Timing of solid food introduction in Hong Kong children: abridged secondary publication

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KEY MESSAGES

- 1. The incidence of anaphylaxis has increased over the past decade. Hong Kong is experiencing a 'second wave of the allergy epidemic', particularly among young children.
- 2. Physician and public education and empowerment are needed to increase awareness of and preparedness for anaphylaxis.
- 3. Delayed introduction of allergenic solid foods is common in Hong Kong; further studies are

Introduction

The prevalence of food allergy (FA) has increased in the past decade; the highest challenge-confirmed FA prevalence was 10.4%, observed in Australian infants. FA impacts the health, quality of life, social interactions, and daily activities of affected individuals and their caregivers; it can also lead to severe allergic reactions and death. Thus, FA is an important public health problem. In Hong Kong, most healthcare professionals recommend that infants are introduced to solid foods at the age of 6 months, whereas some recommend delayed introduction of allergenic foods to highrisk infants. However, since the publication of the Learning Early about Peanut Allergy study,¹ early introduction of allergenic food to high-risk infants has been recommended. The disease burden of FA and food anaphylaxis in Hong Kong is unknown. We evaluated Hong Kong's disease burden of FA and food anaphylaxis, associated risk factors, and the associations between the timing of solid food introduction and FA in Hong Kong children.

Methods

Medical records of patients with anaphylaxis-related or allergy-related conditions (based on International Classification of Diseases (ICD) codes) who were admitted to Hong Kong's public hospitals between 2009 and 2019 were identified using the Clinical Management System. Data collected included details of allergic reactions, suspected allergens, age at onset, timing of solid food or food allergen introduction, test findings, and management plan (eg, prescription of adrenaline autoinjectors [AAIs]).

Additionally, patients with FA and/or anaphylaxis were prospectively recruited in seven major public hospitals in Hong Kong between needed to determine its role in the increasing anaphylaxis trend.

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June 2019 and December 2020. Patients and their caretakers were interviewed, and corresponding medical records reviewed. All patients with FA reactions underwent allergen-specific immunoglobulin E testing, including serological and skin prick tests.

Results

The 10-year incidence of anaphylaxis was 3.57 per 100 000 person-years. There was an increasing trend from 2009 to 2014 in both paediatric and adult populations, after which the incidence remained stable until 2019. The increase was more marked in the paediatric population than in the adult population; the respective incidence ratios in 2019 were 3.51 (95% confidence interval=1.12-2.66) and 1.82 (95% confidence interval=1.05-1.60). The incidence of new FA diagnosis increased from 2009 to 2019 (12.4 to 38.1 per 100000 population), consistent with the increase in anaphylaxis incidence. Although the rate of AAI prescription increased for patients admitted with anaphylaxis, it remained below 15% and was lower in adult patients than in paediatric patients (36.5% vs 89.4%, P<0.001).²

Among paediatric patients with allergy-related symptoms (rather than those identified by ICD codes) who presented between 2010 and 2019,³ the 10-year incidence of anaphylaxis was 9.76 per 100 000 personyears. The trend of anaphylaxis incidence increased over time. Food-induced anaphylaxis caused most hospital presentations; peanut and shellfish were the primary triggers. Most anaphylaxis episodes were classified as grade 4 severity, and young age was identified as a predictor for severe allergic reactions. Only 42.5% of cases were correctly coded as anaphylaxis using ICD-9 codes (995.0, 999.4, and 995.60 to 995.69); 29.7% of anaphylaxis episodes were misclassified as angioedema (code 995.1). Adrenaline was administered in 42.2% of cases; 9.4% of these were administered prior to hospital arrival. Other predominant medications used for anaphylaxis were antihistamines (88.8%) and systemic steroids (51.6%). Four cases required intubation and three cases required cardiopulmonary resuscitation, but no deaths were reported. The use of adrenaline in hospitals increased during the study period but still lagged behind standard anaphylaxis management.

In collaboration with members of The Asia Pacific Academy of Pediatric Allergy, Respirology & Immunology, we initiated an Asian anaphylaxis registry using a standardised protocol. From June 2019 to December 2020, 100 episodes of anaphylaxis were recorded in Hong Kong. More than two-thirds of cases occurred in boys. The median patient age was lower in Hong Kong than in Singapore or Bangkok (1.14 [4.88-13.09] vs 4.95 [2.29-10.47] vs 10.67 [6.67-13.5] years). Most patients had no known history of anaphylaxis and presented with predominantly mucocutaneous features, followed by respiratory, gastrointestinal, cardiovascular, and neurological

TABLE. Timing of allergenic solid food introduction in 422 atopic cases and controls

Allergenic solid food	Non-delayed introduction (≤12 months)*	Delayed introduction (>12 months)*	P value
Cow's milk	363 (86.0)	59 (14.0)	<0.001
Eggs	332 (82.6)	70 (17.4)	< 0.001
Fish	326 (80.9)	77 (19.1)	<0.001
Shellfish	174 (44.2)	220 (55.8)	0.02
Wheat	170 (44.5)	212 (55.5)	0.03
Peanuts	108 (28.1)	276 (71.9)	<0.001
Tree nuts	87 (23.0)	292 (77.0)	<0.001

Data are presented as No. (%) of participants



symptoms. Food was the predominant trigger in all three regions. Insect-induced anaphylaxis was only observed in Bangkok. Shellfish was the most common food allergen in Asia, followed by eggs, tree nuts, and peanuts. Most cases were under-recognised and undertreated; only 9% of patients were administered adrenaline prior to hospital arrival.

The timing of allergenic solid food introduction was analysed in 422 atopic cases and controls (Table). Of these, 32 (7.58%) were introduced to all seven common allergenic foods by 12 months of age; 17 (4.03%) had premature introduction of allergenic solid foods, including eggs and fish, before 4 months old. Delayed introduction (after 12 months of age) was common for tree nuts (77.0%, P<0.001) and peanuts (71.9%, P<0.001), whereas non-delayed introduction was common for fish (19.1%, P<0.001), eggs (17.4%, P<0.001), and cow's milk (14.0%, P<0.001) [Fig]. Despite the increasing evidence supporting nondelayed introduction of allergenic foods to prevent FA, delayed introduction (especially for nuts and peanuts), was common among Hong Kong children.

Discussion

The incidence of anaphylaxis between 2009 and 2014 is similar in Hong Kong and the West, but the rate of AAI prescription was lower in Hong Kong than in countries with similar disease burdens. Our findings highlight the need for physician and public education and empowerment to increase awareness of and preparedness for anaphylaxis. Delayed introduction of allergenic solid foods is common in Hong Kong; further studies are needed to determine its roles in the increasing anaphylaxis trend. The Hong Kong Anaphylaxis Consortium consensus statements are formulated to facilitate the prescription of AAIs by frontline physicians.⁴

A notable limitation of this study was the interruption of patient recruitment during the COVID-19 pandemic. Outpatient appointments for new cases were missed, and parents avoided hospital attendance. Nevertheless, most severe cases of allergic reactions were captured, but underestimation of the problem may persist.

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Disclosure

The results of this research have been previously published in:

1. Leung ASY, Li RMY, Au AWS, et al. Changing pattern of pediatric anaphylaxis in Hong Kong,

2010-2019. Pediatr Allergy Immunol 2022;33:e13685.

2. Tham EH, Leung ASY, Yamamoto-Hanada K, et al. A systematic review of quality and consistency of clinical practice guidelines on the primary prevention of food allergy and atopic dermatitis. World Allergy Organ J 2023;16:100770.

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