Upcoming Changes in Immunology Testing

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Determination of IgE based sensitivity along with a history of exposure and symptoms are important factors in the diagnosis of allergic disorders. Individuals who experience symptoms when exposed to an allergen - and also produce IgE antibodies that specifically recognize that allergen - have a type 1 (immediate) hypersensitivity reaction (1). Although skin testing for IgE-mediated allergy is still common practice today, serum-based testing for IgE directed against species specific proteins offers advantages for certain patients. As opposed to skin testing, serum-based IgE testing poses no risk of an allergic reaction and may be preferred when the risk of an allergic reaction is present. Also serum-based IgE testing is not affected by medications that confound the results of skin testing nor is it reliant on skin integrity or affected by skin disease (2). Finally, serum-based IgE testing may be more humane for pediatric patients and more convenient for adult patients.

The Clinical Immunology Laboratory at CMH performs serum based testing for total and species specific IgE using the ImmunoCAP method. This methodology is arguably the most accurate, reliable and best accepted of the several methods available. From the inception of IgE testing the normal range for serum specific IgE was set at amounts less than 0.35 Kilo International Units per Liter (KU/L). However, the factors related to this “normal” value depended not only on the observation that persons with specific IgE values less than 0.35 KU/L were unlikely to exhibit symptoms in response to exposure but also the lower limit of sensitivity for the assay was about 0.35 KU/L. As the technology has progressed, testing can now deliver a limit of detection as low as 0.043 KU/L. Also, research about the types of sensitivities that develop early in childhood, those that develop later in childhood, and those that may develop in adulthood has indicated that a high percentage of the population may have some low level of specific IgE against many substances including foods. Therefore, there has been increasing demand to measure low levels of specific IgE.

In response to this demand, Phadia (formerly Pharmacia), the makers of the ImmunoCAP method, have announced their intention to extend the reportable range for total and specific IgE to 0.1 KU/L. The Clinical Immunology Laboratory will implement the associated upgrades in software and hardware this spring. And, physicians should begin to see the change in reported values by the summer of 2010. This change in the reportable range should have little impact on the use of the results. Most allergists agree that specific IgE levels below 0.35 KU/L are not likely to be related to atopic disease. Therefore, we will maintain our normal levels where they currently are at less than 0.35 KU/L.

Exactly where the field of allergy testing will go in the future is unpredictable; however, there are several new technologies that could provide additional benefits. Since the advent of multiplex technology, researchers have been developing component-based IgE quantification methods either on microchip or microsphere platforms. These technologies involve detection of IgE antibodies to recombinant or highly purified individual protein molecules, rather than to a complex mixture of substances typically contained in an extract. The individual molecular components are typically immobilized on a micro-array chip or on individual micro beads. On these formats the testing can provide specific IgE values for 100 or more
components using the same small amount of serum. Very typically these multiplex platforms contain many allergen proteins for the primary organisms that people respond to. These tests can provide additional information about some complex sensitivities such as peanut allergy that might be useful to a physician managing these conditions. An additional advantage for a pediatric practice is the ability of these multiplex platforms to provide numerous simultaneous results from a single very small specimen. However, much work remains to be done on the interpretation and clinical usefulness of the large amounts of information generated by these technologies.

In further news from Immunology, the testing for antibodies directed against HIV and Hepatitis C will be moved to the new Vitros ECiQ. This move will provide for the testing to be available at all times and will replace the current very labor intensive technology. This current technology provided by Abbot Laboratories was the best we could find in the early 1990’s; but, the field has moved since that time. Also, after the revised recommendations put forward by CDC(4) that suggested a benefit to increased HIV screening, an automated HIV testing method is needed.

Additionally, in the coming months, the Immunology Laboratory will begin testing for the presence of Tuberculosis infection using the Quantiferon-TB methodology. This is a whole-blood test approved by the U.S. Food and Drug Administration in 2005. To perform the test whole blood samples are mixed with synthetic peptides representing two M. tuberculosis proteins, ESAT-6 and CFP-10. After incubation of the blood with antigens for 16 to 24 hours, the amount of interferon-gamma (IFN-gamma) is measured. Subjects infected with M. tuberculosis will release IFN-gamma in response to contact with the TB antigens and interpretation of the test is based on the amount of IFN-gamma released. Because there are limited data on the use of this test in children, persons recently exposed to M. tuberculosis, and persons with immunodeficiency or immunocompromising circumstances this test is primarily intended to be used by Human Resources at CMH to replace the tuberculin skin test.

References:
3. Check W. Allergy testing: from skin to tube to chip. CAP Today December 2009.
4. MMWR Recommendations and Reports September 22, 2006 / 55(RR14);1-17