**Body mass index and mortality in COVID-19 and other diseases: a cohort study in 35,506 ICU patients**Emma J. Kooistra1,2, Sylvia Brinkman3, 4, Peter H.J. van der Voort5, Nicolette F. de Keizer3, 4, Dave A. Dongelmans3, Matthijs Kox1,2, and Peter Pickkers1,2

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**Supplemental Digital Content 1-9**

Journal: Critical Care Medicine

**Supplemental Digital Content 1. Patient characteristics of different BMI categories in the non-SARS-CoV-2 viral pneumonia cohort.** Data presented as median [interquartile range] or n (%). P-values calculated using chi-square tests or Kruskal Wallis tests across all five categories. \* p<0.001 compared with BMI 18.5-25 kg/m2 using pairwise chi-square or Wilcoxon tests.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | BMI < 18.5 kg/m2 (n=129) | BMI 18.5-25 kg/m2 (n=1206) | BMI 25-30 kg/m2 (n=864) | BMI 30-35 kg/m2 (n=425) | BMI ≥35 kg/m2 (n=316) | p-value |
| Age, years | 63 [56-71] | 66 [58-74] | 67 [57-75] | 66 [56-74] | 61 [53-70] | 0.002 |
| Male sex, % | 52 (40.3) | 619 (51.3) | 490 (56.7) | 199 (46.8) | 124 (39.2)\* | <0.001 |
| Lowest PaO2/FiO2 ratio of the first 24 hours in the ICU, mmHg | 195 [137-264] | 176 [114-240] | 170 [113-229] | 152 [104-219] | 155 [107-233] | 0.42 |
| Mechanical ventilation on ICU admission | 71 (55.0) | 623 (51.7) | 468 (54.2) | 220 (51.8) | 173 (54.7) | 0.69 |
| Mechanical ventilation in first 24 hours in the ICU | 89 (69.0) | 837 (69.4) | 586 (67.8) | 298 (70.1) | 233 (73.7) | 0.40 |
| Use of vasoactive medication in first 24 hours in the ICU | 44 (34.1) | 523 (43.4) | 369 (42.7) | 174 (40.9) | 117 (37.0) | 0.10 |
| APACHE III APS | 52 [40-62] | 49 [37-64] | 48.5 [37-61] | 47 [36-59] | 47 [35-61] | 0.08 |
| APACHE III Score | 65.5 [50-79] | 63 [50-79] | 62 [50-78] | 60 [48-73] | 57 [45-76] | 0.15 |
| SAPS II score | 37 [31-46] | 38 [30-47] | 38 [30-47] | 37 [30-45] | 34 [28-44] | 0.02 |
| **Medical history** |  |  |  |  |  |  |
| Malignancy | 6 (4.7) | 66 (5.5) | 60 (6.9) | 19 (4.5) | 7 (2.2) | 0.03 |
| Immunological insufficiency | 23 (17.8) | 185 (15.3) | 139 (16.1) | 66 (15.5) | 29 (9.2) | 0.03 |
| COPD | 76 (58.9) | 572 (47.4) | 390 (45.1) | 200 (47.1) | 144 (45.6) | 0.06 |
| Chronic respiratory insufficiency | 41 (31.8)\* | 205 (17.0) | 127 (14.7) | 71 (16.7) | 59 (18.7) | <0.001 |
| Chronic renal failure | 8 (6.2) | 62 (5.1) | 52 (6.0) | 31 (7.3) | 35 (11.1) | 0.01 |
| Chronic cardiovascular insufficiency | 3 (2.3) | 38 (3.2) | 34 (3.9) | 17 (4.0) | 9 (2.8) | 0.71 |
| Diabetes mellitus | 10 (7.8) | 165 (13.7) | 160 (18.5) | 131 (30.8)\* | 123 (38.9)\* | <0.001 |

