**Supplementary material**

**Clinical risk factors for mortality among critically ill Mexican patients with COVID-19**

Intensive care medicine

Carmen M. Hernández-Cárdenas1, José Alberto Choreño-Parra2,3, Carlos Torruco-Sotelo1, Felipe Jurado1, Héctor Serna-Secundino1, Cristina Aguilar1, José G. García-Olazarán1, Diana Hernández-García1, Eduardo M. Choreño-Parra4, Joaquín Zúñiga2,5, and \*Gustavo Lugo-Goytia1

1Respiratory Intensive Care Unit, Instituto Nacional de Enfermedades Respiratorias Ismael Cosío Villegas, Mexico City, Mexico. 2Laboratory of Immunobiology and Genetics, Instituto Nacional de Enfermedades Respiratorias Ismael Cosío Villegas, Mexico City, Mexico. 3Escuela Nacional de Ciencias Biológicas, Instituto Politécnico Nacional, Mexico City, Mexico. 4Posgrado en Ciencias Biológicas, Universidad Nacional Autónoma de México, Mexico City, Mexico. 5Tecnologico de Monterrey, Escuela de Medicina y Ciencias de la Salud, Mexico City, Mexico.

**\*Correspondence:**

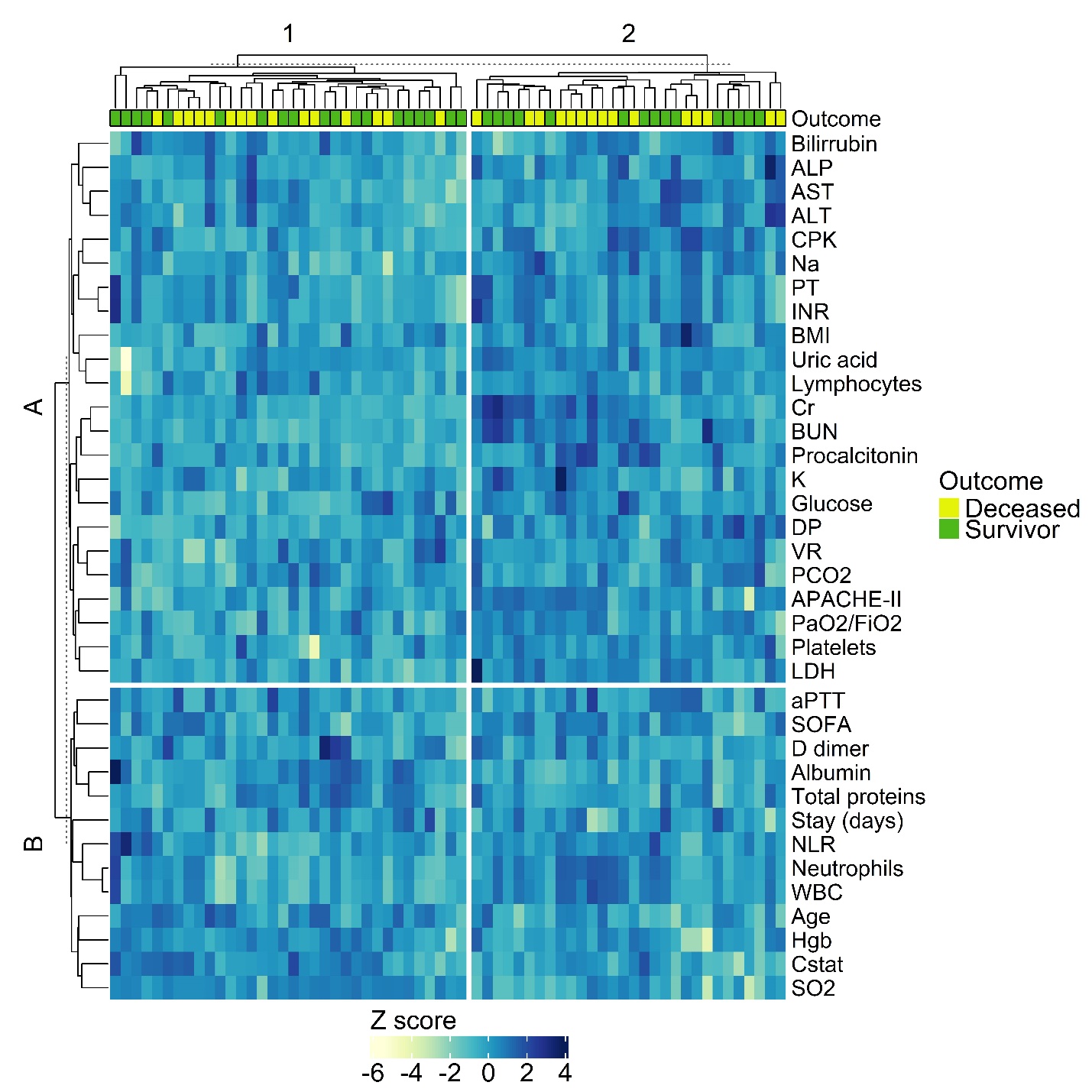
Gustavo Lugo-Goytia, M.D., Ph.D.

