Clinical Case Study (Lymphatic System and Immunity)

The Case of the Mother with a Cold

Sarah, a forty-nine year old Anglo woman, visits her physician complaining of weight loss, sweating, listlessness and flu-like symptoms (fever, headache, scratchy throat, generalized body ache). After checking her history the physician notes that Sarah is married, has four children and no previous history of chronic illness. Her weight has decreased 15 pounds over the past three months and she presents with a temperature of 101° F, a slightly elevated pulse (85 beats per minute), normal blood pressure (112/78 mm Hg) and slightly labored breathing. Sarah has a negative family history of cardiovascular and respiratory disease. All of her family members are living and are free of cardiovascular or respiratory diseases. Sarah does not smoke and is current on all immunizations. She does report that she developed these symptoms a few days after visiting a friend whose son was home with a cold. After a chest X-ray and physical examination of Sarah's ear, nose and throat, the physician confirms the diagnosis and prescribes bed rest, aspirin and a nasal decongestant. The physician also cautions Sarah from returning to her normal activities until she has been afebrile for a minimum of 24 hours.

Sarah's condition continues to worsen such that a week later she returns to her physician's office. She has pain on the left side of her chest, is coughing more frequently and her sputum has a yellow color. Her respiratory rate is 32 breaths per minute and her breathing is labored. Her blood pressure is unchanged and does not demonstrate postural changes. Breath sounds indicate inspiratory rales and a chest X-ray indicates a dense infiltrate within the lungs. Physical examination reveals lymphadenopathy. The physician suspects pneumonia and orders laboratory tests on Sarah's blood and sputum. The results of the sputum tests indicate the presence of gram positive diplococci and polymorphonucleocytes that are too numerous to count. What concerns the physician, however, are the results of Sarah's blood test. Her blood tests indicate leukopenia, anemia, and thrombocytopenia. In addition, the differential leukocyte count indicates that the concentration of helper T cells has decreased. The physician now suspects that Sarah has been infected with the human immunodeficiency virus (HIV) and that she has developed pneumonia as a result of the immune suppression.

In reviewing her history, the physician notes that Sarah has been married for the past 30 years and does not admit to any extramarital affairs. She has not received any blood transfusions or blood products and does not use intravenous drugs. She is a self-employed certified public accountant and has not visited any countries with high incidences of HIV infection. Upon further discussion, Sarah does mention to the physician that she and her husband were separated a few years ago for approximately 6 months as a result of his extramarital affair. The physician asks Sarah if he can run another test to determine whether or not she has contacted HIV and asks Sarah to talk to her husband about being tested for HIV as well. The physician also begins treating Sarah for the pneumonia that has developed and asks her to return the next day for the results of the HIV test.
The next day Sarah and her husband return to the physician's office and the physician confirms that the enzyme-linked immunoadsorbent assay confirms that Sarah is HIV positive. The physician does mention that a second more sensitive test will be conducted to confirm this finding, however, he is doubtful that the result will indicate a false positive in the first test. Her husband admits to having numerous extramarital affairs with both women and men and consents to a blood test to determine his HIV status, which subsequently is positive. The physician then discusses the replicative cycle of HIV, the concept of a retrovirus, and treatment options with both Sarah and her husband. Sarah immediately starts on a regimen of protease inhibitors and nucleoside analogs (azidothymidine, AZT, and ddI). In addition, the physician discusses with Sarah and her husband the necessity of practicing "safe sex" even though both are HIV positive and the importance of not exposing themselves to opportunistic diseases. In addition, he mentions that some of the drugs they will be taking to minimize viral replication may cause nausea. He cautions them to take all medications as scheduled and to return to his office at the first sign of any disorder. He also reiterates that this disease cannot be transferred by casual contact, but can be transferred through an exchange of body fluids (blood, semen and vaginal secretions).

1. Define the bold terms in the text.
2. Why was HIV not initially considered as a possible cause for the symptoms Sarah presented with?
3. Why did Sarah’s symptoms worsen and develop into pneumonia?
4. Identify the specific types of leukocytes and the function of each cell.
5. Why does HIV specifically affect one type of leukocyte?
6. Why can protease inhibitors and nucleoside analogs be used in minimizing the replication of the HIV virus?