Prediction of outcome in cancer patients with febrile neutropenia: a prospective validation of the Multinational Association for Supportive Care in Cancer risk index in a Chinese population and comparison with the Talcott model and artificial neural network

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The study aimed to validate the Multinational Association for Supportive Care in Cancer (MASCC) risk index, and compare it with the Talcott model and artificial neural network (ANN) in predicting the outcome of febrile neutropenia in a Chinese population. A total of 227 eligible patients with solid tumor or hematological malignancy were enrolled in a 2-year prospective observational cohort study at a hospital if they developed an episode of chemotherapy-induced febrile neutropenia. All patients were prospectively assigned to Talcott's group I to IV (I = onset of febrile neutropenia, IV = low risk) and MASCC score (low risk of febrile neutropenia with MASCC score ≥21, high risk with MASCC score <21). For the ANN model, the first 114 patient-data were used for training and data from the subsequent 113 patients were used for validation. Main results for the Talcott model were: positive predictive value (PPV, patients at low risk) was 84%, sensitivity was 50%, specificity was 72%, negative predictive value (NPV) was 33%, and misclassification rate was 44%. The MASCC risk index had a PPV of 86%, sensitivity of 81%, specificity of 60%, NPV of 52%, and misclassification rate of 24%. Results of the ANN model were: PPV of 85%, sensitivity of 84%, specificity of 60%, NPV of 58%, and misclassification rate of 22%. The area under the receiver operating characteristic (ROC) curve was 0.573 for Talcott, 0.808 for MASCC, and 0.737 for ANN model. Therefore, the MASCC score is superior to the Talcott model and is comparable to the ANN model.