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| **Supplementary Material 1 Baseline and outcome of young patients for sepsis-associated encephalopathy** |
| **Characteristic** | **Survival group(n=541)** | **Non-Survival group(n=51)** | ***P*** |
| Age, years |  54.00 [47.00, 61.00] |  58.00 [49.00, 62.00] | 0.213 |
| Male sex, n (%) |  317 (58.6)  |  29 ( 56.9)  | 0.927 |
| **Co-morbid conditions, n (%)** |
| Charlson |  3.00 [2.00, 5.00] |  5.00 [3.00, 7.00] | <0.001 |
| Hypertension |  232 (42.9)  |  19 ( 37.3)  | 0.529 |
| Diabetes |  145 (26.8)  |  13 ( 25.5)  | 0.971 |
| Chronic obstructive pulmonary disease |  101 (18.7)  |  8 ( 15.7)  | 0.737 |
| Chronic kidney diseae |  88 (16.3)  |  12 ( 23.5)  | 0.259 |
| **Site of infection, n (%)** |
| Pulmonary infection |  46 ( 8.5)  |  6 ( 11.8)  | 0.598 |
| Abdominal infection |  29 ( 5.4)  |  2 ( 3.9)  | 0.911 |
| Urinary infection |  37 ( 6.8)  |  0 ( 0.0)  | 0.104 |
| Skin softtissue infection |  28 ( 5.2)  |  2 ( 3.9)  | 0.955 |
| Catheter infection |  23 ( 4.3)  |  2 ( 3.9)  | 1.000 |
| **Pathogenic microorganisms, n (%)** |
| Acinetobacter baumannii |  12 ( 2.2)  |  1 ( 2.0)  | 1.000 |
| Klebsiellapneumoniae |  79 (14.6)  |  4 ( 7.8)  | 0.264 |
| Pseudomonas aeruginosa |  55 (10.2)  |  2 ( 3.9)  | 0.231 |
| Staphylococcus aureus |  41 ( 7.6)  |  1 ( 2.0)  | 0.227 |
| Escherichiacoli |  103 (19.0)  |  2 ( 3.9)  | 0.012 |
| **Physiology** |
| Temperature,℃  |  37.39 [37.06, 37.83] |  37.22 [36.75, 37.67] | 0.113 |
| Heart rate,beats per minute |  94.00 [81.00, 106.00] |  88.00 [69.00, 109.50] | 0.203 |
| Systolicblood pressure, mmHg | 107.00 [94.00, 127.00] | 103.00 [88.00, 122.50] | 0.137 |
| Diastolicblood pressure,mmHg |  59.50 [50.00, 70.00] |  57.00 [42.50, 66.00] | 0.037 |
| Respiratory rate,beats per minute |  22.00 [17.00, 27.00] |  21.00 [17.00, 26.75] | 0.760 |
| **Laboratory tests** |
| **Blood system** |
| White blood cell×109 /L  |  13.50 [9.25, 17.95] |  17.10 [11.20, 22.35] | 0.002 |
| Hemoglobin(g/dL) |  9.60 [8.10, 11.45] |  9.40 [8.00, 11.00] | 0.498 |
| Platelet (×10ˆ9 /L)  | 168.00 [109.50, 243.00] | 139.00 [77.50, 223.50] | 0.082 |
| PT(sec) |  14.70 [12.80, 18.80] |  18.80 [14.70, 26.25] | <0.001 |
| APTT(sec) |  34.20 [28.80, 44.78] |  44.78 [31.45, 55.50] | 0.001 |
| INR |  1.30 [1.20, 1.70] |  1.72 [1.35, 2.55] | <0.001 |
| **Other organ functions** |
| Creatinine(mg/dL) |  1.00 [0.70, 1.60] |  1.40 [1.00, 2.90] | <0.001 |
| Bun(mg/dL)  |  19.00 [13.00, 30.00] |  32.00 [16.00, 51.50] | <0.001 |
| Glucose(mg/dL)  | 160.00 [126.00, 202.00] | 157.00 [130.50, 202.00] | 0.972 |
| Lactate (mmol/L)  |  2.00 [1.30, 2.50] |  2.50 [1.75, 4.00] | 0.003 |
| PaCO2,mmHg |  40.00 [35.00, 45.00] |  39.00 [34.00, 45.00] | 0.451 |
| SpO2,% |  93.00 [91.00, 95.00] |  93.00 [91.00, 94.00] | 0.178 |
| **Treatment strategies** |
| Use of vasoactive drugs, n (%) |  189 (34.9)  |  35 ( 68.6)  | <0.001 |
| Renal replacement therapy, n (%) |  34 ( 6.3)  |  10 ( 19.6)  | 0.001 |
| **Outcome** |
| SOFA |  3.00 [2.00, 5.00] |  5.00 [3.00, 8.00] | <0.001 |
| SAPS II |  33.00 [24.00, 43.00] |  45.00 [36.00, 51.50] | <0.001 |
| SAPS III |  45.00 [33.00, 60.00] |  65.00 [49.50, 75.50] | <0.001 |
| MELD |  11.00 [8.00, 21.00] |  23.08 [10.50, 30.56] | <0.001 |
| LODS |  5.00 [3.00, 7.00] |  7.00 [5.00, 8.00] | <0.001 |
| OASIS |  31.00 [25.00, 37.00] |  36.00 [31.00, 39.00] | 0.001 |
| Los\_icu  |  4.12 [2.04, 10.13] |  6.39 [3.62, 9.53] | 0.069 |
| Los\_hospital  |  15.52 [7.46, 27.99] |  12.25 [7.35, 18.14] | 0.015 |

APPT: Activated partial thrombin time; BUN: blood urea nitrogen; INR: International Normalized Ratio; PT: Prothrombin time; SAPS: simplified acute physiology score; SOFA: Sequential organ failure assessment; LODS:Logical evaluation system for organ dysfunction; OASIS: Oxford acute severity of illness score; *P* < 0.05, statistically significant.