**Supplemental Digital Content 2. Patient characteristics of different BMI categories in the bacterial pneumonia cohort.** Data presented as median [interquartile range] or n (%). P-values calculated using chi-square tests or Kruskal Wallis tests across all five categories. \* p<0.001 compared with BMI 18.5-25 kg/m2 using pairwise chi-square or Wilcoxon tests.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | BMI < 18.5 kg/m2 (n=810) | BMI 18.5-25 kg/m2 (n=6024) | BMI 25-30 kg/m2 (n=4391) | BMI 30-35 kg/m2 (n=1815) | BMI ≥35 kg/m2 (n=1210) | p-value |
| Age, years | 64 [54-72]\* | 69 [60-77] | 70 [62-78] | 68 [60-76] | 66 [57-73]\* | <0.001 |
| Male sex, % | 371 (45.8)\* | 3656 (60.7) | 2831 (64.5) | 1024 (56.4) | 532 (44.0)\* | <0.001 |
| Lowest PaO2/FiO2 ratio of the first 24 hours in the ICU, mmHg | 154 (99-220) | 150 (97-223) | 144 (97-215) | 147 (98-215) | 138 (93-204) | 0.62 |
| Mechanical ventilation on ICU admission | 305 (37.7) | 2224 (36.9) | 1618 (36.8) | 686 (37.8) | 563 (46.5)\* | <0.001 |
| Mechanical ventilation in first 24 hours in the ICU | 420 (51.9) | 3248 (53.9) | 2320 (52.8) | 1005 (55.4) | 775 (64.0)\* | <0.001 |
| Use of vasoactive medication in first 24 hours in the ICU | 316 (39.0) | 2597 (43.1) | 1822 (41.5) | 730 (40.2) | 526 (43.5) | 0.03 |
| APACHE III APS | 55 [41-70] | 54 [41-69] | 52 [39-66] | 51 [39-66] | 52 [40-67] | 0.05 |
| APACHE III Score | 68 [54-84] | 69 [55-86] | 68 [53-84] | 66 [52-83] | 65 [52-81] | 0.12 |
| SAPS II score | 38 [30-48] | 39 [31-49] | 39 [30-48] | 38 [30-48] | 38 [30-48] | 0.097 |
| **Medical history** |  |  |  |  |  |  |
| Malignancy | 61 (7.5) | 547 (9.1) | 333 (7.6) | 130 (7.2) | 45 (3.7)\* | <0.001 |
| Immunological insufficiency | 157 (19.4) | 1068 (17.7) | 707 (16.1) | 249 (13.7)\* | 145 (12.0)\* | <0.001 |
| COPD | 362 (44.7)\* | 2149 (35.7) | 1478 (33.7) | 644 (35.5) | 477 (39.4) | <0.001 |
| Chronic respiratory insufficiency | 160 (19.8)\* | 770 (12.8) | 495 (11.3) | 208 (11.5) | 213 (17.6)\* | <0.001 |
| Chronic renal failure | 52 (6.4) | 452 (7.5) | 392 (8.9) | 171 (9.4) | 119 (9.8) | 0.002 |
| Chronic cardiovascular insufficiency | 14 (1.7) | 207 (3.4) | 195 (4.4) | 74 (4.1) | 59 (4.9) | 0.001 |
| Diabetes mellitus | 56 (6.9)\* | 908 (15.1) | 931 (21.2)\* | 610 (33.6)\* | 493 (40.7)\* | <0.001 |

