



Editorial

The changing diagnostic world in allergy and immunology



We are living in an extraordinary time to practice medicine. Technological advances in the areas of molecular biology, genetics, imaging, and even telecommunications have completely changed on how we practice medicine and deliver care. One area of medicine that has evolved drastically in the past 30 years is the field of diagnostics, and this is no more evident than in allergy and immunology. From diagnosis of primary immune deficiency to rhinitis, our field has grown leaps and bounds. In this issue, we highlight some of the changing diagnostic landscape for our specialty and look at how we may use new diagnostic techniques in the future of immunoglobulin E (IgE)–mediated allergy and how we can use currently available techniques to improve our care of patient with common variable immune deficiency (CVID).

Evaluation of allergen-specific IgE has always been vital to diagnosis in our field. Although I feel like a bore correcting our fellows-in-training when they state that the patient had “RAST testing” done, I do feel that it is important to understand how the assays we order work, because this helps define their precision and accuracy. Furthermore, although the current commercially available antigen-specific IgE tests are an improvement in the radioallergosorbent test, there is still room for improvement. One possible method for improvement is through microarray assays, and in this issue, Keshavarz et al¹ did an excellent job introducing these and examining the strengths and weaknesses of these assays. The microarray assays hold potential to allow measurement for multiple allergen components (>100 on current chips) with small-volume serum samples; thus, one can easily see how this could be beneficial in clinical care. In fact, as the authors point out, they are currently being used in many places around the globe but are not approved for clinical use in the United States. As these assays evolve, and further clinical data support (1) their concordance with the currently available serum IgE assays and (2) their use in clinical studies of specific disease states (eg, perspective studies in food-challenge studies), it is possible that they may one day be used routinely in clinic. With the advancements in technology, it is in fact not unreasonable to imagine a day when a physician could use a finger stick and apply a small-volume serum sample to a chip and get a read-out within a few hours regarding IgE sensitization to multiple allergens, painting a picture of sensitization patterns and true clinical reactivity. Although this may never replace skin testing, it is not unreasonable to see how it could hold a place in routine clinical care. One drawback to this assay is that the allergen content on the chip is

not easily modified, that is, the allergens tested must be set ahead of time. Thus, the panel of allergens tested, at this point, cannot be chosen “à la carte.” A second major drawback, if used clinically, is that the clinician will be receiving tests to multiple allergens (>100 on current ISAC chip); thus, there will be many results that will be unnecessary, creating a dilemma on how to interpret positives to allergens that never needed to be tested, especially in the context of high false-positivity rate of current serum IgE assays.

Beyond improvements in fine-tuning IgE detection for allergic conditions, diagnostic improvements have also affected how we care for immune deficiencies, from improvements in flow cytometry for immunophenotyping to having newborn screening available to pick up cases of severe combined immunodeficiency early in life. Perhaps the most common primary immune deficiency a practicing allergist manages is CVID. Lee et al² did an excellent job reviewing current diagnostic strategies for CVID here, offering practical advice for the clinician, comparing current expert consensus diagnostic strategies, and outlining appropriate surveillance diagnostics with a helpful algorithm. One area of interest in CVID that has surfaced in recent years is the use of genetic testing in patients with CVID. Although obtaining panel next-generation sequencing will not lead to a diagnosis in most patients with CVID, there are some known monogenic causes of CVID that can benefit from specific mediator therapy, and testing may be warranted in patients with early onset CVID or perhaps in patients with certain noninfectious complications. This is highlighted in this review and in previous reviews, and the nuts and bolts of genetic testing have been reviewed in a recent yardstick of the American College of Allergy, Asthma and Immunology.³

In addition to genetic testing, immunophenotyping and surveillance testing can identify patients with CVID who have noninfectious complications and are likely to have poorer prognosis. These diagnostic tests are ever more important today when we have increasing number of cytokine-specific therapies and small molecule inhibitors that may be appropriate for patients with CVID with noninfectious complications.⁴

As technology rapidly evolves, so do our diagnostic testing capabilities. As clinicians, we must keep up to date with these changes, be knowledgeable on these new assays, and be ready to adapt as they become available.

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