Predictors of Bleeding Event Among Aged Patients With Mechanical Valve Replacement Using Random Forest Model

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Purpose: There are various risk factors that predict bleeding in individuals taking warfarin. This is particularly the case in the elderly, because age is an independent risk and a target prothrombin time is maintained for a lifetime after mechanical valve replacement. This study aimed to identify an accurate model for predicting bleeding in elderly patients with mechanical valve replacement, in the context of oral anticoagulant therapy.

Methods: This prospective cohort study targeted elderly cardiac surgery patients receiving warfarin therapy after mechanical valve replacement. A random Forest model was used to determine the factors that predict bleeding events among 598 participants. The random Forest model is an ensemble method that uses a decision tree-based classification and prediction model. The random forest model was used to identify various factors, especially potential drug interaction of warfarin affecting bleeding. Statistical analysis was performed using SPSS 23.0 (SPSS Inc, Chicago, IL), and the random Forest package of R software (http://www.r-project.org).

Results: A total of 22 descriptors including individual-related, disease-related, and medication-related factors were selected as predictors for bleeding. Steroid use was the most important predictor of bleeding events, followed by labile international normalized ration, history of stroke, history of myocardial infarction, and cancer. The random Forest model was sensitive (80.77%), specific (87.67%), and accurate (85.86%), with an area under the curve of 0.87, suggesting fair prediction.

Conclusion: Drug administration and treatment monitoring of oral anticoagulants taken for life after mechanical valve replacement were selected as a result of decision-making with important ownership of the patient and therefore can be a strength of systematic strategy building. At-home monitoring of prothrombin time confirmation is also very important and the formation of professional staff available for consult is required. As a result, Aged patients who take warfarin for a lifetime require lifelong management, including prothrombin time monitoring, personalized influencers associated with diet, and medication.

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Abstract Summary:
This study aimed to identify an accurate model for predicting bleeding in aged patients with mechanical valve replacement, in the context of oral anticoagulant therapy. A random Forest model was used to determine the factors that predict bleeding events.

References:

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