

Diagnosed in the Allergy and Immunology Clinic

"It must be an allergy."

"Something is wrong with his/her immune system."

"This has gone on for so long. We need to get it under control."

These are usually the thoughts in the pediatrician's or the parents' mind when they seek consultation with the pediatric allergy and Immunology Clinic, and in the clinic, they often get the answer.

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A BOY WITH SPEECH DELAY

A 20-month-old boy was seen in the allergy clinic for evaluation of recurrent ear infections, chronic nasal congestion, and rhinorrhea. He also had failure to gain weight. His mother had concerns that the child had food allergies, which are the cause of his poor weight gain. Detailed history shows that he had an acute reaction of vomiting from cow's milk-based formula as an infant. Cow's milk had since been eliminated from his diet and was replaced with soy milk-based formula and now with soy milk.

The mother had also brought the child's twin sister to the visit. While in the examination room, the sister was conversant, playful, and engaging, while the brother sat in the stroller and did not speak. The mother was asked about the child's language development. She said that he had not spoken until recently, at about 2 years, and has said few words. She added that he is in speech therapy because he has a nasal tone to his voice that makes his speech difficult to understand.

Amal Assa'ad, MD



Figure. Patient with DiGeorge syndrome exhibiting facial features of the syndrome. Source: Assa'ad A.

The next step was to discern what disorder combines recurrent infections with delayed milestones, nasal speech, and evidence of elevated IgE. The child's facial features were again examined and were compared with those of his twin sister. The boy had small palpebral fissures, a bulbous nose, a small mouth, and prominent ears (see Figure). Additionally, the exam revealed dry, eczematous skin and scarred tympanic membranes. The remainder of the cardiac, lung, and abdominal exams were normal.

DIAGNOSIS

DiGeorge Syndrome

The history and exam were suggestive of DiGeorge syndrome. Serum immunoglobulins, a CBC with differential and lymphocyte subsets, and mitogen responses were taken, all were normal.

A fluorescence in situ hybridization (FISH) test for 22q deletion was positive. Neither the twin nor the mother carried the deletion.

DiGeorge syndrome, also known as velo-cardio-facial syndrome, has a spectrum of manifestations, and not all manifestations are present in each patient.¹ It is among several congenital immunodeficiencies that are associated with aberrant IgE responses.²

Although there is no treatment for DiGeorge syndrome, heart defects and low calcium levels can be corrected. Developmental conditions can be more challenging to manage, however.

A BOY WITH EYE DRAINAGE

A 2-year-old boy was brought to the allergy clinic for allergy testing due to persistent thick, white eye

drainage. The exam was remarkable for crusting on the eye lashes and thick greenish rhinorrhea. One tympanic membrane was erythematous and bulging. The other side was non-visualized because the ear canal was filled with white exudate. The oropharyngeal exam showed no tonsils.

The mother was asked if they had been surgically removed, and she said they were not. Otherwise, the child had normal milestones and normal growth parameters. There was no family history of an immunodeficiency. The skin tests to environmental allergens were negative. The extensive and persistent ear, nose, and eye infection and absent tonsils in a male child suggested an X-linked B-cell disorder.

Immunoglobulin levels showed absent IgG, IgM, and IgA, as well as IgE.

DIAGNOSIS

X-linked Agammaglobulinemia

A CBC with differential was normal, but lymphocyte subsets showed absent B cells with normal T and natural killer cells, consistent with X-linked agammaglobulinemia.

The child and the mother had a mutation in the Bruton's tyrosine kinase gene. The child has been receiving IVIG every 3 weeks and currently is receiving biweekly home infusions of subcutaneous IgG, which is the standard of care. All previous symptoms resolved except for the eye drainage, which was only ameliorated.³⁻⁵

A GIRL WITH FATIGUE

A 12-year-old girl presented to the allergy and immunology clinic for evaluation of a possible role of allergies as the cause of her chronic fatigue. The fatigue has been to the extent that she sleeps 14 hours per day and when awake, she has no energy. The physical exam was remarkable for height below the 5th percentile, lack of any secondary sexual characteristics, and widely separated nipples.

Skin tests for environmental allergens were positive to dust mite and cat. The girl and her mother were pleased that they found the answer, as they had three cats in the home. Her last visit to the pediatrician had been 3 years earlier, and she was below the growth curve at the time, too.

The parental heights did not predict short stature for the patient. The differential diagnosis included syndromes associated with short stature and delayed or absent sexual maturation, such as Turner's syndrome, or endocrine abnormalities, such as growth hormone deficiency, or hypothyroidism, or both.⁶⁻⁸ Her karyotype was normal.