**Supplemental Digital Content 3. Patient characteristics of different BMI categories in the trauma cohort.** Data presented as median [interquartile range] or n (%). P-values calculated using chi-square tests or Kruskal Wallis tests across all five categories. \* p<0.001 compared with BMI 18.5-25 kg/m2 using pairwise chi-square or Wilcoxon tests.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | BMI < 18.5 kg/m2 (n=461) | BMI 18.5-25 kg/m2 (n=7797) | BMI 25-30 kg/m2 (n=5201) | BMI 30-35 kg/m2 (n=1541) | BMI ≥35 kg/m2 (n=681) | p-value |
| Age, years | 59 [26-80] | 57 [34-76] | 62 [48-77]\* | 63 [50-74]\* | 60 [48-72]\* | <0.001 |
| Male sex, % | 169 (36.7)\* | 5042 (64.7) | 3630 (69.8)\* | 1052 (68.3) | 389 (57.1) | <0.001 |
| Lowest PaO2/FiO2 ratio of the first 24 hours in the ICU, mmHg | 352 [252-450] | 317 [226-404] | 290 [203-364] | 258 [182-342] | 250 [174-324] | 0.02 |
| Mechanical ventilation on ICU admission | 124 (26.9) | 2528 (32.4) | 1644 (31.6) | 440 (28.6) | 168 (24.7)\* | <0.001 |
| Mechanical ventilation in first 24 hours in the ICU | 133 (28.9) | 2744 (35.2) | 1790 (34.4) | 492 (31.9) | 204 (30.0) | 0.001 |
| Use of vasoactive medication in first 24 hours in the ICU | 126 (27.3) | 2216 (28.4) | 1473 (28.3) | 415 (26.9) | 179 (26.3) | 0.59 |
| APACHE III APS | 36 [26-48] | 34 [24-50] | 33 [23-48] | 32 [23-47] | 31 [22-46] | 0.30 |
| APACHE III Score | 48 [34-64] | 45 [31-64] | 46 [32-63] | 44 [32-62] | 42 [30-59] | 0.10 |
| SAPS II score | 28 [20-37] | 28 [20-39] | 28 [20-39] | 27 [20-37] | 25.5 [17-36]\* | <0.001 |
| **Medical history** |  |  |  |  |  |  |
| Malignancy | 6 (1.3) | 94 (1.2) | 66 (1.3) | 25 (1.6) | 10 (1.5) | 0.75 |
| Immunological insufficiency | 18 (3.9) | 159 (2.0) | 133 (2.6) | 40 (2.6) | 14 (2.1) | 0.04 |
| COPD | 48 (10.4) | 512 (6.6) | 329 (6.3) | 178 (11.6)\* | 85 (12.5)\* | <0.001 |
| Chronic respiratory insufficiency | 11 (2.4) | 82 (1.1) | 65 (1.2) | 42 (2.7)\* | 35 (5.1)\* | <0.001 |
| Chronic renal failure | 20 (4.3) | 237 (3.0) | 160 (3.1) | 70 (4.5) | 44 (6.5)\* | <0.001 |
| Chronic cardiovascular insufficiency | 14 (3.0) | 184 (2.4) | 95 (1.8) | 44 (2.9) | 20 (2.9) | 0.05 |
| Diabetes mellitus | 19 (4.1) | 462 (5.9) | 543 (10.4)\* | 236 (15.3)\* | 190 (27.9)\* | <0.001 |

