Supplementary Material

**S figure ELN小于30 AJCC rAJCC 合并AUC比较**

**Supplementary Figure 1.** The Kaplan-Meier survival curves for gastric cancer patients with ELN (Examined Lymph Nodes) less than 30 in the (a) Dataset 1, (b) Dataset 2, (c) Dataset 3 and (d) Dataset 4 were depicted according to the rAJCC staging system.

Performance of the rAJCC staging systems compared with the 8th AJCC staging system in the (e) Dataset 1, (f) Dataset 2, (g) Dataset 3 and (h) Dataset 4 with ELN less than 30.

图表, 箱线图

描述已自动生成

**Supplementary Figure 2.** Performance of the rAJCC staging systems incorporating ELN compared with the rAJCC staging system without ELN restriction in thea.TCGA dataset and b. Third Affiliated Hospital of Sun Yat-sen University dataset.

**Supplementary Table 1.** Demographic and pathological characteristics of study population.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Characteristics | Dataset 1 | Dataset 2 | Dataset 3 | Dataset 4 |
| N = 6351 (100%) | N=1786(100%) | N=277(100%) | N=719(100%) |
| Sex (%) |  |  |  |  |
| Male | 4242 (66.79) | 1206 (67.53) | 178 (64.26) | 486 (67.59) |
| Female | 2109 (33.21) | 580 (32.47) | 99 (35.74) | 233 (32.41) |
| Age (%) |  |  |  |  |
| <50 | 613 (9.65) | 176 (9.85) | 21 (7.58) | 149 (20.72) |
| 50-69 | 3067 (48.29) | 904 (50.62) | 148 (53.43) | 435 (60.50) |
| >69 | 2671 (42.06) | 706 (39.53) | 107 (38.63) | 135 (18.78) |
| Unknown | / | / | 1 (0.36) |  |
| Year (%) |  |  |  |  |
| 2010 | 1071 (16.86) | / | / | / |
| 2011 | 1046 (16.47) | / | / | / |
| 2012 | 1074 (16.91) | / | / | / |
| 2013 | 1049 (16.52) | / | / | / |
| 2014 | 1112 (17.51) | / | / | / |
| 2015 | 999 (15.73) | / | / | / |
| 2016 | / | 861 (48.21) | / | / |
| 2017 | / | 925 (51.79) | / | / |
| Race (%) |  |  |  |  |
| White | 4171 (65.67) | 1123 (62.88) | 189 (68.23) | / |
| Black | 756 (11.90) | 214 (11.98) | 7 (2.53) | / |
| Other | 1398 (22.01) | 431 (24.13) | 51 (18.41) | 719(100) |
| Unknown | 26 (0.41) | 18 (1.01) | 30 (10.83) | / |
| Grade (%) |  |  |  |  |
| I | 510 (8.03) | 141 (7.89) | 3 (1.08) | 18 (2.50) |
| II | 2054 (32.34) | 568 (31.80) | 94 (33.94) | 156 (21.70) |
| III | 3390 (53.38) | 935 (52.35) | 175 (63.18) | 494 (68.71) |
| IV | 107 (1.68) | 27 (1.51) | / | 51 (7.09) |
| Unknown | 290 (4.57) | 115 (6.44) | 5 (1.81) | / |
| Tumor size (%) |  |  |  |  |
| ＜5cm | 3591 (56.54) | 1012 (56.66) | 134 (48.38) | 453 (63.00) |
| ≥5cm | 2101 (33.08) | 495 (27.72) | / | 234 (32.55) |
| Unknown | 659 (10.38) | 279 (15.62) | 143 (51.62) | 32 (4.45) |
| Primary site (%) |  |  |  |  |
| Body | 594 (9.35) | 210 (11.76) | 72 (25.99) | 191 (26.56) |
| Antrum/pylorus | 1796 (28.28) | 501 (28.05) | 89 (32.13) | 289 (40.19) |
| Cardia/fundus | 2226 (35.05) | 596 (33.37) | 106 (38.27) | 145 (20.17) |
| Greater curvature | 255 (4.02) | 62 (3.47) | / | 3 (0.42) |
