|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **TableS1. The correlation matrix of 12 metal(loid)s in whole blood of COVID-19 patients.** | | | | | | | | | | | |
|  | **Mg** |  |  |  |  |  |  |  |  |  |  |
| **Ca** | -0.21 |  |  |  |  |  |  |  |  |  |  |
|  | 0.0002 | **Ca** |  |  |  |  | | | |  |  |
| **Cr** | -0.06 | 0.30 |  |  |  |  | < -0.4 |  | 0 ~ 0.2 |  |  |
|  | 0.3173 | <0.0001 | **Cr** |  |  |  | -0.4 ~ -0.2 |  | 0.2 ~ 0.4 |  |  |
| **Mn** | 0.32 | -0.25 | -0.15 |  |  |  | -0.2 ~ 0 |  | 0.4 ~ 0.6 |  |  |
|  | <0.0001 | <0.0001 | 0.0081 | **Mn** |  |  |  |  | > 0.6 |  |  |
| **Fe** | 0.55 | -0.59 | -0.35 | 0.51 |  |  |  |  |  |  |  |
|  | <0.0001 | <0.0001 | <0.0001 | <0.0001 | **Fe** |  |  |  |  |  |  |
| **Cu** | -0.06 | 0.35 | 0.19 | -0.08 | -0.22 |  |  |  |  |  |  |
|  | 0.3194 | <0.0001 | 0.0007 | 0.1811 | 0.0001 | **Cu** |  |  |  |  |  |
| **Zn** | 0.36 | -0.52 | -0.09 | 0.32 | 0.64 | -0.08 |  |  |  |  |  |
|  | <0.0001 | <0.0001 | 0.1304 | <0.0001 | <0.0001 | 0.1432 | **Zn** |  |  |  |  |
| **As** | 0.24 | -0.30 | -0.30 | 0.37 | 0.50 | -0.20 | 0.30 |  |  |  |  |
|  | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 | 0.0003 | <0.0001 | **As** |  |  |  |
| **Cd** | -0.09 | -0.01 | -0.05 | 0.13 | 0.01 | 0.11 | 0.08 | 0.01 |  |  |  |
|  | 0.1312 | 0.8109 | 0.4083 | 0.0230 | 0.8718 | 0.0600 | 0.1757 | 0.9105 | **Cd** |  |  |
| **Hg** | 0.15 | -0.22 | -0.05 | 0.19 | 0.31 | 0.00 | 0.27 | 0.23 | -0.04 |  |  |
|  | 0.0071 | 0.0002 | 0.3820 | 0.0010 | <0.0001 | 0.9753 | <0.0001 | <0.0001 | 0.4855 | **Hg** |  |
| **Tl** | 0.01 | -0.14 | -0.21 | 0.18 | 0.27 | -0.06 | 0.12 | 0.43 | 0.10 | 0.12 |  |
|  | 0.8112 | 0.0159 | 0.0002 | 0.0018 | <0.0001 | 0.3329 | 0.0397 | <0.0001 | 0.0741 | 0.0386 | **Tl** |
| **Pb** | 0.22 | -0.15 | -0.14 | 0.17 | 0.32 | 0.13 | 0.26 | 0.21 | 0.32 | 0.09 | 0.12 |
|  | 0.0001 | 0.0083 | 0.0131 | 0.0031 | <0.0001 | 0.0195 | <0.0001 | 0.0002 | <0.0001 | 0.1278 | 0.0415 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| **Notes:** correlation coefficients (CC, above) and p values (below). Abbreviations: Mg, magnesium; Ca, calcium; Cr, chromium; Mn, manganese; Fe, iron; Cu, copper; Zn, Zinc; As, arsenic; Cd, cadmium; Hg, mercury; Tl, thallium; Pb, lead. | | | | | | | | | | | |

