Predicting Fever in Neutropenia with Safety Relevant Events in Children Undergoing Chemotherapy for Cancer: the Prospective Multicenter SPOG 2015 FN Definition Study

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Abstract

Background Fever in neutropenia (FN) remains a frequent complication in pediatric patients undergoing chemotherapy for cancer. There are only conflicting and weak recommendations for and against antibiotic prophylaxis during chemotherapy. Procedure Pediatric patients were observed in a prospective multicenter study (NCT02324231). A score predicting the risk to develop FN with safety relevant events (SRE; bacteremia, severe sepsis, intensive care unit admission, death) was developed using multivariate mixed Poisson regression. Its predictive performance was assessed by internal cross-validation and compared with the performance of published rules. Results In 238 patients, 318 FN episodes were recorded, including 53 (17%) with bacteremia and 68 (21%) with SRE. The risk prediction score used three variables: chemotherapy intensity, time since diagnosis and type of malignancy. Its cross-validated performance, assessed by the time needed to cover (TNC) one event, exceeded the performance of published rules. Two clinically useful score thresholds were found: a threshold of [?]11 resulted in 2.3% time at risk and 4.1 months TNC; a threshold of [?]8 in 24.9% time at risk and 12.1 months TNC. Using external information on efficacy and timing of intermittent antibiotic prophylaxis, 4.3 months of prophylaxis were needed to prevent one FN with bacteremia, and 5.2 months to prevent one FN with SRE, using a threshold of [?]11. Conclusions This score, based on three routinely accessible characteristics, accurately identifies pediatric patients at risk to develop FN with SRE during chemothearpy. The score can help to design clinical decision rules on targeted primary antibiotic prophylaxis and corresponding efficacy studies.

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figures/Figure-1-Predicting-FN/Figure-1-Predicting-FN-eps-converted-to.pdf