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Letter to the Editor

Infection management in hematological malignancies

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Dear Editor,

Hematological malignancies encompass a group of diseases that often require intensive cytotoxic chemotherapy. These chemotherapy protocols can lead to prolonged neutropenia, increasing the risk of hospitalization and potentially fatal infections (1). The risk of infection varies among patients due to factors such as diagnosis, risk status, relapse/refractory condition, comorbidities (renal or liver failure, etc.), chemotherapy intensity, and the severity and duration of neutropenia. Severe and prolonged neutropenia is particularly common following myeloablative regimens in stem cell transplantation, induction protocols in acute leukemia, and salvage therapies in refractory/relapsed patients. In addition to neutropenia, chemotherapy also predisposes patients to infections by disrupting the mucosal barrier and causing disease-related immunosuppression. The disruption of the mucosal barrier allows colonizing microorganisms to invade, increasing the risk of invasive infections (2).

Managing infections in patients with hematological malignancies presents several challenges, including shifting epidemiology, limited availability of rapid and reliable diagnostic methods, the effectiveness of prophylaxis, appropriate selection of empirical antibiotic therapy, drug interactions, and antibiotic resistance. Due to their compromised immune response, patients with severe neutropenia are highly susceptible to serious infections, even from typically mild pathogens. Febrile neutropenia (FN) is defined as an oral temperature exceeding 38.3 °C or >38.0 °C on two consecutive occasions within two hours, accompanied by an absolute neutrophil count (ANC) of $<0.5 \times 10^9$/L or expected to fall below this threshold within 48 hours (2). Sometimes, fever may be the only symptom. The disease can progress rapidly, leading to hypotension, end-organ damage, and an increased risk of serious morbidity and mortality.

Accurate risk assessment in patients with hematological malignancies facilitates the timely initiation of appropriate antibiotic prophylaxis and granulocyte-colony stimulating factor (G-CSF) in high-risk individuals, as well as empirical antibiotic and G-CSF therapy in patients with febrile neutropenia (3). The selection of broad-spectrum empirical antibiotics should be based on local hospital flora, the pathogens

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commonly isolated in immunocompromised febrile neutropenic patients, and their antibiotic resistance patterns, including extended-spectrum beta-lactamase (ESBL) positivity and carbapenem resistance (4). Studies investigating isolated pathogens and their resistance patterns in this patient population provide critical guidance for clinicians. Historically, the primary causes of infection have evolved over the decades. In the 1970s, gram-negative bacteria were predominant, whereas gram-positive bacteria, particularly coagulase-negative staphylococci, became more prevalent in the 1980s. In the 1990s, both gram-negative and gram-positive bacteria were isolated at similar rates, but gram-negative agents re-emerged as the dominant pathogens in the early 2000s (5).

A study by Arabacı et al. demonstrated that bloodstream infections were more common in immunosuppressed patients with hematological malignancies, consistent with previous findings. Among bloodstream infection pathogens, 51% were gram-negative bacteria and 32% were gram-positive bacteria. The two most frequently isolated pathogens were coagulase-negative staphylococci (20%) and *Escherichia coli* (19%). Antibiotic resistance analysis revealed a 47% ESBL positivity rate in *E. coli* isolates and a concerning 92% carbapenem resistance rate in *Acinetobacter* species (6). These findings provide valuable insights into the management of febrile neutropenia. Given the dynamic nature of pathogens and their resistance profiles in patients with hematological malignancies, regular monitoring and updates in treatment guidelines are essential. Additionally, future research should include subgroup analyses based on patient diagnosis, chemotherapy protocol, relapse/refractory status, and neutropenia duration to improve febrile neutropenia management. More effective and tailored febrile neutropenia management could help reduce prolonged hospital stays, antibiotic resistance, and healthcare costs.

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