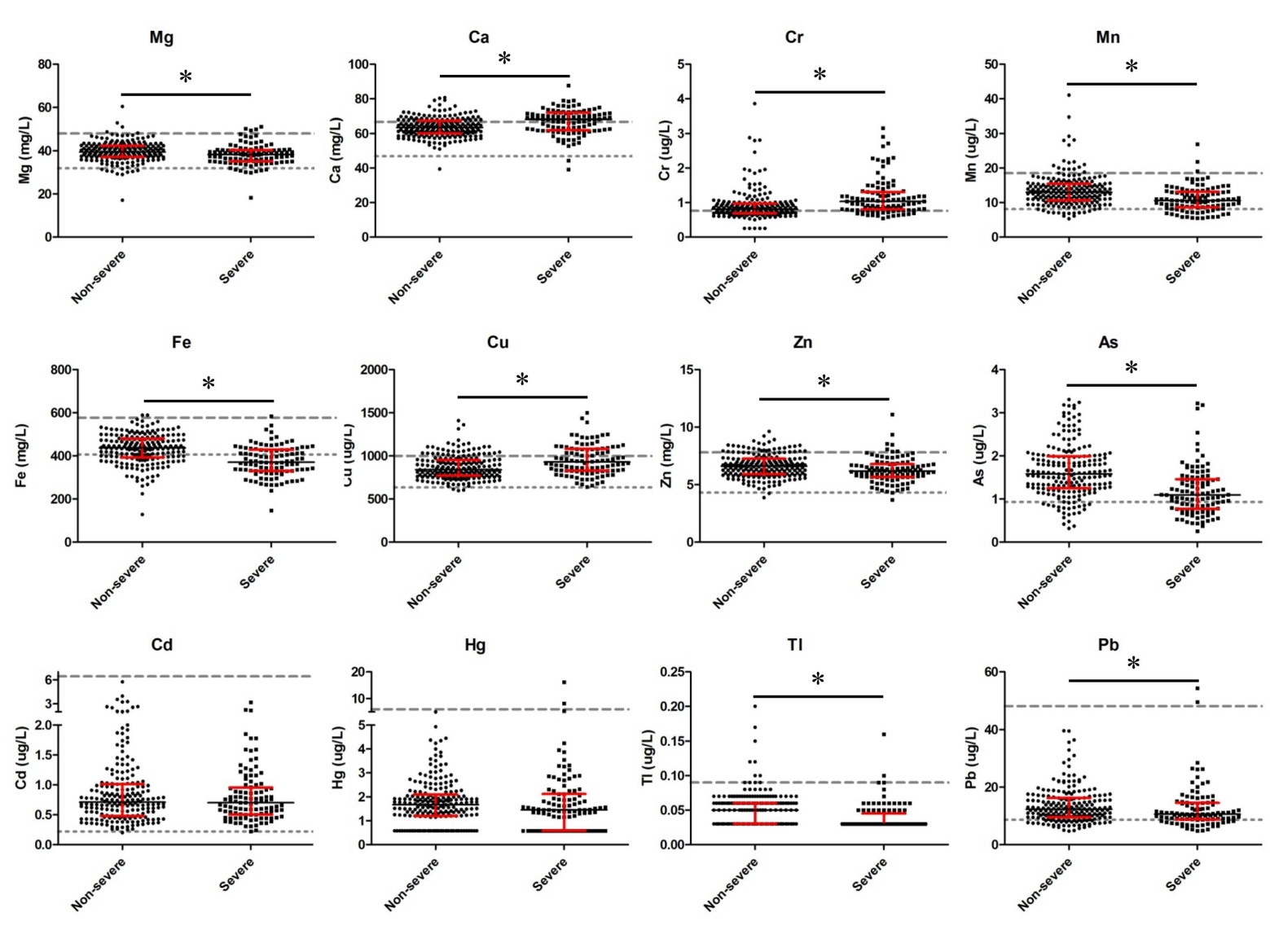
|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table S2. The Cut-off points of laboratory findings in COVID-19 patients by applying ROC** | | | | | | | | |  |  |  |
| Parameter | Disease status | | | | |  | Outcome | | | | |
| Cut-off | Sensitivity | Specificity | AUC (95% CI) | *P* |  | Cut-off | Sensitivity | Specificity | AUC (95% CI) | *P* |
| Mg | 40.52 | 0.45 | 0.78 | 0.61 (0.54 - 0.67) | **0.002** |  | 35.95 | 0.87 | 0.33 | 0.53 (0.39 - 0.68) | 0.681 |
| Ca | 68.00 | 0.53 | 0.80 | 0.66 (0.59 - 0.72) | **< 0.001** |  | 62.91 | 0.73 | 0.47 | 0.56 (0.37 - 0.74) | 0.491 |
| Cr | 1.03 | 0.51 | 0.82 | 0.68 (0.62 - 0.74) | **< 0.001** |  | 1.32 | 0.67 | 0.83 | 0.77 (0.64 - 0.9) | **0.001** |
| Mn | 10.98 | 0.72 | 0.58 | 0.68 (0.61 - 0.74) | **< 0.001** |  | 10.90 | 0.48 | 0.67 | 0.53 (0.38 - 0.69) | 0.687 |
| Fe | 376.67 | 0.81 | 0.55 | 0.73 (0.67 - 0.79) | **< 0.001** |  | 343.25 | 0.69 | 0.53 | 0.56 (0.39 - 0.74) | 0.424 |
| Cu | 823.98 | 0.78 | 0.47 | 0.65 (0.59 - 0.72) | **< 0.001** |  | 1090.65 | 0.40 | 0.81 | 0.57 (0.4 - 0.74) | 0.392 |
| Zn | 6.54 | 0.53 | 0.67 | 0.61 (0.55 - 0.68) | **0.001** |  | 5.46 | 1.00 | 0.22 | 0.55 (0.41 - 0.7) | 0.508 |
| As | 1.24 | 0.76 | 0.63 | 0.74 (0.68 - 0.8) | **< 0.001** |  | 0.96 | 0.70 | 0.80 | 0.75 (0.61 - 0.89) | **0.002** |
| Cd | 0.61 | 0.65 | 0.42 | 0.52 (0.45 - 0.58) | 0.654 |  | 0.68 | 0.93 | 0.55 | 0.75 (0.63 - 0.87) | **0.002** |
| Hg | 1.70 | 0.50 | 0.64 | 0.55 (0.48 - 0.62) | 0.122 |  | 1.62 | 0.60 | 0.64 | 0.61 (0.43 - 0.78) | 0.194 |
