

## Special features of allergic and immunological disorders in tropical Asia

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The epidemiological features of allergic diseases vary between regions worldwide. Allergy and immunological disorders in tropical Asia-Pacific region have special characteristics. Features of allergic airway diseases, food and drug adverse reactions, primary immune deficiencies, as well as infectious diseases in this geographic region are also unique, attributable to its environmental factors and diverse ethnicities.

Allergic rhinitis is considered a global health problem. Due to the warm climate, however, clinical features between allergic rhinitis and non-allergic rhinitis in tropical regions become less distinct. Symptoms of allergic rhinitis and non-allergic rhinitis can be quite similar because allergen burdens contributing to symptoms of rhinitis are abundant all-year round. Clinical characteristics of allergic airway diseases caused by indoor allergens and outdoor allergens such as pollens may be difficult to distinguish since blooming periods of pollens in warm climate are not well-defined. A pollen survey in Bangkok indicated that average pollen count was relatively high throughout the year and *Amaranthus* (careless-weed) pollen is one of the major airborne pollens in the Bangkok metropolitan area.<sup>1,2</sup> The diagnosis of allergic airway diseases (allergic rhinitis or asthma) in young adolescents was demonstrated to have a negative impact on the quality of life, particularly in asthmatic patients.<sup>3</sup>

Regarding food and drug allergies, exotic food in the region such as bird's nest and weaver ant eggs have been reported to cause anaphylactic reactions.<sup>4,5</sup> Oral mite anaphylaxis has been reported from tropical Asia as well.<sup>6,7</sup> Patterns of drug allergic reactions in Asians are different from the data reported from European countries. The prevalence of aspirin-exacerbated respiratory disease is much lower than those in western countries.<sup>8</sup> In Southeast

Asians, the prevalence of NSAIDs-induced urticaria/angioedema is higher than that of NSAIDs-induced respiratory symptoms, particularly NSAIDs-induced periorbital oedema, which usually affects atopic subjects.<sup>9</sup> Apart from NSAIDs, angiotensin converting enzyme inhibitors (ACEI) can also cause angioedema in Asians although ACEI-induced cough is much more common. In fact, there is an increased risk of ACEI-induced cough in people with East Asian ancestry, but the prevalence of ACEI-induced angioedema is less frequent.<sup>10</sup> Not only ACEI, but also other drugs blocking the renin-angiotensin-aldosterone system such as angiotensin receptor inhibitors, can also contribute to angioedema with special preponderance in elderly females.<sup>11</sup>

Genetic makeup obviously plays an important role in the development of drug allergy. Since genetic polymorphisms vary between races, available data from western countries cannot be used as a reference for the Southeast Asian population. Pharmacogenomic data show a significant correlation between genes at risk and drug hypersensitivity in Chinese and Southeast Asians. The incidence of severe drug-induced cutaneous adverse reactions is very high in Southeast Asia.<sup>12,13</sup> Allopurinol and carbamazepine are among the most common causes of drugs-induced Stevens-Johnson syndrome/toxic epidermal necrolysis syndromes in the region due to the high frequencies of the HLA-B\*5801 and HLA-B\*1502 alleles, respectively, in individuals of Chinese and South East Asian descent.<sup>14,15</sup>

Autoantibodies against interferon-gamma have been reported to associate with adult-onset immunodeficiency in patients with Southeast Asian ancestry presenting with disseminated non-tuberculous mycobacterial (NTM) disease and other opportunistic pathogens.<sup>16</sup> Whether these autoantibodies are the underlying cause or the consequence of defective response to NTM infection contributing to vicious cycle of immune deficiency is still unclear. The detection of autoantibodies in asymptomatic patients prior to disease development and in their asymptomatic relatives would then support an

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autoimmune hypothesis. Other than the immune deficiency that is unique to the region, a rare primary immune deficiency also found elsewhere such as Wiskott-Aldrich syndrome has been sporadically reported.<sup>17</sup> A group of researchers from Naresuan University showed that Wiskott-Aldrich syndrome protein, a key role of actin polymerisation, could be recruited to the T cell receptor activation site by different pathways and plays an essential role in T cell responses.<sup>18</sup>

Several arbovirus infections are endemic in this region, particularly dengue virus (DENV), Japanese encephalitis virus (JEV), and Chikungunya virus. Serologic cross-reactivity between arboviruses sometimes occurs and can interfere with laboratory diagnostic tests.<sup>19</sup> Whether the cross-reactivity could influence immunity caused by vaccine is not yet known. A study from Chulalongkorn University demonstrated that cross-reactivity between DENV and JEV may have less of an impact on immune responses than expected, as they showed no significant effect on dengue virus-specific neutralising antibody production in mice previously immunised with JEV vaccines.<sup>20</sup>

Taken together, the management of allergic and immunological disorders in different parts of the world is a challenging task for allergists and clinical immunologists. Allergic airway diseases, drug and food allergies, primary immune deficiencies, and infectious diseases in tropical Asia have unique presentations and require special attention. Thorough understanding of epidemiological data and knowledge on special regional features would be beneficial for the proper management of allergic problems in this region.

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