

Supplementary Table 1: Hospital admission liver tests of 1110 patients with COVID-19 and normal liver tests prior to hospital admission

| Characteristic | Total (n=1110) | Non-severe COVID-19 (n=736) | Severe COVID-19 (n=374) | p-value |
|--------------------------------|-------------------|-----------------------------------|-------------------------------|---------|
| Age, mean (SD), years | 63.1 (18.0) | 62.1 (18.4) | 65.1 (17.0) | 0.008 |
| Male gender, n (%) | 586 (52.8%) | 360 (48.9%) | 226 (60.4%) | <0.001 |
| BMI, mean (SD) | 30.1 (7.7) | 29.6 (7.3) | 31.2 (8.3) | 0.002 |
| Diabetes mellitus, n (%) | 374 (33.7%) | 221 (30.0%) | 153 (40.9%) | <0.001 |
| Obesity, n (%) | 475 (44.5%) | 300 (42.8%) | 175 (47.7%) | 0.13 |
| AST, median (range), U/L | 41 (12-2098) | 38 (13-1399) | 52 (12-2098) | <0.001 |
| AST abnormal (>33 U/L) | 706 (67.1%) | 410 (59.9%) | 296 (80.4%) | <0.001 |
| ALT, median (IQR), U/L | 29 (6-1831) | 27 (6-1831) | 32 (8-1441) | <0.001 |
| ALT, abnormal (>34 U/L) | 440 (41.5%) | 268 (38.8%) | 172 (46.5%) | 0.015 |
| ALP, median (IQR), U/L | 71 (20-919) | 72 (20-609) | 69 (32-919) | 0.34 |
| ALP abnormal (>122 U/L) | 89 (8.4%) | 57 (8.2%) | 32 (8.6%) | 0.84 |
| TBIL, median (IQR), mg/dL | 0.5 (0.1-8.9) | 0.4 (0.1-4.0) | 0.5 (0.2-8.9) | <0.001 |
| TBIL, abnormal (>1.2 mg/dL) | 25 (2.4%) | 9 (1.3%) | 16 (4.4%) | 0.002 |
| Albumin, median (IQR) mg/dL | 3.5 (1.2-5.4) | 3.6 (1.5-5.4) | 3.4 (1.2-4.8) | <0.001 |
| Albumin, abnormal (<3.5 mg/dL) | 565 (53.2%) | 343 (49.7%) | 222 (59.7%) | 0.002 |

SD = standard deviation; BMI = body mass index; AST = aspartate aminotransferase; ALT = alanine aminotransferase; IQR = interquartile range; ALP = alkaline phosphatase; TBIL = total bilirubin

Severe COVID-19 defined as: death OR ICU stay OR use of mechanical ventilation OR vasopressor requirement, OR ECMO requirement.

Supplementary Table 2: Predictors of peak hospitalization abnormal liver tests greater than 5x ULN in patients with normal liver tests prior to hospital admission

| Characteristic | AST n = 152 vs. 914 | ALT n = 222 vs. 1531 |
|--|--|--|
| Age, mean, years | 57.3 vs. 64.5 (p<0.001) | 55.6 vs 64.7 (p<0.001) |
| Male gender, n (%) | 65.8 vs. 51.6% (p=0.001) | 71.9 vs 50.8% (p<0.001) |
| BMI (mean) | 31.1 vs. 30.0 (0.09) | 30.9 vs 30.0 (p=0.21) |
| Diabetes mellitus (%) | 25.7 vs. 35.7% (p=0.016) | 24.0 vs 35.8% (p=0.005) |
| Admission median AST and range (U/L) | 88 (13-2098) vs. 38 (12-160) (<0.001) | 75 (13-2098) vs 39 (12-451) (p<0.001) |
| Admission median ALT and range (U/L) | 58 (9-1831) vs. 27 (6-185) (p<0.001) | 57 (9-1831) vs. 27 (6-170) (p<0.001) |
| Admission median ALP and range (U/L) | 73 (21-609) vs. 71 (20-919) (p=0.31) | 78 (21-609) vs 71 (20-919) (p=0.030) |
| Admission median TBIL and range (mg/dL) | 0.5 (0.2-8.9) vs. 0.4 (0.1-4.0) (p=0.017) | 0.5 (0.2-4.0) vs. 0.4 (0.1-8.9) (p=0.009) |
| Admission median albumin and range (mg/dL) | 3.4 (2.0-4.7) vs. 3.5 (1.2-5.4) (p<0.001) | 3.4 (2.0-4.7) vs. 3.5 (1.2-5.4) (p<0.001) |
| Hydroxychloroquine use (%) | 91.5 vs. 83.9% (p=0.016) | 91.8 vs. 84.1% (p=0.015) |
| Lopinavir/Ritonavir use (%) | 9.9 vs. 7.3% (p=0.28) | 14.4 vs. 6.6% (p=<0.001) |
| Remdesivir use (%) | 5.9 vs 2.3% (p=0.028) | 6.3 vs. 2.3% (p=0.015) |
| Tocilizumab use (%) | 70.4 vs. 41.3% (p<0.001) | 71.2 vs. 41.4% (p<0.001) |

AST = aspartate aminotransferase; ALT = alanine aminotransferase; ALP = alkaline phosphatase; TBIL = total bilirubin; NS = not significant; BMI = body mass index

Supplementary Table 3: Association (odds ratio) between admission and peak hospitalization liver tests and clinical outcomes in patients with normal liver tests prior to hospital admission

| | ICU admission (multivariate model) | Mechanical ventilation (multivariate model) | Death (multivariate model) |
|-----------------------------|--|--|----------------------------|
| Age (1-year increase) | 1.00 (p=NS) | 1.00 (p=NS) | 1.09 (p<0.001) |
| Male | 1.56 (p=0.005) | 1.89 (p=0.001) | 1.52 (p=NS) |
| BMI (1-point increase) | 1.03 (p<0.001) | 1.04 (p<0.001) | 1.06 (p<0.001) |
| Diabetes mellitus | 1.50 (p=0.01) | 1.46 (p=0.04) | 1.39 (p=NS) |
| Admission | | | |
| Abnormal AST | 2.95 (p<0.001) | 3.40 (p<0.001) | 1.24 (p=NS) |
| Abnormal ALT | 0.91 (p=NS) | 1.13 (p=NS) | 1.00 (p=NS) |
| Abnormal ALP | 1.19 (p=NS) | 0.94 (p=0.03) | 1.21 (p=NS) |
| Abnormal TBIL | 2.03 (p=NS) | 1.56 (p=NS) | 5.66 (p<0.001) |
| Abnormal albumin | 1.34 (p=0.05) | 1.39 (p=0.07) | 1.21 (p=NS) |
| Peak Hospitalization | | | |
| Abnormal AST | 2.39 (p=0.01) | 8.20 (p=0.04) | 1.29 (p=NS) |
| Abnormal ALT | 2.82 (p<0.001) | 4.43 (p<0.001) | 1.04 (p=NS) |
| Abnormal ALP | 1.88 (p<0.001) | 2.57 (p<0.001) | 1.36 (p=NS) |
| Abnormal TBIL | 2.55 (p<0.001) | 2.97 (p<0.001) | 2.83 (p<0.001) |
| Abnormal albumin | 2.14 (p=0.01) | 21.01 (p<0.001) | 0.75 (p=NS) |

BMI = body mass index, NS = not significant; AST = aspartate aminotransferase; ALT = alanine aminotransferase; ALP = alkaline phosphatase; TBIL = total bilirubin