| Tl | 0.05 | 0.52 | 0.82 | 0.67 (0.61 - 0.73) | **< 0.001** |  | 0.06 | 0.15 | 0.93 | 0.53 (0.38 - 0.68) | 0.708 |
| Pb | 11.24 | 0.59 | 0.61 | 0.59 (0.52 - 0.66) | **0.012** |  | 7.21 | 0.92 | 0.40 | 0.54 (0.33 - 0.74) | 0.647 |
|  |  |  |  |  |  |  |  |  |  |  |  |
| Abbreviations: Mg, magnesium; Ca, calcium; Cr, chromium; Mn, manganese; Fe, iron; Cu, copper; Zn, Zinc; As, arsenic; Cd, cadmium; Hg, mercury; Tl, thallium; Pb, lead. | | | | | | | | | | | |

**Supplementary Figures**

**Figure S1. Whole blood levels of 12 metal(loid)s in 306 COVID-19 patients between non-severe and severe group.** Difference between non-severe and severe group were tested by using Mann-Whitney U test. Data are shown as median and interquartile range and were tested for significance at \* *p* < 0.05. Gray dotted line and dashed line represented normal lower and upper limit, respectively. Abbreviations: Mg, magnesium; Ca, calcium; Cr, chromium; Mn, manganese; Fe, iron; Cu, copper; Zn, zinc; As, arsenic; Cd, cadmium; Hg, mercury; Tl, thallium; Pb, lead.

**Figure S2. Whole blood levels of 12 metal(loid)s in the severe patients with COVID-19 between deceased and recovered group.** Difference between deceased and recovered group were tested by using Mann-Whitney U test. Data are shown as median and interquartile range and were tested for significance at \* *p* < 0.05. Gray dotted line and dashed line represented normal lower and upper limit, respectively. Abbreviations: Mg, magnesium; Ca, calcium; Cr, chromium; Mn, manganese; Fe, iron; Cu, copper; Zn, zinc; As, arsenic; Cd, cadmium; Hg, mercury; Tl, thallium; Pb, lead.

**Figure S1**



**Figure S2**

