



Food Allergies, Intolerances and Sensitivities: Issues in Pediatrics

By:
Jim LaValle, RPh,CCN, MT

A true IgE food allergy is 1 of the 4 symptom manifestations of the “atopic march,” along with eczema, allergic rhinitis, and asthma.

It is clear if your pediatric patient has a true IgE food allergy because of the immediate IgE immune response, making these classic type of food allergies easy to determine.

However, becoming more prevalent and harder to pinpoint, are food intolerances and sensitivities. Specifically, identifying IgG, IgG4 and Complement protein factors C3b and C3d delayed immune reactions are important to measure. The IgG family of reactions can be difficult to recognize because of the vague and wide range of symptoms which can take up to 72 hours to present.

Food sensitivities can develop over time, to some extent, because imbalances in the gut microbiome or changes in gut permeability can take time to develop. The top five food sensitivities in children are: gluten, dairy, corn, soy and eggs. The potential consequences of consuming these foods, if the child has a sensitivity to one or more of them are, chronic inflammation leading to skin disorders, GI problems such as eosinophilic esophagitis, as well as asthma, autoimmunity and weight gain.

Potential signs of food intolerance in children:

- GI issues - stomach aches, constipation and/or diarrhea, burping/belching excessively, IBS, IBDs
- Frequent and prolonged crying
- Learning and behavioral problems
- Unexplained fatigue
- Immune/autoimmune issues
- Allergies/asthma



Potential signs of food intolerance in children (continued):

- Frequent infections, especially ear and throat
- Chronic low-grade fever
- Skin issues - irritations, rashes
- Unexplained weight gain or loss
- Sleep issues
- Neurological issues
- Autism Spectrum disorder

In early 1990s a study of 48 children between 6 months and 3 years of age with food allergy/intolerance symptoms reported that 22.9% had specific IgE to food, 62.5% had specific IgG and 14.6% had both specific IgE and IgG, while children without symptoms of food allergy had neither specific IgE nor IgG to food. During the first three years of life, the undesirable response to aliments is more often IgG-dependent than IgE-dependent. In fact, IgG to milk, eggs and flour has been found two or three times more often than IgE.

Current literature supports the fact that pediatric food allergies, intolerances and sensitivities are directly tied to pro-inflammatory sequelae and the release of GUT mucosal IgE and IgG type antibodies. This inflammatory signaling “drives” metabolic, immunologic and neurologic issues in pediatrics.

The GI tract is a significant source of chronic inflammatory signaling due to changes including mucosal integrity and microbiome issues. Food allergies/sensitivities and intolerances can play a significant role in gut permeability and related gut health

An altered microbiome, directly reflecting changes in microbiota, is not only a marker of disease but also actively contributes to metabolic and neurologic issues in pediatrics.



Importance of Pediatric GUT Health

Emerging research of the pediatric microbiome demonstrates its importance in the development of GUT mucosal integrity, the immune system, nervous system, and growth in children.

Undesirable dysbiotic changes to the microbiome during infancy are directly related to the development of chronic illnesses such as asthma, allergies, and inflammatory bowel disease. Dysbiosis is associated with many other conditions such as ADHD, autism, obesity and type 2 diabetes in children. Conversely a healthy pediatric microbiome provides protection against various pathogens, adverse vaccine responses and drug metabolism.

Statistics for GUT-Immune Allergic and Related Conditions in Pediatrics:

- Functional gastrointestinal disorders are one of the most common complaints in children and adolescents including functional abdominal pain. Worldwide prevalence of function abdominal pain is 13.5% of the pediatric population, of which irritable bowel syndrome was the most prevalent (8.8%).
- Ear infections are the most common reason parents bring their child to a doctor. Three out of four children will have at least one ear infection by their third birthday.
- Asthma is the most common chronic condition among children, currently affecting an estimated 6.1 million children in the US under 18 years, of which 3.5 million suffered from an asthma attack or episode in 2016.
- CDC estimates that since 2010, flu-related hospitalizations among children younger than 5 years old have ranged from 7,000 to 26,000 in the United States; children younger than 5 years old - especially those younger than 2 - are at high risk of developing serious flu-related complications.
- 23.6% of children aged 0-18 years' experience a skin allergy.
- 20.3% of children aged 6-11 years are obese.

Unfortunately, the rate of childhood obesity has increased in parallel with adult obesity, resulting in pediatric patients presenting with diseases traditionally associated with adulthood such as dyslipidemia, nonalcoholic fatty liver disease (NAFLD), and type 2 diabetes. Food intolerance reflected by immunoglobulin G (IgG) antibodies may predispose the child to low grade inflammation and atherogenesis. A 2007 study using obese juveniles reported a highly significant increase in intima media thickness (IMT), elevated CRP values and anti-food IgG antibody concentrations compared to normal weight juveniles. Anti-food IgG showed tight correlations with CRP and IMT and sustained highly significant in a multiple regression model.

Factors including vaginal delivery, breastfeeding, maternal health and nutrition help shape the microbiome. Caesarian delivery, formula feeding, poor dietary choices and antibiotic use can alter microbiome diversity and are associated with the development of chronic health issues like GI disorders, diabetes, asthma, allergic diseases, autoimmunity and obesity later in life.



Autism and Food Intolerances/Sensitivities

Autism spectrum disorder (ASD) is a complex neurodevelopmental condition described by impairments in three main behavioral areas: social deficits, impaired communication, and repetitive behaviors. Despite many years of vast study, the causes of ASD are still unknown. Various risk factors including genetic, infectious, metabolic and immunological have been suggested along with environmental, nutritional and metabolic related risk factors.¹

Children with ASD often show intolerance to one or more foods. Food proteins and protein-derived compounds may modulate the immune response in the body. Changes in gut permeability may lead to food-borne immune complexes and pathogens being allowed into blood circulation. This results in an abnormal immune response and increased levels of circulating pro-inflammatory cytokines. Studies report that gluten and casein intolerance in children with ASD often have high-level specific IgG antibodies. **These GUT-IMMUNE abnormalities may explain, in part, the pathogenesis of ASD.**

Studies using IgE antibody tests report that autistic children routinely have higher levels of IgE antibodies. A 2020 study investigated aberrant eating behaviors (EBs), gastrointestinal (GI) symptoms, and food intolerance in children with autism spectrum disorder (ASD) and their association with clinical core symptoms of ASD in 94 preschool children diagnosed with ASD. For placebo, 90 children with typical development (TD) were also used. Questionnaires were used along with serum specific IgG antibodies against 14 kinds of food were detected using enzyme-linked immunosorbent assays (ELISAs). Results were that the detection rate of aberrant EBs in the ASD group was significantly higher than that in the TD group (67.39 vs. 34.94%), and the rate of GI symptoms was also higher in the ASD group than that in the TD group (80.22 vs. 42.11%). Detection of food intolerance in children with ASD reported a positive rate of 89.89% and that the majority of children had multiple food intolerances. The authors concluded that ASD with aberrant EBs or high food-specific IgG antibodies concentrations had more severe stereotyped behavior, which may have implications for exploring the immune mechanism of ASD.



Conclusion

Testing for IgE, IgG, IgG4 and Complement factor proteins C3b and C3d is an important tool for pediatricians to utilize in children with GUT, immune, metabolic and other chronic health issues. Certain foods may trigger GUT microbiome issues that then disrupt GUT-Brain and GUT-Immune signaling, thereby leading to increased symptoms in the child.

Prescribing a diet that eliminates the foods that cause these responses decrease many types of inflammation. This allows for a down regulation of symptoms and may promote gut healing and is foundational to the well-being of the child.



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