| Lesser curvature | 685 (10.79) | 182 (10.19) | / | 7 (0.97) |
| Overlapping regions | 400 (6.30) | 131 (7.33) | / | 42 (5.84) |
| Stomach NOS | 395 (6.22) | 104 (5.82) | 10 (3.61) | 42 (5.84) |
| 8th AJCC T stage (%) |  |  |  |  |
| T1 | 1633 (25.71) | 416 (23.29) | 18 (6.50) | 116 (16.13) |
| T2 | 940 (14.80) | 279 (15.62) | 67 (24.19) | 119 (16.55) |
| T3 | 2612 (41.13) | 771 (43.17) | 135 (48.74) | 88 (12.24) |
| T4a | 865 (13.62) | 259 (14.50) | 37 (13.36) | 294 (40.89) |
| T4b | 301 (4.74) | 61 (3.42) | 20 (7.22) | 102 (14.19) |
| 8th AJCC N stage (%) |  |  |  |  |
| N0 | 2761 (43.47) | 761 (42.61) | 85 (30.69) | 287 (39.92) |
| N1 | 1558 (24.53) | 444 (24.86) | 73 (26.35) | 110 (15.30) |
| N2 | 1044 (16.44) | 312 (17.47) | 64 (23.10) | 124 (17.25) |
| N3 | 988 (15.56) | 269 (15.06) | 55 (19.86) | 198 (27.54) |
| 8th AJCC TNM stage (%) |  |  |  |  |
| I | 1841 (28.99) | 488 (27.32) | 42 (15.16) | 175 (24.34) |
| II | 1817 (28.61) | 524 (29.34) | 96 (34.66) | 161 (22.39) |
| III | 2693 (42.40) | 774 (43.34) | 139 (50.18) | 383 (53.27) |
| rN stage (%) |  |  |  |  |
| rN0 | 3192 (50.26) | 960 (53.75) | 90 (32.49) | 306 (42.56) |
| rN1 | 1204 (18.96) | 335 (18.76) | 54 (19.49) | 196 (27.26) |
| rN2 | 1023 (16.11) | 265 (14.84) | 57 (20.58) | 139 (19.33) |
| rN3a | 328 (5.16) | 69 (3.86) | 25 (9.03) | 38 (5.29) |
| rN3b | 604 (9.51) | 157 (8.79) | 51 (18.41) | 40 (5.56) |
| rAJCC stage (%) |  |  |  |  |
| rI | 2093 (32.96) | 563 (31.52) | 43 (15.52) | 189 (26.29) |
| rII | 2234 (35.18) | 704 (39.42) | 99 (35.74) | 178 (24.76) |
| rIII | 2024 (31.87) | 519 (29.06) | 135 (48.74) | 352 (48.96) |
| Chemotherapy (%) |  |  |  |  |
| No/Unknown | 2734 (43.05) | 689 (38.58) | 180 (64.98) | 293(40.75) |
| Yes | 3617 (56.95) | 1097 (61.42) | 97 (35.02) | 426(59.25) |
| Radiotherapy (%) |  |  |  |  |
| No/Unknown | 3952 (62.23) | 1192 (66.74) | 247 (89.17) | 719(100.0) |
| Yes | 2399 (37.77) | 594 (33.26) | 30 (10.83) | / |
| LNs (median [IQR]) | 16 [10, 24] | 18 [12, 27] | 17 [10, 31] | 35 [26, 45] |
| pLNs (median [IQR]) | 1 [0, 4] | 0 [0, 3] | 2 [0, 7] | 2 [0, 7] |
| LNR (median [IQR]) | 0.019 [0.000, 0.250] | 0.000 [0.000, 0.200] | 0.162 [0.000, 0.500] | 0.053 [0.000, 0.227] |
| Median follow-up (months) | 50 [19, 77] | 30 [20, 37] | 18[11, 28] | 45 [20, 73] |
| 3-Y OS (95%CI) | 60.2(59.0-61.5) | 64.6(62.2-67.1) | 51.2(44.2-59.3) | 81.9(78.8-85.1) |
| 5-Y OS (95%CI) | 49.5(48.2-50.7) | / | 43.3(34.5-54.3) | 74.2(70.5-78.1) |

**Supplementary Table 2.** The rN staging for patients with gastric cancer in the Dataset 1 (Training set).

|  |  |  |
| --- | --- | --- |
| LNR-value | Log-rank (Mantel-Cox) | |
| χ²-value | P-value |
| 0~0.025 | - | - |
| 0.025~0.05 | 5.793 | 0.016 |
| 0.175~0.2 | 4.866 | 0.027 |
| 0.45~0.475 | 5.053 | 0.025 |
| 0.6~0.625 | 6.337 | 0.012 |