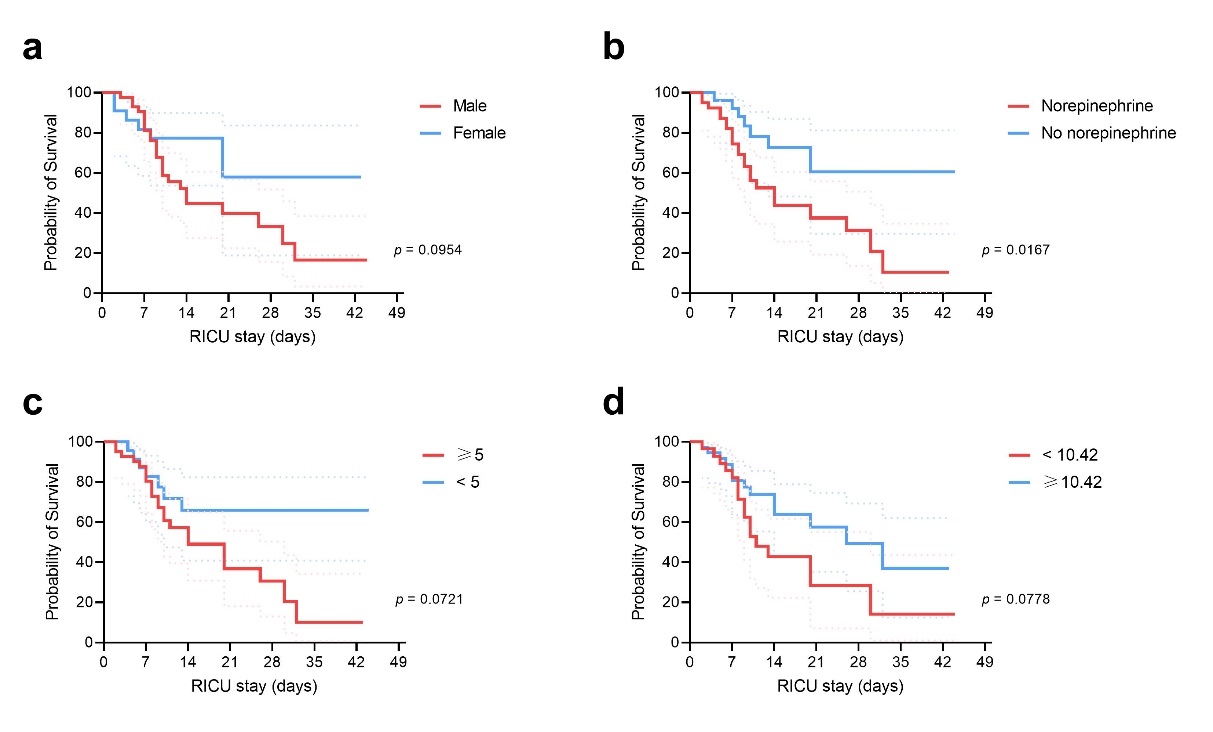
Unidad de Cuidados Intensivos Respiratorios, Instituto Nacional de Enfermedades Respiratorias Ismael Cosío Villegas, Mexico City, Mexico. Email: lugogoytia@iner.gob.mx.

