**Supplementary table 1. Characteristics of COVID-19 disease at hospital presentation**

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| --- | --- | --- | --- | --- |
|  | **Overall**  (n=400) | **Barotrauma**  (n=200) | **No barotrauma**  (n=200) | ***p-value*** |
| **Days from symptoms onset and hospital admission**, median (IQR) | 7 (5-10) | 7 (5-10) | 7 (5-10) | 0.173 |
| **WHO score\*** , n/N (%)  <2  2 | 23/393 (5.9)  370/393 (94.2) | 10/193 (5.2)  183/193 (94.8) | 13 (6.5)  187 (93.5) | 0.578 |
| **qCSI score**, median (IQR) | 5 (2-9) | 6 (5-10) | 4 (0-7) | **<0.001** |
| **4C score**, median (IQR) | 10 (8-12) | 11 (8-13) | 9 (7-12) | **<0.001** |
| **PaO2/FiO2 ratio**, median (IQR) | 214 (127-286) | 190 (130-265) | 242.4 (127-300) | **0.004** |
| **Respiratory rate**, median (IQR) | 22 (18-26) | 23.5 (18-28) | 20 (18-25) | **0.001** |
| **(A-a)DO2**, median (IQR) | 44.8 (33.8-53) | 45 (32.8-52.5) | 43.5 (36.8-53.3) | 0.972 |
| **Extent (%) of lung involvement**, n/N (%)  0-24%  25-49%  50-74%  ≥75% | 29/323 (9.0)  102/323 (31.6)  126/323 (39.0)  66/323 (20.4) | 7/147 (4.8)  30/147 (20.4)  73/147 (49.7)  37/147 (25.2) | 22/176 (12.5)  72/176 (40.9)  53/176 (30.1)  29/176 (16.5) | **<0.001** |
| **CT scan severity score (Salaffi et al)**, n/N (%)  Normal lung parenchyma  At least 75% GGO/crazy paving pattern  Combination of GGO opacities/crazy paving pattern and consolidation provided that each accounts for less than 75%  At least 75% consolidation | 5/291 (1.7)  119/291 (40.9)  154/291 (52.9)  13/291 (4.5) | 1/137 (0.7)  57/137 (41.6)  77/137 (56.2)  2/137 (1.5) | 4/154 (2.6)  62/154 (40.3)  77/154 (50)  11/154 (7.1) | 0.058 |
| **Other radiological findings** |  |  |  |  |
| Cavitations  Pleural effusion  Air bronchogram  Thromboembolism | 5/384 (1.3)  63/380 (16.6)  30/386 (7.8)  65/395 (16.5) | 4 (2)  10 (5)  18 (9)  52(26.3%) | 1/184 (0.5)  20/186 (10.8)  45/180 (25)  13 (6.6%) | 0.374  **0.035**  **<0.001**  **<0.001** |

Legend. \*1: asymptomatic or presymptomatic infection;2 : mild illness;3: moderate illness; 4: severe illness;5 :critical illness (A-a)DO2: alveolar-arterial gradient ; GGO : ground glass opacity; PaO2/FiO2 ratio: ratio of arterial oxygen partial pressure (paO2 in mmHg) to the fraction of inspired oxygen (FiO2), IQR: interquartile range, CT: chest thomography

**Supplementary table 2. Laboratory tests at admission**

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| --- | --- | --- | --- | --- |
|  | **Overall**  (n=400) | **Barotrauma**  (n=200) | **No barotrauma**  (n=200) | ***p-value*** |
| **White blood cells (n/µL)**, median (IQR) | 6805 (4340-9260) | 6635 (3850-9230) | 6910 (4900-9500) | 0.181 |
| **Lymphocytes count(n/µL)**, median (IQR) | 700 (480-1060) | 636 (460-990) | 772 (500-1090) | **0.015** |
| **CRP (mg/L) al ricovero**, median (IQR) | 76.0 (29.4-129.5) | 87.2 (28.1-145) | 69.8 (30-114.8) | 0.094 |
| **PCT (ng/mL)**, median (IQR) | 0.13 (0.07-0.34) | 0.18 (0.07-0.41) | 0.12 (0.06-0.26) | **0.002** |
| **Proadrenomedullin (mmol/L)**, median (IQR) | 1.05 (0.79-1.44) | 0.96 (1.19-1.58) | 0.93 (0.72-1.29) | **0.001** |
| **Interleukin-6 (pg/mL)**, median (IQR) | 1.05 (0.79-1.44) | 65.6 (26-130) | 31.9 (16-66) | **<0.001** |
| **LDH (UI/L)**, median (IQR) | 509.5 (362-716) | 559.5 (362-807) | 467.5 (359.5-643.5) | **0.007** |
| **D-dimer test (FeU/mL)**, median (IQR) | 763 (478-1383) | 966.5 (551.5-1999) | 655 (414-1100) | **<0.001** |

Legend. CRP: C reactive protein; PCT: procalcitonin; LDH: lactate dehydrogenase; IQR: interquartile range

**Supplementary table 3. Barotrauma events according to escalation ventilatory support or not.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **n (%)** | **N=400** | **No barotrauma**  (N=200) | **Barotrauma**  (N=200) | **p-value** |
| **Only COT**  **Only HFNO**  **Only CPAP/PSV**  **Only IMV**  **Escalation COT-HFNO**  **Escalation COT-HFNO-CPAP/PSV**  **Escalation COT-HFNO-CPAP/PSV-IMV** | 89 (22.3)  10 (6.8)  83 (20.8)  16 (4)  17 (4.3)  85 (21.3)  100 (25) | 70 (35)  9 (4.5)  41 (20.5)  6 (3)  10 (5)  31 (15.5)  33 (16.5) | 19 (9.5)  1 (0.5)  42 (21)  10 (5)  7 (3.5)  54 (27)  67 (33.5) | **<0.001** |

**Supplementary table 4. Sovrainfections during hospital stay**

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| --- | --- | --- | --- | --- |
|  | **Overall**  (n=400) | **Barotrauma**  (n=200) | **No barotrauma**  (n=200) | ***p-value*** |
| **Antibiotic administration**, n (%) | 311 (77.8) | 182 (91) | 129 (64.5) | **<0.001** |
| **Bacterial co-infections**, n (%) | 74 (18.5) | 50 (25) | 24 (12) | **0.001** |
| **Fungal co-infections**, n (%) | 54 (13.5) | 46 (23) | 8 (4) | **<0.001** |

**Supplementary table 4. Outcomes**

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| --- | --- | --- | --- | --- |
|  | **Overall**  (n=400) | **Barotrauma**  (n=200) | **No barotrauma**  (n=200) | ***p-value*** |
| **Lenght of hospital stay, days**, median (IQR) | 19 (11-34) | 27 (16-45) | 12 (8-21) | **<0.001** |
| **Deaths**, n/N(%) | 142/395 (36.0) | 108/197 (54.8) | 34/198 (17.2) | **<0.001** |

Legend. IQR: interquartile range.