**Supplemental Digital Content 4. Clinical outcomes of different BMI categories in all four cohorts.** Data presented as median [interquartile range] or n (%). P-values calculated using chi-square tests or Kruskal Wallis tests across all five categories. \* p<0.001 compared with BMI 18.5-25 kg/m2 using pairwise chi-square or Wilcoxon tests.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | BMI < 18.5 kg/m2 | BMI 18.5-25 kg/m2 | BMI 25-30 kg/m2 | BMI 30-35 kg/m2  | BMI ≥35 kg/m2 | p-value |
| **COVID-19** | **n=10** | **n=592** | **n=1196** | **n=565** | **n=272** |  |
| Number of readmissions | 0 (0) | 0 (0) | 6 (0.5) | 4 (0.7) | 1 (0.4) | 0.35 |
| LOS ICU of survived patients, days | 13 [8-41] | 16 [8-31] | 17 [10-32] | 18 [10-31] | 19 [12-32] | 0.39 |
| LOS ICU deceased patients, days | 9 [9-19] | 11 [5-21] | 14 [7-23] | 10 [5-20] | 9 [4-15] | 0.63 |
| LOS hospital of survived patients, days | 18 [18-46] | 28 [18-47] | 30 [19-46] | 31 [19-46] | 31 [20-46] | 0.34 |
| LOS hospital of deceased patients, days | 9 [9-19] | 14 [7-23] | 16 [9-25] | 12 [6-22] | 11 [6-18] | 0.96 |
| 28-day mortality, n (%) | 5 (50.0) | 170 (28.7) | 295 (24.7) | 124 (21.9) | 66 (24.3) | 0.03 |
| In-hospital mortality, n (%) | 5 (50.0) | 194 (32.8) | 353 (29.5) | 147 (26.0) | 70 (25.7) | 0.04 |
|  |  |  |  |  |  |  |
| **non-SARS-CoV-2 viral pneumonia** | **n=129** | **n=1206** | **n=864** | **n=425** | **n=316** |  |
| Number of readmissions | 2 (1.5) | 22 (1.8) | 13 (1.5) | 9 (2.1) | 2 (0.6) | 0.59 |
| LOS ICU of survived patients, days | 4 [2-9] | 4 [2-8] | 4 [2-8] | 4 [2-9] | 4 [2-9] | 0.64 |
| LOS ICU deceased patients, days | 4 [2-9] | 5 [2-10] | 6 [2-14] | 6 [3-13] | 4 [2-11] | 0.47 |
| LOS hospital of survived patients, days | 12 [8-22] | 11 [7-18] | 10 [7-17] | 11 [7-18] | 11 [7-18] | 0.31 |
| LOS hospital of deceased patients, days | 6 [4-11] | 7 [3-14] | 9 [3-17] | 8 [4-15] | 5 [3-12] | 0.74 |
| 28-day mortality, n (%) | 34 (26.4) | 237 (19.7) | 134 (15.5) | 64 (15.1) | 38 (12.0) | <0.001 |
| In-hospital mortality, n (%) | 34 (26.4) | 250 (20.7) | 152 (17.6) | 69 (16.2) | 40 (12.7) | 0.002 |
|  |  |  |  |  |  |  |
| **Bacterial pneumonia** | **n=810** | **n=6024** | **n=4391** | **n=1815** | **n=1210** |  |
| Number of readmissions | 69 (7.8) | 585 (8.9) | 439 (9.1) | 175 (8.8) | 80 (6.2) | 0.02 |
| LOS ICU of survived patients, days | 3 [2-6] | 3 [2-7] | 3 [2-7] | 3 [2-7] | 4 [2-7] | 0.52 |
| LOS ICU deceased patients, days | 3 [1-6] | 4 [1-8] | 4 [2-9] | 4 [2-9] | 5 [2-12] | 0.40 |
| LOS hospital of survived patients, days | 12 [7-19] | 12 [8-20] | 11 [7-19] | 11 [7-18] | 12 [7-19] | 0.86 |
| LOS hospital of deceased patients, days | 7 [4-12] | 7 [3-14] | 9 [4-16] | 8 [3-14] | 7 [3-16] | 0.44 |
| 28-day mortality, n (%) | 228 (28.1)\* | 1331 (22.1) | 799 (18.2)\* | 322 (17.7)\* | 178 (14.7)\* | <0.001 |
| In-hospital mortality, n (%) | 236 (29.1)\* | 1401 (23.3) | 850 (19.4)\* | 340 (18.7)\* | 192 (15.9)\* | <0.001 |
|  |  |  |  |  |  |  |
| **Trauma** | **n=461** | **n=7797** | **n=5201** | **n=1541** | **n=681** |  |
| Number of readmissions | 6 (1.3) | 108 (1.4) | 82 (1.6) | 28 (1.8) | 14 (2.0) | 0.50 |
| LOS ICU of survived patients, days | 1 [1-2] | 1 [1-3] | 1 [1-3] | 1 [1-3] | 1 [1-3] | 0.98 |
| LOS ICU deceased patients, days | 2 [1-3] | 2 [1-5] | 3 [1-7] | 3 [1-9] | 3 [1-15] | 0.48 |
| LOS hospital of survived patients, days | 8 [5-15] | 8 [5-16] | 9 [5-16] | 10 [5-17] | 9 [5-17] | 0.20 |
| LOS hospital of deceased patients, days | 5 [2-10] | 5 [2-10] | 5 [2-11] | 6 [3-13] | 7 [4-15] | 0.85 |
| 28-day mortality, n (%) | 45 (9.8) | 701 (9.0) | 458 (8.8) | 143 (9.3) | 47 (6.9) | 0.37 |
| In-hospital mortality, n (%) | 48 (10.4) | 726 (9.3) | 482 (9.3) | 150 (9.7) | 50 (7.3) | 0.40 |

**Supplemental Digital Content 5.** Twenty-eight-day survival curves of different BMI categories in (a) COVID-19 patients, (b) non-SARS-CoV-2 viral pneumonia patients, (c) bacterial pneumonia patients and (d) trauma patients. P-values were calculated using log-rank tests.



