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A Prognostic Model (BLEND35) with Internal Validation for Treatment Failure in Patients with Peritoneal Dialysis-Associated Peritonitis

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Objectives : Globally, peritoneal dialysis (PD)-associated peritonitis (PDAP) is a common and severe complication in PD. Early identification of high risk PDAP helps to prevent adverse outcomes. Currently, there is no recognized predictive tool for treatment failure of PDAP. Therefore, this study aimed to develop and validate a prediction model for treatment failure in patients with PDAP.
Methods : We retrospectively collected 313 PDAP episodes occurred between January 2007 and August 2023, from real-world clinical practice in a tertiary center in Beijing, North China. The candidate predictors including patient characteristics, latest laboratory tests before PDAP, laboratory tests at PDAP onset and the causative organisms in peritoneal effluent. The prognostic model was developed from a multivariable logistic regression model with predictors selected using the stepwise backward regression. The C-statistic and the calibration curve plot were used to assess the discrimination and calibration of the prediction model. A bootstrap with 100 resampling was also performed as internal validation to further determine the robustness of the model.
Results : Among 313 PDAP episodes, 63 was reported treatment failure. The final model included 7 variables and was termed BLEND35 (sex, PD duration, platelet-to-lymphocyte ratio before PDAP, Gram-negative peritonitis, blood white cell counts at PDAP onset, dialysate white blood cell counts on day 3 and day 5). The C-statistic of the model was 0.936 (95% CI 0.897–0.974), revealing great discrimination. Calibration plot indicated that the model-predicted probabilities correlated well with the actual observed frequencies (Hosmer-Lemeshow test, P = 0.1223; Brier score = 0.064). Decision-curve analysis also revealed a positive net benefit.
Conclusions : The BLEND35 model will help to identify those with most high risk of treatment failure of PDAP and contribute to personalize and precise treatment. However, external validation is required before future application.

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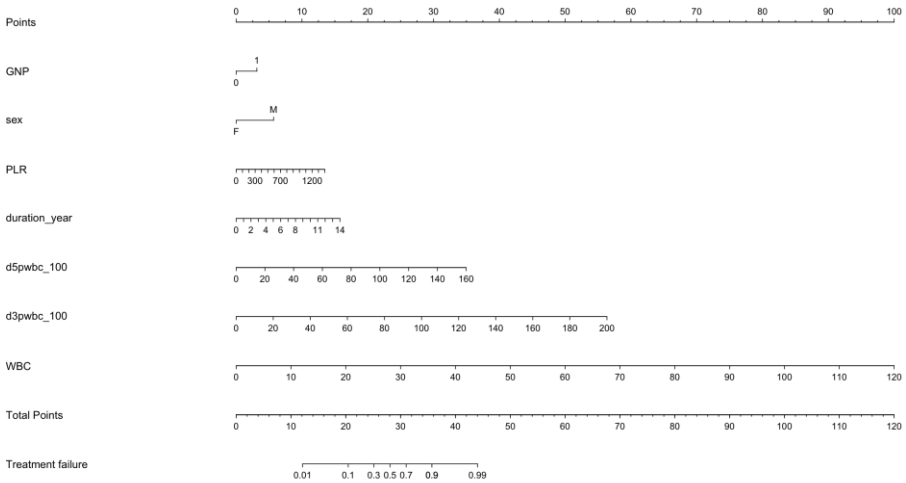

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