

Age of Onset of Asthma Symptoms

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Abstract

Objective: Epidemiological studies have suggested that the majority of asthmatics have their onset of asthma early in childhood. However, there is little information in Chinese population. This study aims to address this question in a group of doctor-diagnosed asthmatic children in a regional hospital in Hong Kong. **Method:** This study was carried out in the Asthma Clinic of a regional hospital in Hong Kong during the period from April 2001 to December 2002. A designated nurse collected information about the age of onset of asthma symptoms from either the accompanying adults (usually the mother) or from the patient. Information on familial history of asthma and allergic illnesses was also collected. **Results:** Data from 942 children were analysed. Six hundred and eight (64.5%) were boys and 334 (35.5%) were girls. The median age of onset of asthma was 3.0 year old, with the peak between 1 to 3 years old. Majority of children had their first symptoms before 6 years old. If there was a history of maternal asthma, there was a tendency for the children to present earlier. **Conclusion:** We conclude that asthma symptoms in our patients start early in life.

Key words Age factors; Asthma; Child; Epidemiology

Introduction

Asthma is one of the commonest chronic illnesses in children. There have been important advances in the understanding of prevalence, pathophysiology, monitoring and treatment of asthma in recent years. However there is only little information on the natural history of asthma,¹⁻⁵ which is one of the major obstacles to the development of preventive strategies for asthma. One of the most representative studies in this area is the retrospective medical record review from Mayo Clinic. Yunginger et al¹ showed that asthma began in early childhood among

Caucasians, but there is little if any information in the Chinese population. We therefore set up a cross sectional survey among our asthmatic patients to collect information about the age of onset of asthma symptoms. Factors that may influence the age of onset were also explored.

Methods

This study was carried out in the Asthma Clinic of a regional hospital in Hong Kong during the period from April 2001 to December 2002. The target subjects were doctor-diagnosed Chinese asthmatic children. The inclusion criteria were modified from the population-based study from Yunginger et al.¹ All subjects must have been followed up for at least one year for better delineation of symptoms, and the medical records were reviewed by one of the authors to confirm the diagnosis of asthma. The inclusion criteria was that a physician had made a diagnosis of asthma and if each of the following three conditions were present: 1) history of cough, dyspnoea, and/or wheezing and 2) substantial variability in symptoms from time to time,

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or periods of weeks or more when symptoms were absent and 3) two or more of the following: a) sleep disturbance by nocturnal cough and wheeze; b) history of allergic rhinitis or infantile eczema; c) favourable clinical response to bronchodilator. In order to exclude transient early wheezer as defined by Martinez et al⁶ (since they may not be asthmatic patients after all), all subjects who ceased to have symptoms after 3 years of age were excluded. When the patient attended the Asthma Clinic during the study period, our Respiratory Nurse collected information from the accompanying adult (usually the mother) or from the patient. Detailed questions about symptoms and illness were taken, providing a retrospective history of respiratory events between birth and the time of study. The age of onset of asthma symptoms is defined as the first time that the child presented his/her asthma symptoms i.e. cough, dyspnoea and/or wheezing (any 2 of the 3 symptoms). Information on family history of asthma and allergic diseases (allergic rhinitis, eczema and allergic conjunctivitis) was also collected.

Statistical Analysis

The data were presented as median/interquartile range (IRQ), or percentage (%) as appropriate. Differences between groups were analysed by the Mann-Whitney test. In all tests, significance was identified at the p<0.05 level.

Results

There were 958 asthmatic children who fulfilled the inclusion criteria, but 16 of them were excluded because the age of onset could not be recalled. Of the remaining 942 subjects, 608 (64.5%) were boys and 334 (35.5%) were girls. The median age of the subjects at the time of data collection was 8.7 years old (IRQ=5.9-11.1), and they had suffered from asthma for a median of 4.7 years (IRQ=2.9-7.6). The median age of onset of asthmatic symptoms was 3.0 years old (2.0-4.0 IRQ), with the peak between 1 to 3

years old. More than 90% of the children had their onset of asthma symptoms before 6 years of age (Figure 1). There was no gender difference in their age of asthma symptoms onset, no difference for the duration of having asthma or any difference in their age at the time of study (Table 1).

There was a strong family history of allergic diseases (75.7%) and asthma (49.6%) in the study population. If there was a history of maternal asthma, there was a tendency for the children to have symptoms earlier (Table 2). No such association was observed for family history of, allergic rhinitis, eczema and allergic conjunctivitis, nor when the father or siblings had asthma.

Discussion

There are several limitations of the present study. Being a cross sectional study of referred patients, it is prone to sampling bias. The retrospective recall of the age of onset of asthma is another potential source of error. Perhaps the best study design to find out the natural course of asthma is a longitudinal prospective population – based cohort study. However this is both resource and time demanding, and probably explains for the scarcity of data in this field.