**Supplementary Table 3.** Survival comparisons among the 8th AJCC and rAJCC staging system in the Datasets 1,2,3 and 4.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Stage | AJCC | |  | rAJCC | |
|  |
| Dataset 1 | 5-Y OS (95%CI) | HR |  | 5-Y OS (95%CI) | HR |
| I | 75.6(73.6-77.6) | 1.0(Ref.) | rI | 82.7(81.1-84.3) | 1.0(Ref.) |
| II | 53.9(51.6-56.3) | 1.9 | rII | 63.7(61.8-65.8) | 2.0 |
| III | 28.4(26.7-30.2) | 3.9 | rIII | 32.9(30.9-35.1) | 4.6 |
| Dataset 2 | 3-Y OS (95%CI) | HR |  | 3-Y OS (95%CI) | HR |
| I | 83.5(80.1-87.2) | 1.0(Ref.) | rI | 83.2(79.9-86.6) | 1.0(Ref.) |
| II | 68.2(63.8-72.8) | 2.0 | rII | 67.9(64.1-71.9) | 2.0 |
| III | 50.4(46.7-54.5) | 3.9 | rIII | 40.5(36.1-45.3) | 4.9 |
| Dataset 3 | 5-Y OS (95%CI) | HR |  | 5-Y OS (95%CI) | HR |
| I | 75.8(60.2-95.4) | 1.0(Ref.) | rI | 76.8(61.8-95.4) | 1.0(Ref.) |
| II | 37.0(15.9-86.1) | 1.6 | rII | 46.6(28.2-76.9) | 1.6 |
| III | 34.2(24.7-47.1) | 2.9 | rIII | 29.8(20.1-44.1) | 3.2 |
| Dataset 4 | 5-Y OS (95%CI) | HR |  | 5-Y OS (95%CI) | HR |
| I | 92.1(87.4-97.1) | 1.0(Ref.) | rI | 92.9(88.6-97.4) | 1.0(Ref.) |
| II | 79.1(71.8-87.1) | 2.7 | rII | 80.5(73.7-88.0) | 2.7 |
| III | 63.8(58.4-69.8) | 5.7 | rIII | 60.8(55.0-67.2) | 6.9 |

