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Evaluating the improvement of model performance with the addition of mean platelet volume marker in a cardiovascular risk prediction model

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Recently, improving the prediction model performance by adding a new prognostic marker is being studied intensively. The purpose of this study is to compare the properties of a number of novel and a traditional measure (ROC) to evaluate the predictive performance of a new marker. In addition, we specifically focused on quantifying the improvement in predictive performance of an existing model after the addition of the new marker. For that purpose, we analyzed data, which contains age, gender, hypertension, hyperlipidemia, smoking and tc/hdl as the clinical risk factors for the initial model, obtained from 293 patients having a risk of Coronary Artery Disease (CAD). Afterwards, the Mean Platelet Volume (MPV) was added to this initial model as a new prognostic marker. The results showed that the addition of MPV improved the model performance; the AUC increased from 0.76 to 0.81 (p = 0.011) and the accuracy range increased from 0.67 to 0.74. Then, in order to assess the relative classification power of the MPV to predict CAD events, the data was analyzed by logistic models and risk reclassification indices such as Net Reclassification improvement Index (NRI) and Integrated Discrimination improvement Index (IDI). NRI was found to be 0.1039 (SE = 0.0364, p = 0.004) and value of NRI being almost the same as IDI (IDI= 0.10388 SE=0.0358 p=0.003). As a result, the model including the mentioned clinical risk factors and the MPV performed better than that without MPV and also, the ratio of the correctly classified individuals after the addition of MPV increased more than the increase of the AUC. Moreover, the novel statistical metrics such as NRI and IDI were found to be more sensitive than the traditional AUC measures.

Biography

Yasemin Yavuz has completed her Ph.D. at the age of 29 years from Ankara University and postdoctoral studies from The University of Reading, Medical and Pharmaceutical Statistics Research Unit. She is the director of Evidence Based Medicine unit of Ankara University, Faculty of Medicine. She has published more than 30 papers in various journals and serving as an editorial board member of some national and international journals in the field of health.

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