**Supplementary Tables**

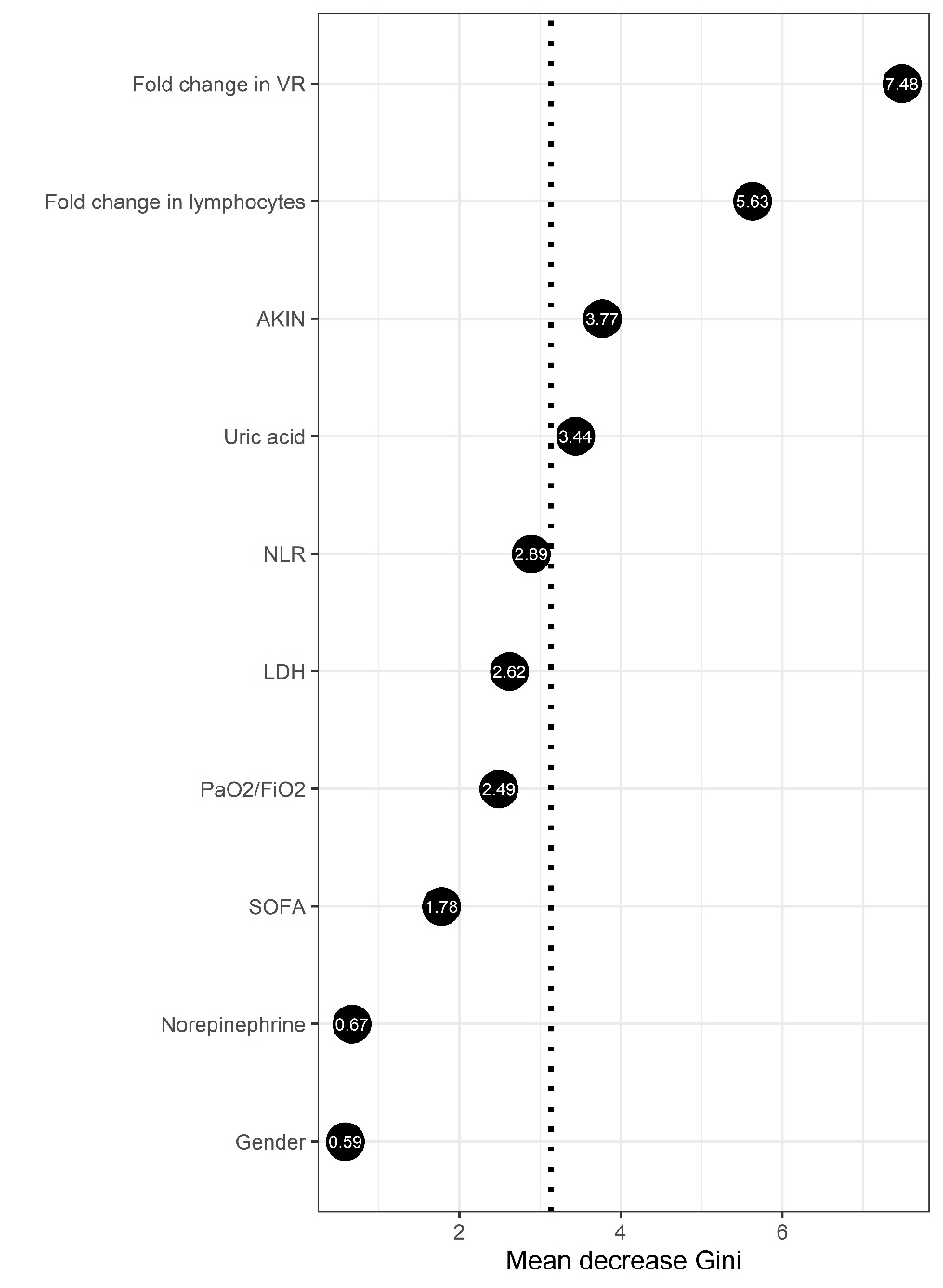
|  |  |  |  |
| --- | --- | --- | --- |
| Supplementary Table 1. Logistic regression analysis of risk factors for COVID-19-associated mortality | | | |
| Variable | **Univariate OR** | **95% CI** | ***p-*value** |
| Male gender | 3.556 | 1.205 – 11.62 | 0.0210 |
| Obesity | 1.868 | 0.6966 – 5.139 | 0.2151 |
| Diabetes | 0.3692 | 0.09141 – 1.265 | 0.1148 |
| SAH | 4.000 | 0.8376 – 28.96 | 0.0838 |
| Prone position | 1.500 | 0.5583 – 4.110 | 0.4220 |
| Norepinephrine | 3.696 | 1.294 – 11.47 | 0.0141 |
| Coinfection | 2.468 | 0.9125 – 6.941 | 0.0754 |
| White blood cells (109/L) | 1.038 | 0.9268 – 1.167 | 0.5192 |
| Neutrophils (109/L) | 1.025 | 0.9099 – 1.157 | 0.6833 |
| Lymphocytes (109/L) | 2.796 | 0.9485 – 10.06 | 0.0629 |
| NLR | 0.9475 | 0.8761 – 0.9989 | 0.0436 |
| Hgb (g/dL) | 1.059 | 0.8244 – 1.377 | 0.6525 |
| Platelets (109/L) | 0.9985 | 0.9933 – 1.003 | 0.5482 |
| Glucose (mg/dL) | 0.9980 | 0.9893 – 1.006 | 0.6428 |
| Na (mmol/L) | 1.039 | 0.9190 – 1.180 | 0.5424 |
| K (mmol/L) | 1.164 | 0.5374 – 2.596 | 0.6958 |
| Total proteins (g/dL) | 1.868 | 0.8080 – 4.582 | 0.1453 |
| Albumin (g/dL) | 0.6553 | 0.2451 – 1.548 | 0.3422 |
| BUN (mg/dL) | 1.007 | 0.9881 – 1.029 | 0.4759 |
| AST (U/L) | 1.005 | 0.9952 – 1.015 | 0.3400 |
| ALT (U/L) | 1.003 | 0.9925 – 1.015 | 0.5485 |
| D dimer (mg/L) | 0.9523 | 0.8068 – 1.053 | 0.3677 |
| INR | 3.656 | 0.01540 – 1026 | 0.6399 |
| PT (sec) | 0.9866 | 0.6924 – 1.401 | 0.9390 |
| ALP (U/L) | 1.009 | 0.9992 – 1.023 | 0.0742 |
| CPK (U/L) | 1.000 | 0.9999 – 1.001 | 0.1524 |
| Procalcitonin (ng/mL) | 1.221 | 0.7334 – 2.157 | 0.4418 |
| SO2% | 1.008 | 0.9837 – 1.035 | 0.5099 |
| PCO2 (mmHg) | 0.9743 | 0.9272 – 1.021 | 0.2780 |
| DP (cm H2O) | 1.044 | 0.8884 – 1.232 | 0.5991 |
| Cstat (ml/cm H2O) | 1.006 | 0.9570 – 1.059 | 0.8002 |
| VR | 0.7156 | 0.3202 – 1.514 | 0.3840 |
| SOFA score | 1.314 | 1.030 – 1.711 | 0.0274 |
| APACHE-II score | 1.042 | 0.9630 – 1.130 | 0.3085 |
