Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Commentary

A Commentary on "P-POSSUM as mortality predictor in COVID-19-infected patients submitted to emergency digestive surgery. A retrospective cohort study" (Int J Surg 2021; 96:106171)

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Dear Editor,

A retrospective study was recently published in International Journal of Surgery to study the predictive power of the P-POSSUM score for postoperative mortality in coronavirus disease (COVID-19)-positive patients treated as emergency general and digestive surgery [1]. In this study which recruited 4988 participants, the authors found the P-POSSUM score to have a high area under the curve (AUC) of 0.88 (95% CI 0.81–0.95) in predicting 30-day mortality, suggesting that the P-POSSUM score played a substantial role in predicting mortality in these COVID-19 patients, which can help to refine risk stratification in COVID-19 patients. However, the following concerns deserve further elaboration and explanation.

First, the *Highlights* of this study stated that "***The predictive capacity of this known surgical score exceeds other scores used during the pandemic***". However, this study only described one kind of scores, the P-POSSUM score, and failed to provide information on the other scores (such as the Cr-POSSUM score [2]). In the absence of comparison with other scores, how can the authors stated in the article that the P-POSSUM score had greater predictive capacity than other scores? Furthermore, as studies which compare different scores (e.g., Cr-POSSUM score versus P-POSSUM score) in predicting mortality of COVID-19 patients are lacking, it is inaccurate to state that the predictive capacity of the P-POSSUM score in predicting mortality in COVID-19 patients to be higher than other scores. To clarify which score has the best value in predicting mortality for COVID-19 patients, the predictive values of different scores should be compared in a single study.

Second, there are significant outliers in this study. As shown in Table 1 of this study [1], the standard deviation (SD) of sodium in the 2019 cohort was 264, while the mean was 143. In addition, the SD of sodium in the COVID-19-positive cohort and the COVID-19-negative cohort were 5.0 and 27.0, respectively, while the mean values were 138 and 139, respectively. By comparing the mean and SD of these three cohorts, it could be inferred that there are significant outliers in the 2019 cohort, resulting in the SD to be significantly larger than the SD of the other two cohorts. For extreme outliers, it is crucial to handle them properly before performing any data analysis.

Third, from a statistical point of view, if the SD is greater than the mean, the studied data is not conforming to a normal distribution, but a skewed distribution. Obviously, the SD of several parameters in Table 1 on this study were greater than the mean values. For instance, the SD of C-reactive protein (CRP) in the 2019 cohort was 185, while the mean was 105 (see Table 1 of the study), suggesting that CRP conformed to a skewed distribution and the data should be described by median and interquartile range. Furthermore, for a skewed distribution, the Kruskal-Wallis test [3,4] should be used for comparisons between groups instead of using analysis of variance. Similar observations were found in the neutrophil-to-lymphocyte ratio (NLR) and platelet-to-lymphocyte ratio (PLR) in the COVID-19-negative cohort and the 2019 cohort. Therefore, a normality test should have been carried out before statistical analysis for all these parameters. Although the final conclusions do not change substantially in this study, appropriate statistical analyses help to increase the reliability and accuracy of this study.

Provenance and peer review

Commentary, internally reviewed.

Author disclosure form

None.

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