Careful selection of predictor variables of AKI for robust regression model in Intensive Care Unit

A seleção cuidadosa de variáveis de previsão de AKI para robusto modelo de regressão na Unidade de Cuidados Intensivos

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Respected Editor,

I have read the research article entitled "Predictors of Acute Kidney Injury and Mortality in an Intensive Care Unit" by Luis Alberto Batista Peres, Vanessa Wandeur and Tiemi Matsuo, published in your prestigious journal "Brazilian Journal of Nephrology" (2015; 37:38-46).[1] I want to congratulate the authors for this successful research article, and make some contributions.

In the research article, authors have made vigorous efforts to identify significant predictors of acute kidney injury (AKI) and mortality among patients attending intensive care unit (ICU). For this purpose, authors provided comprehensive comparisons i.e. AKI *versus* non-AKI, mortality *versus* no mortality and dialysis *versus* non-dialysis. Invasive mechanical ventilation (IMV), serum creatinine and urea were found to be significant predictors of AKI while IMV, urea, hypernatremia and lactate were significant risk factors of mortality in this study.

AKI in ICU is usually defined on the basis of serum creatinine (SCr) or urine output (UO) as did by authors their study.[2] In Table 4, authors included SCr and UO in univariate analysis and SCr in multivariate analysis. We think analysis of these variables in AKI cases is not appropriate, especially since all of them are markers of kidney function based on which the criteria for AKI has been defined. It might be a reason of very high odds ratios in both univariate and multivariate analysis i.e. UO: 2936.00 (univariate) and SCr: 96.08 (univariate), 67.65 (multivariate).

Additionally, the wider 95% confidence interval (CI) in logistic regression further strengthens that inclusion of these variables has misled regression model. We did not come across any study evaluating SCr or UO as independent predictor of AKI, as they serve to define AKI rather than to predict it. To the best of our knowledge, almost all studies evaluating risk factors of AKI excluded variables that were directly related to the presence of AKI from the regression analysis.[3-5]

Electrolyte disturbances are usual manifestations of AKI and authors also tested these manifestations (hyper and hyponatremia, hyper and hypokalemia, bicarbonate) in univariate analysis that may further impair robustness of the regression model. The variables directly related to the AKI (SCr, BUN, low UO, urinary sedimentations and electrolyte disturbances) should be excluded from analysis as they are cardinal features of AKI (dependent variables).

Indeed, authors provided detailed and comprehensive data of patients attending ICU. More careful selection of independent variables for regression analysis will identify important predictors of AKI and mortality. Exclusion of SCr, UO and electrolyte disturbances from logistic regression may provide some other useful predictors of AKI and may result in a robust regression model.

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