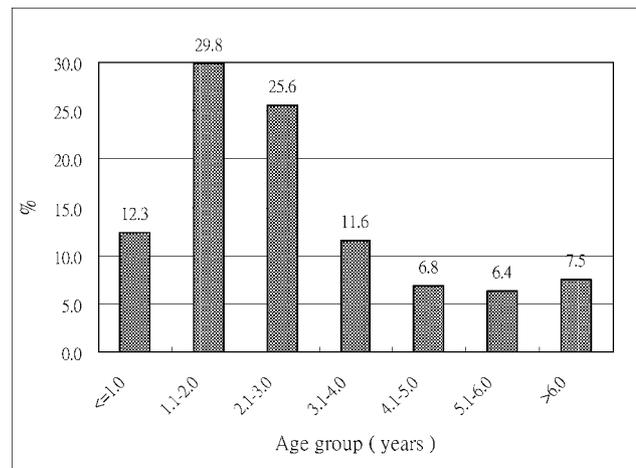


Figure 1 The distribution of age of onset of asthma symptoms.

Table 1 Summary data among different gender

	Male	Female	p-value
Number	608	334	
Age of onset of asthma symptoms, years (median, IRQ)	3.0 (2.0-4.0)	3.0 (2.0-4.0)	0.68
Age at time of study, years (median, IRQ)	8.7 (6.0-11.3)	8.2 (5.7-10.8)	0.06
Duration of asthma, years (median, IRQ)	4.9 (2.0-7.8)	4.6 (1.8-7.1)	0.07

Table 2 Family history of asthma and allergic disease

		Age of onset (years) (median, IRQ)	P-value
Family history of asthma:			
Father	Present (n=96)	3.0 (2.0-4.0)	0.09
	Absent (n=846)	3.0 (2.0-4.0)	
Mother	Present (n=83)	2.0 (2.0-4.0)	0.011
	Absent (n=859)	3.0 (1.5-3.0)	
Sibling	Present (n=153)	3.0 (2.0-4.0)	0.28
	Absent (n=789)	3.0 (2.0-4.0)	
Non first degree relative	Present (n=231)	3.0 (2.0-4.0)	0.42
	Absent (n=711)	3.0 (2.0-4.0)	
Family history of allergic disease:			
Allergic rhinitis	Present (n=670)	3.0 (2.0-4.0)	0.06
	Absent (n=272)	3.0 (2.0-5.0)	
Eczema	Present (n=181)	3.0 (2.0-4.0)	0.09
	Absent (n=761)	3.0 (2.0-4.0)	
Allergic conjunctivitis	Present (n=61)	3.0 (2.0-4.0)	0.61
	Absent (n=882)	3.0 (2.0-4.0)	

The result of epidemiological study is heavily influenced by the definition of asthma. The diagnosis may be based on the subject's self reporting of symptoms,⁷ or by stringent clinical criteria as used by Yunginger¹ and our study. Asthma being a clinical diagnosis, we strongly believed that the criteria adopted in the current study, i.e. physician diagnosed asthma together with stringent clinical criteria is the best possible for a study like this.

Despite these methodological difficulties, to the best of our knowledge, this study is the first one to provide information on this important aspect of the natural history of asthma in the Chinese population. We concur with the literature that the majority of asthma begins in early life. We came to the same conclusion as Morgan's² study. They showed that 79% of children with persistent asthma at 16 years old had their onset of asthma before pre-school age, while ours showed that the majority of our local children with asthma had symptoms before 6 year of age. In contrast to Yunginger's report¹ which showed that the median age of onset of asthma was 3 year for males and 8 year for female children, we did not show such a gender difference. We are not certain what contributes to the differences, or if there is any relationship to ethnic factors.

Allergic illness usually clusters in family, which is also reflected in our study. There was a strong family history of asthma (49.6%) and allergic diseases (75.7%) in our asthmatic children. It supports the notion that there is a

strong genetic component on the development of asthma. Lowe et al⁸ suggested significant interaction between maternal asthma and lung function in early childhood; Kurukulaaratchy et al⁹ showed that allergic comorbidity and maternal asthma emerged as strong factors for persistent wheezing states. We also showed that maternal asthma are associated with earlier onset of symptoms of asthma.

Recent studies^{10,11} suggested that the damage to lung tissues in asthma also began early in life. Longitudinal population-based study from Sear et al¹⁰ showed that derangement in lung function was already present by early school ages in whom persistent asthma would ultimately develop. This finding was further supported by the Childhood Asthma Management Program Study.¹¹ Since asthma begins early in childhood, and the damage also starts in early life, it is reasonable to target intervention in early life for the prevention of asthma. Efforts have been made to manipulate the environmental risk factors like house dust mite allergen avoidance,^{12,13} pet exposure^{14,15} and dietary avoidance¹⁶⁻¹⁸ in early life for primary prevention of asthma, but unfortunately the results so far have been conflicting.

Understanding the natural history of asthma will shed light on the approaches for the prevention of asthma. We are still far from establishing the natural course of asthma, nor do we have successful intervention for preventing it, but we think that we are now on the right track. We showed that asthma symptoms in our local Chinese children began

early in life, and the peak age of onset of asthma in our patients is 1 to 3 years old. The majority of the patients have their symptoms presented before 6 years old, and there is no gender difference. We hope that in the near future, there will be longitudinal population-based study in Chinese population to confirm the results of our study.

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