**Supplemental Digital Content 6. Estimated odds ratios of in-hospital mortality of the multivariate regression model in the COVID-19 cohort.** Covariates used for this analyses included sex, age, medical history (chronic diagnoses), APACHE III acute physiology score (APS), vasoactive medication and mechanical ventilation and PaO2/FiO2 ratio in the first 24 hours following ICU admission.

|  |  |
| --- | --- |
| **Variable** | **Odds ratio [95% CI]** |
| BMI <18.5 kg/m2 | 1.92 [0.51-7.13] |
| BMI 25-30 kg/m2 | 0.95 [0.75-1.21] |
| BMI 30-35 kg/m2 | 0.87 [0.65-1.16] |
| BMI ≥35 kg/m2 | 1.15 [0.79-1.67] |
| Female | **1.47 [1.18-1.83]** |
| Age 40-45 years | 0.79 [0.22-2.80] |
| Age 45-50 years | 1.21 [0.49-3.02] |
| Age 50-55 years | 0.78 [0.32-1.88] |
| Age 55-60 years | 1.85 [0.84-4.08] |
| Age 60-65 years | **2.61 [1.20-5.69]** |
| Age 65-70 years | **4.46 [2.07-9.61]** |
| Age 70-75 years | **5.45 [2.54-11.69]** |
| Age 75-80 years | **8.66 [3.98-18.85]** |
| Age 80-85 years | **14.79 [5.79-37.79]** |
| Age ≥85 years | **20.73 [3.62-118.54]** |
| Immunological insufficiency | 1.13 [0.79-1.63] |
| Renal insufficiency | **1.98 [1.16-3.38]** |
| Chronic respiratory insufficiency | **1.54 [1.17-2.04]** |
| Cardiovasculair insufficiency | 1.77 [0.81-3.87] |
| Cirrhosis | 1.47 [0.09-24.33] |
| Malignancy | **2.53 [1.38-4.62]** |
| Diabetes mellitus | **1.29 [1.02-1.63]** |
| APACHE IV APS 24-34 | 1.23 [0.69-2.2] |
| APACHE IV APS 34-45 | 1.37 [0.80-2.37] |
| APACHE IV APS 45-63 | 1.64 [0.96-2.82] |
| APACHE IV APS ≥63 | **3.87 [2.21-6.78]** |
| Mechanical ventilation during first 24 hours in the ICU | **1.48 [1.09-2.02]** |
| Use of vasoactive medication | 1.17 [0.90-1.51] |
| PaO2/FiO2 ratio 155-226 mmHg | 0.89 [0.69-1.15] |
| PaO2/FiO2 ratio 226-296 mmHg | 0.65 [0.42-1.00] |
| PaO2/FiO2 ratio 296-371 mmHg | 0.65 [0.34-1.25] |
| PaO2/FiO2 ratio ≥371 mmHg | 0.89 [0.43-1.83] |
| Missing PaO2/FiO2 ratio  | 1.02 [0.74-1.42] |

**Supplemental Digital Content 7. Estimated odds ratios of in-hospital mortality of the multivariate regression model in the non-SARS-CoV-2 viral pneumonia cohort.** Covariates used for this analyses included BMI, sex, age, medical history (chronic diagnoses), APACHE III acute physiology score (APS), vasoactive medication and mechanical ventilation and PaO2/FiO2 ratio in the first 24 hours following ICU admission.

