Prevalence of allergic conjunctivitis in Hong Kong school children

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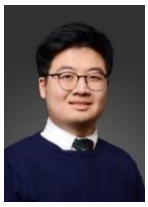

Introduction

Allergic conjunctivitis (AC) is a common ocular disorder among children worldwide.[1] In a recent big-data analytics report containing more than 250,000 new patients in India, the prevalence peaked at early childhood (3-5 years) and gradually lowered to 4.9% in late adolescence (18-21 years). Male sex, a higher socio-economic class and positive history of atopy were considered as high-risk factors of AC.[2]

Ocular itch is a hallmark feature in AC which leads to excessive eye rubbing in children, and in turn increase the risk of developing keratoconus – a progressive deformation of the cornea, among susceptible individuals.[3-5] Severe forms of ocular allergy may also result in visual loss due to corneal ulcerations, subsequent scarring and limbal stem cell failure.[6-9] Thus, the condition should be attended and treated appropriately.

Owing to rapid urbanization and environmental pollution, the prevalence of childhood atopy has been rising over the past decades across the Asia-Pacific region.[10] The International Study of Asthma and Allergies in Childhood (ISAAC) reported that among Asia-Pacific nations, between 3.6 and 24.5% of children aged 6-7 years displayed symptoms of rhinoconjunctivitis, defined as itchy or watery eyes accompanied by the nasal symptoms of allergic rhinitis (AR).[11] However, fewer studies focused on allergic conjunctivitis alone, and these studies were based on a symptomatology questionnaire without ophthalmic evaluation. Therefore, we designed our allergic conjunctivitis questionnaire and conducted an epidemiological study to investigate the prevalence of AC among schoolchildren in Hong Kong.

Methodology of the Hong Kong Children Eye Study

Subjects were recruited from the Hong Kong Children Eye Study (HKCES), a territory-wide population-based study of schoolchildren aged 6–8 years from all 18 districts in Hong Kong. Sample selection for the HKCES was based on a stratified and clustered randomized sampling frame. All primary schools (*n*=571) registered with the Hong Kong Education Bureau were stratified into the seven hospital clusters established across the city according to population densities. For this study, schools located in each cluster region were randomly assigned invitation priority according to computer-generated ranking numbers. Invitations to participate in the study were then sent out according to the ranking numbers until the required sample was achieved for each cluster region. Study subjects were consecutively recruited from July 2015 to July 2017. The inclusion and exclusion criteria for the HKCES were previously published.[12] All recruited children underwent a complete ophthalmoscopic investigation and examination by trained ophthalmologists at the Chinese University of Hong Kong Eye Centre.

Defining allergic conjunctivitis

The challenge of studying AC is the fact that AC is a clinical diagnosis, and till this date there is not a single investigation that can definitively diagnose the condition. Ocular itch is the hallmark feature of the condition, but other causes of ocular irritation such as dry eyes, or blepharitis should be excluded by examination. Upon external examination, one may notice Dennie-Morgan folds from chronic eye rubbing, periocular eczematous skin changes, injection and swelling of the conjunctiva. Slit-lamp examination allows a magnified view of the conjunctiva which may reveal papillary formation and presence of stringy discharge in the fornices. In moderate to severe cases, fluorescein staining of the ocular surface may show punctate epithelial erosions on the cornea or the bulbar conjunctiva. When the upper eyelids are everted, cobblestone or giant papillae with ropy discharge in between, may be present to suggest active inflammation.

Prevalence of allergic conjunctivitis in school children of Hong Kong

This study included a total of 3,069 Chinese children aged 6-8 years, with a mean age 7.5±0.8 years. 51.7% of subjects were boys. Among them, 1,303 (42.5%) children were found to have symptoms of AC (as defined by presence of itchy eyes without concurrent flu) within the past one year. Boys were more commonly affected than girls (55.0% vs 45.0%, p = 0.0002). Among these children, 1,289 completed physical examination, and 644 (50.0%) displayed physical signs of AC upon slit-lamp examination. Consequently, the prevalence of AC with both active symptoms and positive ocular signs was 21.0%.

Ocular itch was the most predominant symptom of AC, occurring in 90.4% of children, followed by eye redness (54.8%) and tearing (51.3%). Among children with symptoms of AC over the past 12 months, 39.9% experienced 1–3 episodes during the year prior, and 24.3% of children experienced more than 12 episodes. 21.0% of children experienced persistent symptoms lasting more than 4 weeks.

50.0% of children with symptoms of AC displayed physical signs on examination. The most common ocular sign was papillae in the upper palpebral conjunctiva (31.9%), followed by follicular lesions in

the lower palpebral conjunctiva (23.7%). Even though these signs may be considered non-specific and could be identified in healthy children, these signs were detected more frequently among those with symptoms of AC compared to those without (p<0.0001).

Impact of allergic conjunctivitis to school children

A total of 840 children reported some degree of impact on their daily lives as a result of AC, with 8.5% and 1.1% reporting moderate and severe impact. A greater impact on daily life was correlated with the severity (as defined by number of days per week, p<0.001) and longevity (as defined by duration of more than 4 weeks, p<0.001) of symptoms. An impact on schooling was that 85 children (2.8%) had taken sick leave from school due to AC. Interestingly, only 291 children (9.5%) had attended eye clinics for treatment of AC, which may partially reflect inadequate awareness among parents.

Parental awareness of allergic conjunctivitis was the lowest compared to other atopic conditions

While parental support for detecting and managing various forms of allergic diseases is extremely beneficial for their children, we note that evaluations on parental awareness of AC have seldom been reported. Among all responding parents, only 10.9% were aware of a prior diagnosis of AC for their child, which was lower than the rates for other atopic conditions such as allergic rhinitis (32.6%) and eczema (25.3%), but higher than that for asthma (5.2%). Among those parents with children exhibiting active atopic conditions, parents of children who had symptoms of AC in the past 12 months had the lowest awareness of a prior diagnosis of AC (20.6%), compared to 46.9%, 31.1%, and 86.6% of parents who reported a correct and corresponding atopy history of allergic rhinitis, asthma, and eczema in their children, respectively.

Conclusions

Allergic conjunctivitis is prevalent among Hong Kong schoolchildren, with more than 40% of children aged between 6-8 years having active symptoms and more than 20% displaying physical signs of allergic conjunctivitis. Among them, 10% of children experienced moderate to severe impact on their daily lives. Unfortunately, parental awareness of the disease was the lowest among other atopic conditions. It is our role as health care providers to educate parents who are taking care of children with AC about the potential severity and impact of the disease and raise the awareness so that we can protect the visual health and development of these children.

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