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| **Supplementary Material 2 Baseline and outcome of Pathogenic microorganisms for sepsis-associated encephalopathy** |
| **Characteristic** | **Other pathogenic microorganisms group(n=541)** | **Pseudomonas aeruginosa and Klebsiella pneumoniae group(n=233)** | ***P*** |
| Age, years |  77.00 [71.00, 84.00] |  79.00 [72.00, 85.00] | 0.033 |
| Male sex, n (%) |  413 ( 53.3)  |  117 ( 50.2)  | 0.453 |
| **Co-morbid conditions, n (%)** |
| Charlson |  6.00 [4.00, 8.00] |  7.00 [5.00, 8.00] | 0.009 |
| Hypertension |  378 ( 48.8)  |  130 ( 55.8)  | 0.071 |
| Diabetes |  273 ( 35.2)  |  94 ( 40.3)  | 0.178 |
| Chronic obstructive pulmonary disease |  225 ( 29.0)  |  64 ( 27.5)  | 0.704 |
| Chronic kidney diseae |  227 ( 29.3)  |  89 ( 38.2)  | 0.013 |
| **Site of infection, n (%)** |
| Pulmonary infection |  57 ( 7.4)  |  36 ( 15.5)  | <0.001 |
| Abdominal infection |  33 ( 4.3)  |  16 ( 6.9)  | 0.147 |
| Urinary infection |  72 ( 9.3)  |  40 ( 17.2)  | 0.001 |
| Skin softtissue infection |  46 ( 5.9)  |  21 ( 9.0)  | 0.133 |
| Catheter infection |  19 ( 2.5)  |  15 ( 6.4)  | 0.006 |
| **Physiology** |
| Temperature,℃  |  37.17 [36.89, 37.56] |  37.11 [36.89, 37.56] | 0.492 |
| Heart rate,beats per minute |  89.00 [77.00, 104.50] |  92.00 [80.00, 110.00] | 0.015 |
| Systolicblood pressure, mmHg | 107.00 [90.00, 124.00] | 101.00 [88.00, 116.00] | 0.004 |
| Diastolicblood pressure,mmHg |  52.00 [44.00, 62.00] |  49.00 [40.50, 60.00] | 0.033 |
| Respiratory rate,beats per minute |  22.50 [18.00, 27.00] |  23.00 [18.00, 27.00] | 0.960 |
| **Laboratory tests** |
| **Blood system** |
| White blood cell×109 /L  |  13.15 [9.30, 17.20] |  14.40 [9.90, 18.00] | 0.086 |
| Hemoglobin(g/dL) |  9.40 [7.97, 11.00] |  8.90 [7.60, 10.50] | 0.013 |
| Platelet (×10ˆ9 /L)  | 177.00 [117.00, 233.25] | 174.00 [128.00, 248.00] | 0.331 |
| PT(sec) |  15.20 [12.90, 18.80] |  15.90 [13.60, 19.20] | 0.023 |
| APTT(sec) |  33.90 [29.10, 44.78] |  37.00 [30.70, 45.20] | 0.015 |
| INR |  1.40 [1.20, 1.72] |  1.50 [1.20, 1.72] | 0.028 |
| **Other organ functions** |
| Creatinine(mg/dL) |  1.10 [0.80, 1.80] |  1.30 [0.90, 2.20] | 0.008 |
| Bun(mg/dL)  |  25.00 [18.00, 40.00] |  29.00 [19.00, 46.00] | 0.006 |
| Glucose(mg/dL)  | 162.00 [131.00, 204.75] | 164.00 [127.50, 211.00] | 0.622 |
| Lactate (mmol/L)  |  2.10 [1.40, 2.50] |  2.00 [1.30, 2.50] | 0.462 |
| PaCO2,mmHg |  41.00 [35.00, 45.00] |  40.00 [35.00, 46.00] | 0.959 |
| SpO2,% |  92.00 [90.00, 95.00] |  93.00 [90.00, 95.00] | 0.263 |
| **Treatment strategies** |
| Use of vasoactive drugs, n (%) |  19 ( 2.5)  |  15 ( 6.4)  | 0.006 |
| Renal replacement therapy, n (%) |  38 ( 4.9)  |  14 ( 6.0)  | 0.617 |
| **Outcome** |
| SOFA |  3.00 [2.00, 5.00] |  3.00 [2.00, 4.00] | 0.792 |
| SAPS II |  41.00 [34.00, 50.00] |  46.00 [37.00, 54.00] | <0.001 |
| SAPS III |  47.00 [37.00, 60.00] |  52.00 [39.00, 64.00] | 0.009 |
| MELD |  13.00 [9.00, 20.00] |  16.00 [10.00, 22.00] | 0.004 |
| LODS |  5.00 [3.00, 7.00] |  5.00 [4.00, 8.00] | 0.025 |
| OASIS |  34.00 [29.00, 39.00] |  34.00 [28.00, 40.00] | 0.282 |
| Los\_icu  |  3.59 [1.94, 7.18] |  3.67 [1.85, 6.95] | 0.688 |
| Los\_hospital  |  11.68 [6.92, 19.96] |  13.10 [7.28, 23.52] | 0.072 |

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