|  |  |
| --- | --- |
| **Variable** | **Odds ratio [95% CI]** |
| BMI <18.5 kg/m2 | 1.50 (0.95-2.37) |
| **BMI 25-30 kg/m2** | **0.78 (0.61-0.99)** |
| BMI 30-35 kg/m2 | 0.76 (0.55-1.04) |
| BMI ≥35 kg/m2 | **0.64 (0.43-0.95)** |
| Female | 0.84 (0.69-1.04) |
| Age 40-45 years | 0.67 (0.12-3.71) |
| Age 45-50 years | **3.31 (1.14-9.63)** |
| Age 50-55 years | **3.35 (1.20-9.33)** |
| Age 55-60 years | **4.69 (1.79-12.29)** |
| Age 60-65 years | **5.69 (2.21-14.65)** |
| Age 65-70 years | **6.57 (2.56-16.84)** |
| Age 70-75 years | **8.67 (3.40-22.16)** |
| Age 75-80 years | **12.64 (4.93-32.40)** |
| Age 80-85 years | **11.18 (4.29-29.17)** |
| Age ≥85 years | **15.54 (5.76-41.9)** |
| Immunological insufficiency | **1.47 (1.12-1.95)** |
| Renal insufficiency | 1.14 (0.78-1.68) |
| Chronic respiratory insufficiency | **1.63 (1.30-2.04)** |
| Cardiovasculair insufficiency | **2.42 (1.52-3.86)** |
| Cirrhosis | 1.58 (0.32-7.75) |
| Malignancy | **2.28 (1.52-3.42)** |
| Diabetes mellitus | 0.90 (0.70-1.16) |
| APACHE IV APS 24-34 | 1.97 (0.84-4.59) |
| APACHE IV APS 34-45 | 2.11 (0.93-4.79) |
| APACHE IV APS 45-63 | **3.05 (1.36-6.84)** |
| APACHE IV APS ≥63 | **6.20 (2.73-14.05)** |
| Mechanical ventilation during first 24 hours in the ICU | **1.85 (1.42-2.41)** |
| Use of vasoactive medication | 1.11 (0.89-1.38) |
| PaO2/FiO2 ratio 155-226 mmHg | **0.71 (0.55-0.93)** |
| PaO2/FiO2 ratio 226-296 mmHg | 0.72 (0.52-1.00) |
| PaO2/FiO2 ratio 296-371 mmHg | **0.60 (0.37-0.97)** |
| PaO2/FiO2 ratio ≥371 mmHg | **0.43 (0.21-0.89)** |
| Missing PaO2/FiO2 ratio  | 0.76 (0.54-1.07) |

**Supplemental Digital Content 8. Estimated odds ratios of 28-day mortality of the multivariate regression model in the bacterial pneumonia cohort.** Covariates used for this analyses included sex, age, medical history (chronic diagnoses), APACHE III acute physiology score (APS), vasoactive medication and mechanical ventilation and PaO2/FiO2 ratio on ICU admission.

|  |  |
| --- | --- |
| **Variable** | **Odds ratio [95% CI]** |
| BMI <18.5 kg/m2 | **1.88 (1.57-2.25)** |
| BMI 25-30 kg/m2 | **0.78 (0.70-0.86)** |
| BMI 30-35 kg/m2 | **0.81 (0.70-0.93)** |
| BMI ≥35 kg/m2 | **0.73 (0.61-0.87)** |
| Female | 1.06 (0.97-1.16) |
| Age 40-45 years | 1.49 (0.87-2.57) |
| Age 45-50 years | **1.81 (1.15-2.85)** |
| Age 50-55 years | **2.22 (1.48-3.33)** |
| Age 55-60 years | **2.32 (1.59-3.41)** |
| Age 60-65 years | **2.88 (1.99-4.15)** |
| Age 65-70 years | **3.85 (2.69-5.52)** |
| Age 70-75 years | **5.07 (3.55-7.23)** |
| Age 75-80 years | **6.80 (4.76-9.71)** |
| Age 80-85 years | **8.67 (6.05-12.41)** |
| Age ≥85 years | **12.43 (8.56-18.06)** |
| Immunological insufficiency | **1.28 (1.14-1.45)** |
| Renal insufficiency | 1.14 (0.98-1.32) |
| Chronic respiratory insufficiency | **1.09 (1.00-1.20)** |
| Cardiovasculair insufficiency | **1.74 (1.43-2.13)** |
| Cirrhosis | **2.77 (1.99-3.86)** |
| Malignancy | **2.19 (1.88-2.55)** |
| Diabetes mellitus | 0.93 (0.83-1.03) |
| APACHE IV APS 24-34 | 1.12 (0.77-1.63) |
| APACHE IV APS 34-45 | **1.56 (1.11-2.19)** |
| APACHE IV APS 45-63 | **2.37 (1.70-3.30)** |
| APACHE IV APS ≥63 | **5.14 (3.68-7.16)** |
| Mechanical ventilation during first 24 hours in the ICU | **1.71 (1.55-1.89)** |
| Use of vasoactive medication | **1.11 (1.01-1.22)** |
| PaO2/FiO2 ratio 155-226 mmHg | **0.75 (0.67-0.84)** |
| PaO2/FiO2 ratio 226-296 mmHg | **0.56 (0.47-0.66)** |
| PaO2/FiO2 ratio 296-371 mmHg | **0.62 (0.49-0.77)** |
| PaO2/FiO2 ratio ≥371 mmHg | **0.64 (0.46-0.89)** |
| Missing PaO2/FiO2 ratio  | 0.97 (0.85-1.11) |

