**Supplementary Table 1. Coefficients and cutoff values of independent prognostic factors analyzed by logistic regression**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Variable | B | b’ | SE | Wald | *p-*value | OR (95% CI) | AUC (95% CI) | Cutoff value | Sensitivity | Specificity |
| Age | 0.028 | 0.169 | 0.093 | 49.037 | 0.033 | 1.918 (1.598–2.301) | 0.586 (0.544–0.628) | 57 | 0.392 | 0.749 |
| WGO | 0.613 | 0.219 | 0.216 | 8.066 | 0.005 | 1.845 (1.209–2.817) | 0.621 (0.579–0.662) | 3 | 0.536 | 0.657 |
| WBC | 0.044 | 0.186 | 0.019 | 5.219 | 0.022 | 1.028 (1.002–1.055) | 0.695 (0.654–0.733) | 10.0 | 0.723 | 0.597 |
| TB | 0.091 | 0.441 | 0.016 | 32.324 | <0.001 | 1.095 (1.061–1.130) | 0.677 (0.636–0.716) | 18.1 | 0.589 | 0.689 |
| Cr | 0.623 | 0.519 | 0.122 | 26.259 | <0.001 | 1.865 (1.469–2.367) | 0.744 (0.705–0.780) | 1.3 | 0.632 | 0.808 |
| INR | 0.693 | 0.655 | 0.147 | 22.142 | <0.001 | 1.999 (1.498–2.668) | 0.779 (0.743–0.812) | 2.5 | 0.799 | 0.621 |
| HE | 0.651 | 0.535 | 0.093 | 49.037 | <0.001 | 1.918 (1.598–2.301) | 0.765 (0.728–0.800) | 1 | 0.665 | 0.819 |

Cr, creatinine; HE, hepatic encephalopathy; INR, international normalized ratio; TB, total bilirubin; WBC, white blood cell; WGO, World Gastroenterology Organization.

**Supplementary Table 2. Predictive efficacy of each score for 28-day and 90-day prognosis by receiver operating characteristic curve analysis in the training set**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Time | Variable | AUC (95% CI) | St | Cutoff value | Sensitivity | Specificity | \*z statistic(*p*–value) |
| 28-day prognosis | CTP | 0.770 (0.732–0.804) | 0.023 | 14 | 0.540 | 0.881 | 3.688 (*p<*0.001) |
| CLIF-SOFA | 0.816 (0.781–0.848) | 0.021 | 11 | 0.803 | 0.732 | 2.093 (*p=*0.036) |
| CLIF-OF | 0.807 (0.772–0.840) | 0.021 | 10 | 0.839 | 0.673 | 2.466 (*p=*0.014) |
| MELD | 0.787 (0.750–0.820) | 0.022 | 25 | 0.818 | 0.646 | 3.708 (*p<0.001*) |
| MELD-Na | 0.779 (0.742–0.814) | 0.022 | 28 | 0.898 | 0.537 | 3.885 (*p<*0.001) |
| WASP-ACLF | 0.858 (0.826–0.886) | 0.017 | 5 | 0.832 | 0.756 | NA |
| 90-day prognosis | CTP | 0.773 (0.736–0.808) | 0.020 | 12 | 0.746 | 0.657 | 6.100 (*p<*0.001) |
| CLIF-SOFA | 0.849 (0.816–0.878) | 0.017 | 10 | 0.790 | 0.837 | 2.930 (*p=*0.003) |
| CLIF-OF | 0.847 (0.815–0.877) | 0.017 | 10 | 0.828 | 0.775 | 2.891 (*p=*0.004) |
| MELD | 0.847 (0.814–0.876) | 0.017 | 26 | 0.756 | 0.793 | 3.119 (*p=*0.002) |
| MELD-Na | 0.832 (0.798–0.862) | 0.018 | 30 | 0.766 | 0.752 | 3.870 (*p<*0.001) |
| WASP-ACLF | 0.895 (0.866–0.919) | 0.014 | 5 | 0.790 | 0.855 | NA |

ACLF, acute-on-chronic liver failure; CLIF-OF, chronic liver failure consortium organ function; CLIF-SOFA, chronic liver failure-sequential organ failure assessment; CTP, Child-Turcotte-Pugh; MELD, model of end-stage liver disease; WASP-ACLF, widely applicable and simple prognostic score of ACLF.

**Supplementary Table 3. Twenty-eight and 90-day mortality of grade I, II, and III patients in the validation set**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Time**  | **Updated WASP-ACLF** | **28-day mortality, % (*n*)** | **χ2, *p*-value** | **90-day mortality, % (*n*)** | **χ2 value, *p*-value** |
| Baseline | Grade I (WASP-ACLF ≤3) | 8.8 (34) | χ2=72.104*p*<0.001 | 18.4 (71) | χ2=80.641*p*<0.001 |
| Grade II (WASP-ACLF=4–6) | 29.7 (78) | 49.4 (130) |
| Grade III(WASP-ACLF ≥7) | 60.8 (14) | 65.2 (15) |
| Third Day | Grade I (WASP-ACLF ≤3) | 5.1 (19) | χ2=114.233*p*<0.001 | 13.9 (52) | χ2=127.554*p*<0.001 |
| Grade II (WASP-ACLF=4–6) | 29.9 (75) | 50.6 (127) |
| Grade III(WASP-ACLF ≥7) | 60.5 (23) | 73.7 (28) |
| First Week | Grade I (WASP-ACLF ≤3) | 4.4 (16) | χ2=108.354*p*<0.001 | 13.4 (49) | χ2=110.295*p*<0.001 |
| Grade II (WASP-ACLF=4–6) | 22.7 (53) | 45.1 (105) |
| Grade III (WASP-ACLF ≥7) | 60.5 (23) | 73.7 (28) |
| Second Week | Grade I (WASP-ACLF ≤3) | 2.9 (11) | χ2=99.643*p*<0.001 | 11.5 (43) | χ2=106.792*p*<0.001 |
| Grade II (WASP-ACLF=4–6) | 18.4 (38) | 44.4 (92) |
| Grade III(WASP-ACLF ≥7) | 55.2 (16) | 69.0 (20) |

