Identification of Immunodeficiency in Primary Care

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In the fight between you and the world, back the world.

—Frank Zappa

Learning Objectives:

1. Ascertain the prevalence of immunodeficiencies presenting in childhood.
2. Identify clinical features that suggest an immunodeficiency
3. Initiate and interpret laboratory testing for immunodeficiency
4. Debate the utility of newborn screening for the most common and treatable of the primary immunodeficiencies

Primary Reference:

1. Chinn IK, Orange JS. Immunodeficiency Disorders. Pediatrics in Review. 2019;40(5): 229-242. https://pedsinreview.aappublications.org/content/pedsinreview/40/5/229.full.pdf

CASE ONE:

Ayma Sicagin, a three-year-old comes to your office accompanied by her mother for evaluation of "frequent infections." The mother tells you that she is worried because in the past year, her daughter has received four courses of antibiotics for ear infections, a single course of antibiotics for sinusitis, and two courses of antibiotics for pneumonia (one of which required hospitalization for IV administration). A thorough history and review of systems reveals chronic mucopurulent nasal drainage and abdominal pain with frequent, loose stools. There is no family history of similar symptoms. The physical exam is unremarkable except for height and weight in the 5th percentile and visible bilateral purulent nasal drainage.

1. **How many respiratory infections do healthy children typically get per year?**

2. **At what point might one consider an underlying immunodeficiency? What is the difference between primary and secondary immunodeficiency?**

3. **What information in this case is concerning? What further information would be important to know?**

4. **What is the differential diagnosis for primary immunodeficiencies? Categorize these according to their main defects.**

5. **What tests should be ordered to further evaluate this patient's condition?**

CASE TWO:

As you are reviewing lab reports at the end of the day, your nurse hands you an abnormal newborn screen result for Noah D'Aminase, a 7-day-old boy. He was born at 38 weeks and looked perfect when you saw him in the office three days ago. His newborn screen report reveals abnormally low TRECs (24 copies/μL) and RNaseP (20; reference range >28), raising concern for severe combined immunodeficiency.

6. **How should the newborn screen be interpreted? How would you manage this infant?**

Additional References:

1. Bonilla FA, et al. AAAAI Practice parameter for the diagnosis and management of primary immunodeficiency (Executive Summary). J Allergy Clin Immunol. 2015;136(5): 1186-1205.
2. Chinen J, Shearer WT. Secondary immunodeficiencies, including HIV infection. Journal of Allergy and Clinical Immunology. 2010;125(2,S2): S195-S203.
3. Dosanjh A. Autoimmunity and Immunodeficiency. Pediatrics in Review. 2015;36(11): 489-494.
4. Esposito S, et al. Immunization of children with secondary immunodeficiency. Hum Vaccin Immunother. 2015;11(11): 2564-2570.
5. Immune Deficiency Foundation. Diagnostic & Clinical Care Guidelines for Primary Immunodeficiency Diseases. 2009. Retrieved April 19, 2017, from https://primaryimmune.org/wp-content/uploads/2011/04/IDF-Diagnostic-Clinical-Care-Guidelines-for-Primary-Immunodeficiency-Diseases-2nd-Edition.pdf
6. Mayo Clinic. The Mayo Medical Laboratories Test Catalog. Test ID: IMMG. Retrieved April 19, 2017, from http://www.mayomedicallaboratories.com/test-catalog/Overview/8156
7. Orange JS, et al. Use and interpretation of diagnostic vaccination in primary immunodeficiency: A working group report of the Basic and Clinical Immunology Interest Section of the American Academy of Allergy, Asthma & Immunology. J Allergy Clin Immunology. 2012;130(3): S1-S24.
8. Stiehm ER. Approach to the child with recurrent infections. In: UpToDate, Post TW (Ed), UpToDate, Waltham, MA. Retrieved April 19, 2017, from http://www.uptodate.com/contents/approach-to-the-child-with-recurrent-infections

Resources:

1. Mayo Clinic Medical Laboratories test catalog, clinical resource for ordering and interpreting laboratory tests. http://www.mayomedicallaboratories.com/test-catalog/index.html
2. Jeffrey Modell Foundation, information on primary immunodeficiencies for families and providers. http://www.info4pi.org/
3. Immune Deficiency Foundation handout for families about SCID. http://primaryimmune.org/wp-content/uploads/2014/08/questions-about-SCID.pdf
4. American College of Medical Genetics information sheets and confirmatory algorithms. https://www.acmg.net/ACMG/Publications/ACT_Sheets_and_Confirmatory_Algorithms/NBS_ACT_Sheets_and_Algorithm_Table/ACMG/Publications/ACT_Sheets_and_Confirmatory_Algorithms/NBS_ACT_Sheets_ and_Algorithms_Table.aspx?hkey=e2c16055-8cdc-4b22-a53b-b863622007c0