Construction and Validation of a Risk Prediction Model for Hemorrhagic Cystitis in Patients Undergoing Hematopoietic Stem Cell Transplantation

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Introduction

You may edit This study aims to construct and validate a risk prediction model for hemorrhagic cystitis (HC) in patients undergoing hematopoietic stem cell transplantation (HSCT) to enhance early identification of high-risk patients and guide clinical decision-making..

Methods

A retrospective analysis was conducted on HSCT patients treated at the First Affiliated Hospital of Chongqing Medical University from 2015 to 2022. The model was constructed using LASSO regression, which efficiently handles high-dimensional data, performs feature selection, and reduces overfitting risk. A cross-validation method randomly divided the data into a training set (70%) and a validation set (30%). The model's predictive probability was evaluated using the receiver operating characteristic (ROC) curve and area under the curve (AUC).

Results

Out of 400 patients analyzed, 60 (15%) developed HC. LASSO regression identified significant clinical characteristics associated with HC, including age, gender, bladder disease history, chemotherapy, and radiotherapy ($P < 0.05$). The model achieved an AUC of 0.82 in the training set and 0.80 in the validation set, indicating good predictive ability.

Discussion

The study developed a risk prediction model for HC in HSCT patients based on LASSO regression, showing significant clinical potential. The model should be implemented in practice to improve early identification and management of high-risk patients, with further research recommended to evaluate its applicability in diverse populations.