Case Study Assignment

Student's Name

Institution of Affiliation

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Case Scenario

A 49-year-old patient with rheumatoid arthritis comes into the clinic with a chief complaint of a fever. The patient's current medications include atorvastatin 40 mg at night, methotrexate 10 mg po every Friday morning, and prednisone 5 mg po qam. He states that he has had a fever up to 101 degrees for about a week and admits to chills and sweats. He says he has had more fatigue than usual and reports some chest pain associated with coughing. He admits to having occasional episodes of hemoptysis. He works as a grain inspector at a large farm cooperative. After an extensive workup, the patient was diagnosed with Invasive aspergillosis.

Background

Invasive aspergillosis (IA) is one of the leading causes of deaths among severely immunocompromised patients. The disease is caused by an opportunistic infection caused by Aspergillus, which is a ubiquitously present airborne pathogenic mold (Challa, 2018). However, delayed diagnosis represents a significant hindrance to the successful treatment of the condition. Conventionally, the diagnostic methods are based on the utilization of histology and culture, which remain the cornerstone of the diagnosis of IA. Recently, efforts have been made toward the identification of non-culture-based markers for early and reliable diagnosis of IA through the detection of Aspergillus components like galactomannan (GM), 1,3-β-D-glucan, as well as DNA. The purpose of this study is to develop a care plan for the IA based on the symptoms the 49-years old presented.

Symptoms

In most cases, invasive aspergillosis occurs in patients with prolonged neutropenia or immunosuppression. The symptoms include fever, cough, dyspnea, pleuric chest pain, and in

other instances, hemoptysis. Besides, patients with IA may be tachypneic and possess rapidly progressive hypoxemia. Some of the risk factors for IA include bone marrow transfer, occurring early with prolonged neutropenia prior to engraftment, and later during high-dose corticosteroid therapy for graft-versus-host disease. Besides, it has a bimodal distribution, and other symptoms can develop in cases where the infection spreads from the lungs to other body parts.

Diagnosis

Diagnosis of IA depends on the demonstration of the organism in tissue such as visualization of the characteristics fungi utilizing Gomori methenamine silver stain. Another diagnostic test is the positive culture result from sputum, needle biopsy, or bronchoalveolar lavage fluid (Jenks & Hoenigl, 2018). From the objective and subjective data provided in the case scenario, the patient was diagnosed with Invasive Aspergillosis. The patients experience chest pain with fever, which are primary diagnostic criteria for IA. Similarly, the patient has chest pain that is associated with coughing.

Genes that May be Associated with the Development of Invasive Aspergillosis

To date, a significant proportion of the susceptibility markers for IA are located in genes directly or indirectly implicated in the activation of the nuclear factor-kappa B (NFκB) signaling pathway. A growing number of studies suggest that host genetic polymorphisms within or near immune-associated genes may significantly contribute to the determination of the risk of developing IA infection. Specifically, single nucleotide polymorphisms (SNPs) within toll-like receptors, C-type lectins, and tumor necrosis factors, which are all pathogen recognition receptors that mostly culminate in the activation of NFκB pathway, can increase the risk of patients developing IA. According to Lupiañez et al. (2016), the presence of common genetic

polymorphisms found in *NFκB1, NFκB2, RelA, RelB, Rel,* and *IRF4* genes can si9gnificantly influence the risk of developing IA, especially in a high-risk population.

The Process of Immunosuppression and the Effect it has on Body Systems

Immunosuppression is the process of deliberately administering drugs such as azathioprine, corticosteroids, FK506, or cyclosporine to depress the immune reactivity in patients undergoing organ or bone marrow transplant. In the process of immunosuppression, Glioma cells orchestrate an immunosuppressive network that impairs the effector cells and decreases the efficiency of therapeutic strategies that aim at reinforcing immune response against tumors (Mangani, Weller, & Roth, 2017). In some cases, immunosuppression may happen as an adverse reaction to the treatment of other health conditions. Notably, immunosuppression has a significant effect on the immune system because it reduces the activation or efficacy of the immune system to fight infections. As a result, the body's immune system weakens, making the patient vulnerable to infectious diseases.

References

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