Metabolic predictors of COVID-19 mortality and severity: A Survival Analysis

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Abstract

Metabolomics has been increasingly utilized in studying host response to infections and under-standing the progression of multi-system disorders such as COVID-19. The analysis of metabo-lites in response to SARS-CoV-2 infection provides a snapshot of the endogenous host metabo-lism and its role in shaping the interaction with SARS-CoV-2. The current study investigated the metabolic signatures of mortality and severity in COVID-19 patients using a targeted metabo-lomics approach. Blood plasma concentrations were quantified through LC-MS using MxP Quant 500 kit. We utilized Kaplan-Meier survival analysis to investigate the correlation between various metabolic markers and patient outcomes. A comparison of survival rates between individuals with high levels of various metabolites and those with low levels showed statistically significant differences in survival outcomes. We further used four metabolic markers to develop a COVID-19 mortality risk model through the application of multiple machine learning methods. These metabolic predictors can be further validated as potential biomarkers to identify patients at risk of poor outcomes. Finally, integrating machine learning models in metabolome analysis of COVID-19 patients can improve our understanding of disease mortality by providing insight into the relationship between metabolites and survival probability, which can lead to the development of potential therapeutics and clinical risk models.

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