WASP-ACLF, widely applicable and simple prognostic score of acute-on-chronic liver failure.

**Supplementary Table 4. Predictive efficacy of each score for 28-day prognosis by receiver operating characteristic curve analysis in the validation set**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Time(cases, n) | Variable | AUC (95% CI) | St | Cutoff value | Sensitivity | Specificity | \*z statistic(*p-*value) |
| Baseline(*n*=671) | CTP | 0.574 (0.536–0.612) | 0.026 | 11 | 0.826 | 0.314 | 7.362 (*p<*0.001) |
| CLIF-SOFA | 0.696 (0.660–0.731) | 0.026 | 8 | 0.738 | 0.556 | 2.949 (*p=*0.003) |
| CLIF-OF | 0.690 (0.654–0.725) | 0.026 | 10 | 0.532 | 0.767 | 2.677 (*p=*0.007) |
| MELD | 0.733 (0.697–0.766) | 0.026 | 26 | 0.659 | 0.745 | 0.964 (*p=*0.335) |
| MELD-Na | 0.748 (0.713–0.780) | 0.024 | 28 | 0.730 | 0.708 | 0.343 (*p=*0.732) |
| WASP-ACLF | 0.756 (0.722–0.788) | 0.021 | 4 | 0.730 | 0.644 | NA |
| Third day(*n*=662) | CTP | 0.621 (0.583–0.658) | 0.025 | 11 | 0.826 | 0.369 | 7.929 (*p<*0.001) |
| CLIF-SOFA | 0.753 (0.718–0.785) | 0.023 | 8 | 0.710 | 0.571 | 3.439 (*p<*0.001) |
| CLIF--OF | 0.772 (0.738–0.804) | 0.023 | 10 | 0.473 | 0.807 | 2.152 (*p=*0.031) |
| MELD | 0.772 (0.738–0.803) | 0.025 | 26 | 0.652 | 0.741 | 1.913 (*p=*0.056) |
| MELD-Na | 0.777 (0.743–0.808) | 0.023 | 27 | 0.797 | 0.560 | 1.857 (*p=*0.063) |
| WASP-ACLF | 0.817 (0.785–0.846) | 0.019 | 4 | 0.749 | 0.706 | NA |
| First week(*n*=637) | CTP | 0.634 (0.595–0.672) | 0.028 | 11 | 0.848 | 0.400 | 7.568 (*p<*0.001) |
| CLIF-SOFA | 0.761 (0.726–0.794) | 0.026 | 8 | 0.731 | 0.576 | 3.843 (*p<*0.001) |
| CLIF-OF | 0.773 (0.739–0.805) | 0.024 | 9 | 0.880 | 0.549 | 2.502 (*p=*0.012) |
| MELD | 0.723 (0.686–0.757) | 0.033 | 27 | 0.587 | 0.807 | 3.399 (*p<*0.001) |
| MELD-Na | 0.760 (0.725–0.793) | 0.028 | 30 | 0.652 | 0.771 | 2.471 (*p=*0.014) |
| WASP-ACLF | 0.830 (0.798–0.858) | 0.021 | 5 | 0.696 | 0.824 | NA |
| Second week(*n*=610) | CTP | 0.648 (0.609–0.686) | 0.033 | 11 | 0.785 | 0.486 | 6.504 (*p<*0.001) |
| CLIF-SOFA | 0.782 (0.747–0.814) | 0.029 | 9 | 0.646 | 0.817 | 2.505 (*p=*0.012) |
| CLIF-OF | 0.795 (0.760–0.826) | 0.028 | 9 | 0.908 | 0.613 | 1.835 (*p=*0.067) |
| MELD | 0.746 (0.709–0.780) | 0.038 | 25 | 0.662 | 0.785 | 2.618 (*p=*0.009) |
| MELD | 0.769 (0.734–0.802) | 0.032 | 30 | 0.662 | 0.787 | 2.069 (*p=*0.039) |
| WASP-ACLF | 0.839 (0.807–0.867) | 0.025 | 5 | 0.708 | 0.824 | NA |

ACLF, acute-on-chronic liver failure; CLIF-OF, chronic liver failure consortium organ function; CLIF-SOFA, chronic liver failure-sequential organ failure assessment; CTP, Child-Turcotte-Pugh; MELD, model of end-stage liver disease; WASP-ACLF, widely applicable and simple prognostic score of ACLF.