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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**

**Ganda Ilmana, Mulya Rahma Karyanti, Hanifah Oswari, Murti Andriastuti, Teny Tjitra Sari, Nastiti Kaswandani**

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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/ $\mu$ L), 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:** Our analysis points out age as the most important determinant in the prognosis of pediatric GCT. Although serum AFP greater than 10,000 ng/ml and metastatic disease were associated with poor prognosis, statistical significance could not be proved due to the limited size of study population therefore multicentre prospective collaborative research is needed to ensure early diagnosis and adapt more effective treatment strategies for advanced cases.