DIAGNOSIS

Primary Hypothyroidism

She had a high TSH and low T3, indicating primary hypothyroidism. The girl was treated with thyroxine, which is the standard of care, with marked improvement in fatigue. The need to remove the cats from the home environment was emphasized.

A YOUNG MAN WITH ASTHMA

A 16-year-old boy was admitted to the intensive care unit for an asthma exacerbation, which took 3 days of intensive treatment and oral steroids to resolve. The allergy and immunology service was consulted to manage the asthma as an outpatient.

This had been the first hospital admission for this patient. The patient was sitting up comfortably in a chair, and his mother was also in the room. The patient was about to be discharged because his albuterol treatments were now at every 4 hours, and his chest exam was normal, according to the notes on the chart.

On exam, he had no retractions or wheezes but had very poor air movement.

Pulmonary function tests showed an FEV1 as low as 55% of predicted levels and an FEF 25% to 75% of 30% of predicted levels. The hospitaliza-

tion was extended, albuterol was given more frequently, and the dose of oral steroids was increased to twice daily. It took 2 more days of hospital treatment to move the FEV1 to 80% of predicted levels, and the patient was then discharged home.

At the follow-up visit, other issues became apparent. Although the mother was employed, the child was not cov-

The child had pruritus, and he was sent to school with gloves to control itching and to cover the eczematous open bleeding areas.

ered by her insurance for financial reasons. The young man denied smoking cigarettes, but openly admitted to marijuana use. He also indicated that his adherence to inhaled steroid was suboptimal. Evaluation for environmental allergens showed sensitizations to multiple indoor and outdoor allergens.

DIAGNOSIS

Noncompliance with Asthma Treatment Plan

To help with his treatment management plan, the allergy and immunology fellow worked closely with the patient, sending him text-message reminders of his medication dosage. Financial services applied for insurance for him.

Gradually, asthma control improved, and allergen immunotherapy and the anti-IgE omalizumab was discussed. The patient's subsequent course was marked by frequent periods of absence from medical care and not showing up for appointments.

Home care nursing was utilized, which resulted in improved medication adherence and improvement of lung functions. Additional interventions were

the utilization of school nurses to administer the morning medication doses and follow the clinical course daily.⁹⁻¹³

A YOUNG BOY WITH ECZEMA

A 6-year-old boy was seen for eczema. Exam showed marked eczematous lesions on the flexural areas of the arms and legs, on the chest and back, and on the face. The child had pruritus, and he was sent to school with gloves to control itching and to cover the eczematous open bleeding areas.

The child had serum IgE to multiple foods measured; many were negative, and a strict elimination diet was performed.

The psychosocial issues around the eczema and the restricted diet interfered severely with the child's attention at school and even with his desire to attend school. The family had been advised to only bathe the child twice a week because of the drying effect of water and to use topical steroids very sparingly and only on the most severely affected areas.

DIAGNOSIS

Severe, Inadequately Managed Eczema

At the child's first visit to the allergy and immunology clinic, the list of food avoidances was reduced to only the foods known to play a possible role in eczema and that may cause acute allergic reactions (ie, includes eggs, milk, peanuts). An intensive skin-care regimen, which, included a daily long bath and the application of a topical steroid ointment to the affected area and topical moisturizers (eg, the application of petrolatum daily and immediately after the bath on the entire body, with the additional use of wet wraps at night on the severely affected area), resulted in a marked improvement in skin condition.

The itching decreased, and oral antihistamines were discontinued. Skin tests to eggs, cow's milk, and peanuts were performed and were positive to only for eggs and peanuts. An oral food challenge to cow's milk was performed

in clinic and was negative. Cow's milk was reintroduced in the diet without any side effects or worsening of eczema.

An oral food challenge to eggs in the clinic was positive, with resultant hives after the ingestion of 2 tsp of egg. Egg avoidance was continued.

The patient continues to be followed every 2 to 3 months to reinforce the daily skin care.

The serum IgE specific to eggs and peanuts is measured yearly to find the opportunity to repeat the egg challenge when the serum IgE level is in a range that may predict a negative challenge and to consider a similar challenge to peanut.

The National Institutes of Health (NIH)-sponsored expert panel guidelines on food allergy and the World Allergy Organization cow's milk allergy guidelines outline evidence and recommendations for the diagnosis and management of food allergy and recommend the use of oral food challenges for diagnoses.¹⁴⁻¹⁷

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