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LETTER TO THE EDITOR

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Transthoracic echocardiography and computerized tomography for surgically confirmed late tamponade after cardiac surgery: Methodological issues on diagnostic value and prediction

Dear Editor,

We were interested to read an article that recently published by Ay and Kahraman Ay[1] in the September 2019 issue of the *Journal of Cardiac Surgery*. The purpose of the authors was to investigate the diagnostic value of transthoracic echocardiography (TTE) and contrast-enhanced computerized tomography (cCT) in the diagnosis of late tamponade following open-heart surgery.[1] Eighty-eight patients with late tamponade diagnosis were retrospectively evaluated. The diagnostic value was evaluated by sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV). Finally, the calculated accuracy value was used to predict the tamponade. The authors reported that the sensitivity, specificity, PPV, NPV, and accuracy of an optimal cutoff value on cCT images for predicting late tamponade and on TTE for the diagnosis of late tamponade were (91.4%, 66.6%, 97.4%, 36.3%, and 89.7%) and (34.1%, 50.0%, 90.3%, 5.2%, and 35.2%), respectively.[1]

It is good to know that diagnostic value should be considered as a combination of diagnostic accuracy (validity) and diagnostic precision (reliability) which conceptually and methodologically are two different issues. To assess validity for qualitative variables, sensitivity, specificity, PPV, NPV, positive likelihood ratio (LR+) and negative likelihood ratio (LR−) as well as diagnostic accuracy and odds ratio (ratio of true to false results) are among the most appropriate estimates. The receiver operating characteristic (ROC) curve is usually used to assess the diagnostic accuracy of a model. However, for clinical purposes, it is crucial to know that reporting the diagnostic added value of a diagnostic test applying the ROC curve should be considered. In this case, it would be great to report the added value of cCT and TTE to sign and symptoms of the outcome. Reported estimates as in this study can be acceptable; however, considering the rest of validity estimates as well as an added value, our final conclusion can easily be changed. Moreover, in addition to the calculation of related estimates for the validity of a test (such as sensitivity, specificity, predictive values, likelihood ratios, ROC curve), its reliability (such as weighted kappa and Bland-Altman agreements, and intraclass correlation coefficient, respectively, for qualitative and quantitative outcomes) is required.[2-6]

Furthermore, reporting validity estimates and ROC have nothing to do with prediction. For the prediction of an outcome, we need data from two different cohorts or at least from one cohort divided into two to first to develop a prediction model and subsequently validate it. Misleading results are generally the main outcome of the research that fails to validate its prediction models.[7,8] Therefore, validity estimates or AUC, do not guarantee correct prediction. Because their application is to evaluate the accuracy of a single test (compared with a gold standard) or a diagnostic model, respectively.

The authors concluded that computerized tomography imaging seems to represent a superior imaging technique in terms of visualizing the intrapericardial fluid collections after cardiac surgery and has the potential to readily diagnose late tamponade and effectively prevent unnecessary morbidity and mortality.[1] Therefore, to make our methodological comments brief, it is crucial to know that to determine the validity and predictive ability of cCT and TTE for predicting tamponade, methodological, and statistical issues should be correctly taken into account.[2-8]

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