| 95% CI, 95% confidence interval; ALP, alkaline phosphatase; ALT, alanine aminotransferase; APACHE-II, Acute Physiology and Chronic Health disease Classification System II; AST, aspartate aminotransferase; Cstat, static compliance; BUN, blood ureic nitrogen; CPK, creatine phosphokinase; DP, driving pressure; Hgb, hemoglobin; INR, international normalized ratio; NLR, neutrophil/lymphocyte ratio; OR, odds ratio; PCO2, partial pressure of carbon dioxide in the blood; PT, prothrombin time; SAH, systemic arterial hypertension; SO2%, oxygen saturation; SOFA, Sequential Organ Failure Assessment; VR, ventilatory ratio. | | | |

**Supplementary Figures**

**Supplementary Fig. 1. K-means clustering algorithm of the clinical and laboratory characteristics of COVID-19 patients in critical condition.** Before data visualization, clinical features and laboratory parameters were scaled and centered. Patients with any missing value in the variables of interest were excluded.



**Supplementary Fig. 2. Survival of COVID-19 patients admitted to the RICU according to their clinical characteristics.** Critically ill COVID-19 patients were categorized according to different clinical risk factors for mortality identified by binomial logistic regression analyses. (a) Gender. (b) Use of norepinephrine. (c) Sequential Organ Failure Assessment score. (d) Neutrophil to lymphocyte ratio. Survival curves were compared using the Kaplan-Meyer method and the log-rank test. Continuous variables were dichotomized using the best ROC curve threshold determined using the Youden index.



**Supplementary Figure 3. Random forest analysis of selected clinical characteristics associated with mortality in critically ill COVID-19 patients.** All variables with statistically significant association with mortality in the binomial regression analyses were included in a random forest analysis. The points represent the mean decrease Gini values, indicative of the importance of each variable to mortality. Variables with mean decease Gini values above the mean importance of the model (discontinuous vertical line) were considered as the most explicative variables of severe COVID-19-associated mortality in our cohort.