**Supplemental Digital Content 9. Estimated odds ratios of 28-day mortality of the multivariate regression model in the multiple trauma cohort.** Covariates used for this analyses included sex, age, medical history (chronic diagnoses), APACHE III acute physiology score (APS), vasoactive medication and mechanical ventilation and PaO2/FiO2 ratio in the first 24 hours following ICU admission.

|  |  |
| --- | --- |
| **Variable** | **Odds ratio [95% CI]** |
| BMI <18.5 kg/m2 | 1.23 (0.86-1.78) |
| BMI 25-30 kg/m2 | 0.90 (0.78-1.03) |
| BMI 30-35 kg/m2 | 0.99 (0.79-1.23) |
| BMI ≥35 kg/m2 | 0.81 (0.57-1.15) |
| Female | **1.45 (1.26-1.66)** |
| Age 40-45 years | 1.41 (0.94-2.11) |
| Age 45-50 years | **1.56 (1.10-2.23)** |
| Age 50-55 years | **2.30 (1.66-3.19)** |
| Age 55-60 years | **1.85 (1.33-2.56)** |
| Age 60-65 years | **2.65 (1.95-3.60)** |
| Age 65-70 years | **3.76 (2.82-5.01)** |
| Age 70-75 years | **5.40 (4.13-7.08)** |
| Age 75-80 years | **6.56 (5.00-8.61)** |
| Age 80-85 years | **9.44 (7.20-12.37)** |
| Age ≥85 years | **12.44 (9.54-16.21)** |
| Immunological insufficiency | 1.08 (0.74-1.57) |
| Renal insufficiency | 1.00 (0.76-1.30) |
| Chronic respiratory insufficiency | **1.26 (1.03-1.54)** |
| Cardiovasculair insufficiency | **1.38 (1.00-1.89)** |
| Cirrhosis | **2.44 (1.30-4.58)** |
| Malignancy | 1.52 (0.96-2.41) |
| Diabetes mellitus | 1.11 (0.91-1.35) |
| APACHE IV APS 24-34 | **1.77 (1.22-2.57)** |
| APACHE IV APS 34-45 | **2.87 (2.01-4.09)** |
| APACHE IV APS 45-63 | **5.57 (3.93-7.91)** |
| APACHE IV APS ≥63 | **27.53 (19.43-39.02)** |
| Mechanical ventilation during first 24 hours in the ICU | **1.90 (1.59-2.26)** |
| Use of vasoactive medication | **1.97 (1.72-2.26)** |
| PaO2/FiO2 ratio 155-226 mmHg | **0.76 (0.60-0.98)** |
| PaO2/FiO2 ratio 226-296 mmHg | 0.80 (0.63-1.01) |
| PaO2/FiO2 ratio 296-371 mmHg | **0.63 (0.50-0.81)** |
| PaO2/FiO2 ratio ≥371 mmHg | **0.64 (0.50-0.82)** |
| Missing PaO2/FiO2 ratio  | 0.83 (0.67-1.03) |