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Letter to the Editor

Accurate preoperative prediction of unplanned, 30-day postoperative readmission using 8 predictor variables: Methodological issues

To the Editors:

We would like to thank Gibula et al for their study developing the accurate preoperative prediction of unplanned, 30-day postoperative readmission using 8 predictor variables.[1] They were pursuing this goal in their study that developed and implemented the Surgical Risk Preoperative Assessment System (SURPAS), which uses just 8 preoperative predictor variables to estimate the risk of 11 adverse outcomes across a broad spectrum of surgical specialties. Preliminary analyses were performed using 28 preoperative variables to determine which factors showed a bivariable association with unplanned, related 30-day hospital readmission. The bivariable association between each of these variables and unplanned, related 30-day readmission was tested using a χ^2 test for categorical predictor variables or an unpaired t test for continuous variables. This model, as the full model, was compared with the 8-variable model. They used a logistic regression model for both subsets of variables and a comparison of results was performed on the basis of using the C-index as a measure of discrimination, the Hosmer-Lemeshow observed-to-expected plots as a measure of calibration, and the Brier score, a combined metric of discrimination and calibration. The result showed that an 8 variable SURPAS model detects patients at risk for postoperative, unplanned, related readmission as accurately as the full model developed from all 28 nonlaboratory preoperative variables.[1]

We want to explain some methodological issues regarding this study. First of all, to develop and validate a prediction model, it is strongly recommended to use 2 different groups or at least 1 cohort for division (the group is composed with both the failures and the success of the result) and, if the model is not validated, the results of the study are not sufficiently generalized.[2-6] Different methods are usually applied for validation of a prediction model, such as the split file, jackknife, and bootstrap by multiple sampling, or other well-known validation methods. Second, interactions between important variables should be evaluated, especially when there are qualitative interactions, the final results will be significantly affected.[2] Another unpleasant issue is missing data that can influence the model development. The missing data usually follow a non-random pattern, which is explanatory and causal. If the missing data is deleted, the cause is also lost, which ultimately affect the conclusions and model development.[3]

The authors concluded that the 8 variable SURPAS model detects patients at risk for postoperative, unplanned, related readmission as accurately as the full model developed from all 28 nonlaboratory preoperative variables in the American College of Surgeons National Surgical Quality Improvement Program dataset. Therefore,

unplanned readmission can be integrated into the existing SURPAS tool providing moderately accurate prediction of postoperative readmission.[1] Briefly, in prediction studies, the main purpose is to provide a model, index, or score applicable to an individual (patient). Finally, associations, even those that are statistically significant, do not guarantee prediction.[3,4]

Conflict of interest/Disclosure

The authors report no proprietary or commercial interest in any product mentioned or concept discussed in this article.

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