of garbage, burning wastes in the open space is a significant risk for health. Pollutants emitted by this process are dioxins, fine particles, carbon monoxide, and volatile organic compounds.

Particle pollutants are microscopic particles impact severely on respiratory health; leading to severe consequences like asthma and bronchitis [8]. A study from Brazil confirmed air pollution from biomass burning and increased asthma hospital admissions in a sugar cane plantation. Which is supportive of our present findings [9]. Another research from Grenada, Caribbean showed a strong association of household bush burning practice and related respiratory symptoms. Authors reported the most common lower respiratory symptom associated with bush burning was dry cough, higher prevalence of sinusitis symptoms and had a slightly higher prevalence of cough. Prevalence of physician-diagnosed asthma and sinusitis were also more. Our report showed that the patient's family members used to dispose of the waste by the open burning method. This may be one of the possible causes that trigger the development of his childhood asthma [10].

Smoking and asthma

Passive smoking is a significant cause of respiratory illness and is associated with increased bronchial responsiveness in children [11, 12]. This case study showed the patient's father was a chain smoker (20 number of cigarettes smoked per day) and often used to smoke at home. A higher level of IgE was associated with first degree relatives exposed to second-hand smoking was reported by Orszczyzn et al. [13]. History of our patient also shows higher level IgE during his first asthmatic attack.

Dust mites, pollens, animal dander as a causative factor of asthma

Continuous allergen exposure e.g. house dust mites, pollens, animal dander, etc. can cause allergic sensitization that can play a major role in the development of persistent asthma [14]. House dust mites are usually found in dust and household stuffs such as bedding, pillows, mattresses, etc. [15]. During history taking, we found the presence of plenty of flower plants in front of the patients house. So, pollens may be another factor behind the recurrent episodes of his asthma. Repeated exposure to pollens can trigger the

exacerbation of bronchial asthma in sensitized person and most of the allergic trees belong to flowering groups was reported by Bush et al. [16]. Several studies had shown a strong correlation between cat dander and bronchial asthma in school children. All breeds of cat produce one of the major allergen named as Fel d 1 which is usually found in cat skin and hair follicles, and pet owner's clothing is one of the major sources of allergen spreading [17, 18]. This study showed that the patient was rearing two kittens in his house. Recurrent exposure to cat allergen may be the other cause of sensitization and the asthmatic attack in this child.

Conclusion

Pediatric asthma is a real challenge for clinicians worldwide. Genetic factors, environmental, and diet are associated with this morbid illness. Symptoms and control of pediatric asthmatic patients should be closely monitored, as well as risk factors need to be assessed; the frequency of exacerbations needs to monitor closely. Bronchial asthma is non-curable and always needs to take careful control measures, failure of which may lead to worsening of features, or even to death. Public awareness needs to be created through different health promotion programs, emphasizing on the side effects of passive smoking, garbage burning. It would be an effective measure to combat asthma. Effective measures by implementing strategies to control allergen from pollen, animals could reduce the risk of bronchial asthma in children.

Abbreviations

Body Mass Index (BMI), Immunoglobulin-E (Ig-E), Jugular Venous Pressure (JVP), Second-Hand Smoker (SHS)

Authors' contribution

Conceptualization was done by TA, HN, KF, CYS and ZXL. Patient clerking was done by CYS and ZXL. Resources by TA, HN, KF, DS, CYS and ZXL.

Competing interests

The authors declare no conflicts of interest.

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[Disclosure: The community Medicine survey is carried out by MBBS Year 3 students of AIMST University at Jalan Kampung Baru, Kedah, Malaysia under their community medicine posting is a part of the community diagnosis module. This is part of the AIMST University curriculum and annually each batch carries out a survey at a different village in this region. The village is as identified by a liaison officer and it is selected after the village head agrees to the students carrying out a survey in their locality.]

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