Immunodeficiency Disease

Booklet A
Pretest Correct Answers

Please discuss the answers to each question with the members of your group. Be sure that no one has any questions about them. If any one does, try to explain the rationale for the right answer. In explaining something to another person, most people gain a better understanding of it and often transmit a better understanding. *The pretest discussion and patient-oriented problem-solving parts of this activity are "open book."* Be sure to refer to textbooks, notes, and other written resources whenever questions arise.

1. A T-independent antigen (ie, an antigen that can stimulate antibody production in the absence of functional T-lymphocytes) requires B-lymphocytes for production of antibody. A is therefore correct. Since the pathogen is T-independent, a functional T-cell system is not needed. B and C are therefore incorrect. D is incorrect since cell-mediated immunity (T-cell dependent) does not have to occur with humoral immunity, although it usually does. E is wrong.

4. B-cell (Ab) deficiency such as agammaglobulinemia is characterized by an increase in infections of the extracellular type. Therefore, the answer is B.

7. A period of about seven to 14 days is usually required to produce detectable antibody levels in a normal primary immune response. The correct answer is therefore C. Ask your group to compare this with a normal secondary or anamnestic response. (Answer.- a secondary response occurs in about three days and produces a higher rise in titer that persists longer. In summary, a secondary response is sooner, higher, and longer.) Ask your group what immunologic phenomenon *does* take about 48 hours. (Answer: Delayed-type hypersensitivity reaction.) What takes five to 15 minutes? (Answer: Immediate hypersensitivity reaction.) However, both of these could only occur in an already sensitized patient.

12. The patient's serum has a significant titer of Ab to poliovirus. B is therefore correct, and E must be incorrect. The presence of Ab does not indicate ongoing infection or previous infection. The patient could have been immunized. C and A are therefore incorrect. This assay has no value in determining the presence of a bacterial infection, so D is incorrect.

After discussing all the pretest answers, please instruct your group to proceed to the "Introduction to the Clinical Problem."

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Introduction to the Clinical Problem

The goal of this exercise is twofold. One is to help you learn how to apply your basic knowledge of immunology to clinical problems. The other is to help you learn how to work with other people (ie, how to learn from them and solve problems together). Good health professionals must first be able to learn from their patients and then be able to teach them. With this in mind, the data necessary for the solution of the patient-oriented immunological problem have been divided into four parts so that everyone in your group must share data to arrive at a diagnosis.

Please do your best to teach each other; seek additional information from your textbooks and share it with each other and, as a group, arrive at the correct diagnosis in a logical way At the end of the exercise, everyone in the group should agree on the diagnosis and be able to identify the data that were (1) consistent with the diagnosis, (2) irrelevant to making the correct diagnosis, or (3) inconsistent with the diagnosis. You also should understand the principles behind each observation and laboratory assay. At the end of this problem, you will look at the correct answers to the problem and compare them with the answers you and your group wrote.

Begin the problem by presenting the patient's history on the following page to your colleagues.

Immunodeficiency Disease

Data Sheet A

Patient's History

Tim O'Neill (Tiny Tim) is a diminutive 6-year-old male.

Present Illness - For 12 hours, the patient has had fever; cough producing blood-streaked, yellow sputum; chills; pleuritic chest pain; and rapid, labored breathing. For the past two days, the patient has complained of itching on both ankles. On admission, the patient's WBC count was 12,000/mm^3 (normal is 5,000-10,000/mm^3). The differential count showed 75% polymorphonuclear leukocytes (normal is 50% to 60%), 5% monocytes (normal is 3% to 7%), and 20% lymphocytes (normal is 25% to 35%).

Past History - Since he was about one year of age, the patient has had recurrent infections, including many boils and approximately ten cases of pneumonia. Two months ago, the patient was admitted to the hospital with an illness similar to the present one, and pneumococcal pneumonia was diagnosed. Type 3 pneumococcus was isolated.

The patient had mumps at age 3 and chickenpox at age 4. Both diseases followed a normal course. He broke his leg last year when he fell out of a tree. He received a tetanus booster in the emergency room, and his leg healed normally.

The next step is to hear about the physical exam from the student who has
Data Sheet B