A Unique Triage Approach to Management of Febrile Neutropenia in Pediatric Oncology Patients for Efficient Patient Stabilization and Antibiotic Administration

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One of the most common complications of chemotherapy treatment is febrile neutropenia (FN), affecting 50% of patients with a mortality rate as high as 21%. Oftentimes, fever is the first and only presenting symptom. These patients should receive antibiotics within 60 minutes to improve prognosis, however, national mean time to antibiotic administration (TTA) ranges from 102-300 minutes. Currently, there are no pediatric-specific risk models or predictors of TTA in place for FN. A unique protocol was instituted in a local children's hospital to achieve rapid TTA where patients are evaluated in the pediatric hematology oncology clinic, bypassing the emergency department. An order-set for FN is then activated for nurses to conduct patient stabilization, blood culture collection, and antibiotic administration. 18 variables in 328 pediatric oncology FN encounters over five years under this protocol were analyzed. 98.1% of TTA < 60 minutes was achieved. A random forest model was then created to find specific key variables contributing to delayed TTA. Turning points for each contributing variable in the delay categories of less than 30 min, 31-45 min, 46-60 min, and over 60 min were determined. This information was then integrated into a mobile app designed to flag patients at certain turning points to predict TTA, optimizing antibiotic administration and aftercare. Both the mobile app and diagnostic additions to the protocol have been proposed to the local institution. The novel triage system may be replicated in other institutions to reduce TTA and improve outcomes of febrile neutropenia in pediatric oncology patients.

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