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abstract

Developing an Algorithm for the Management of High-Risk Febrile Neutropenia in Children with Cancer: A Study from a Tertiary Referral Hospital

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Developing an Algorithm for the Management of High-Risk Febrile Neutropenia in Children with Cancer: A Study from a Tertiary Referral Hospital

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Introduction: Febrile neutropenia (FN) remains a critical challenge in pediatric cancer treatment, particularly in resource- limited settings. At Cipto Mangunkusumo Hospital (CMH), a tertiary referral center in Indonesia, FN management is limited to ceftazidime as the empirical antibiotic, with no institutional protocol for time-to- antibiotic (TTA), granulocyte colony-stimulating factor (GCSF) use, antifungal initiation, or antibiotic adjustments. The absence of standardized guidelines has resulted in inconsistent clinical practices, underscoring the need for a structured approach. This study aimed to develop an algorithm to optimize FN management and standardize care delivery.

Methodology: An open-label, randomized controlled trial was conducted from January to October 2024 involving 104 pediatric patients with high-risk FN. The experimental group followed an algorithm incorporating piperacillin-tazobactam as the empirical antibiotic, TTA < 8 hours, selective GCSF use (ANC < 100/µL), and a stepwise escalation approach. The algorithm was adapted from established guidelines by the IDSA and NICE, adjusted for local bacteriological profiles and resource availability. The control group received standard care with ceftazidime, with treatment determined by specialists.

Results: The algorithm achieved faster TTA (< 8 hours in 100%, < 2 hours in 19.2%) and reduced rates of antibiotic resistance (28.6% vs. 44.7%). GCSF use was halved in the experimental group, while antibiotic modifications (28.8% vs. 40.3%) and antifungal initiation (17.3% vs. 28.8%) were also lower. Culture positivity was 48.1%, similar in each group, with Klebsiella pneumoniae and Staphylococcus aureus as predominant pathogens. Fever resolution, length of stay, complication, and mortality rates were comparable between groups.

Conclusion: The proposed algorithm facilitates faster TTA, selective GCSF use, reduced antibiotic resistance, and fewer antibiotic modifications, making it a practical and effective strategy for improving FN management. Its implementation is recommended to enhance care quality at CMH, with further evaluation needed to assess cost-effectiveness.