**Supplementary Table 4.** Discrimination AUC comparison between rAJCC and 8th AJCCstaging system in different datasets

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dataset 1 | |  |  | Dataset 2 | |  |
| months | AUC(AJCC) | AUC(rAJCC) | | months | AUC(AJCC) | AUC(rAJCC) |
| 2.00 | 0.59 | 0.64 |  | 2.00 | 0.58 | 0.63 |
| 6.00 | 0.63 | 0.66 |  | 4.00 | 0.60 | 0.65 |
| 10.00 | 0.66 | 0.69 |  | 6.00 | 0.60 | 0.63 |
| 14.00 | 0.68 | 0.70 |  | 8.00 | 0.62 | 0.65 |
| 18.00 | 0.69 | 0.71 |  | 10.00 | 0.63 | 0.66 |
| 22.00 | 0.70 | 0.72 |  | 12.00 | 0.66 | 0.68 |
| 26.00 | 0.71 | 0.73 |  | 14.00 | 0.65 | 0.68 |
| 30.00 | 0.71 | 0.73 |  | 16.00 | 0.66 | 0.68 |
| 34.00 | 0.71 | 0.73 |  | 18.00 | 0.66 | 0.69 |
| 38.00 | 0.71 | 0.73 |  | 20.00 | 0.66 | 0.69 |
| 42.00 | 0.71 | 0.73 |  | 22.00 | 0.65 | 0.69 |
| 46.00 | 0.71 | 0.73 |  | 24.00 | 0.65 | 0.68 |
| 50.00 | 0.71 | 0.73 |  | 26.00 | 0.66 | 0.69 |
| 54.00 | 0.71 | 0.73 |  | 28.00 | 0.66 | 0.69 |
| 58.00 | 0.72 | 0.73 |  | 30.00 | 0.67 | 0.69 |
| 62.00 | 0.72 | 0.73 |  | 32.00 | 0.66 | 0.69 |
| 66.00 | 0.72 | 0.73 |  | 34.00 | 0.66 | 0.69 |
| 70.00 | 0.71 | 0.73 |  | 36.00 | 0.67 | 0.70 |
| 74.00 | 0.71 | 0.72 |  | 38.00 | 0.68 | 0.71 |
| 78.00 | 0.71 | 0.72 |  | 40.00 | 0.67 | 0.70 |
| 82.00 | 0.72 | 0.73 |  | 42.00 | 0.68 | 0.71 |
| 86.00 | 0.71 | 0.72 |  | 44.00 | 0.67 | 0.71 |
| 90.00 | 0.70 | 0.71 |  | 46.00 | 0.68 | 0.73 |
| 94.00 | 0.69 | 0.70 |  |  |  |  |
| 98.00 | 0.69 | 0.70 |  |  |  |  |
| 102.00 | 0.68 | 0.70 |  |  |  |  |
| 106.00 | 0.67 | 0.68 |  |  |  |  |
| 110.00 | 0.66 | 0.68 |  |  |  |  |
| 114.00 | 0.67 | 0.69 |  |  |  |  |
| 118.00 | 0.63 | 0.66 |  |  |  |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Dataset 3 | |  |  | Dataset 4 | |  |
| months | AUC(AJCC) | AUC(rAJCC) | | months | AUC(AJCC) | AUC(rAJCC) |
| 1.50 | 0.75 | 0.76 |  | 2.10 | 0.54 | 0.57 |
| 5.50 | 0.59 | 0.53 |  | 6.10 | 0.63 | 0.66 |
| 9.50 | 0.61 | 0.59 |  | 10.10 | 0.69 | 0.71 |
| 13.50 | 0.62 | 0.64 |  | 14.10 | 0.66 | 0.66 |
| 17.50 | 0.61 | 0.63 |  | 18.10 | 0.65 | 0.67 |
| 21.50 | 0.61 | 0.64 |  | 22.10 | 0.65 | 0.67 |
| 25.50 | 0.58 | 0.61 |  | 26.10 | 0.66 | 0.68 |
| 29.50 | 0.64 | 0.67 |  | 30.10 | 0.66 | 0.69 |
| 33.50 | 0.65 | 0.67 |  | 34.10 | 0.67 | 0.70 |
| 37.50 | 0.59 | 0.62 |  | 38.10 | 0.67 | 0.71 |
| 41.50 | 0.60 | 0.67 |  | 42.10 | 0.68 | 0.71 |
| 45.50 | 0.66 | 0.74 |  | 46.10 | 0.68 | 0.71 |
| 49.50 | 0.68 | 0.74 |  | 50.10 | 0.68 | 0.71 |
| 53.50 | 0.67 | 0.72 |  | 54.10 | 0.68 | 0.71 |
| 57.50 | 0.66 | 0.70 |  | 58.10 | 0.68 | 0.70 |
| 61.50 | 0.62 | 0.65 |  | 62.10 | 0.67 | 0.70 |
| 65.50 | 0.61 | 0.61 |  | 66.10 | 0.67 | 0.71 |
| 69.50 | 0.57 | 0.57 |  | 70.10 | 0.67 | 0.71 |
| 73.50 | 0.58 | 0.58 |  | 74.10 | 0.68 | 0.70 |
| 77.50 | 0.58 | 0.58 |  | 78.10 | 0.68 | 0.72 |
| 81.50 | 0.55 | 0.55 |  | 82.10 | 0.70 | 0.73 |
| 85.50 | 0.50 | 0.50 |  | 86.10 | 0.69 | 0.73 |
| 89.50 | 0.50 | 0.50 |  | 90.10 | 0.71 | 0.75 |
| 93.50 | 0.50 | 0.50 |  | 94.10 | 0.74 | 0.78 |
| 97.50 | 0.50 | 0.50 |  | 98.10 | 0.74 | 0.78 |
|  |  |  |  | 102.10 | 0.74 | 0.78 |
|  |  |  |  | 106.10 | 0.74 | 0.78 |
|  |  |  |  | 110.10 | 0.74 | 0.79 |
|  |  |  |  | 114.10 | 0.72 | 0.76 |
|  |  |  |  | 118.10 | 0.71 | 0.76 |

**Supplementary Table 5.** Survival comparisons among the 8th AJCC and rAJCC staging systems in patient with ELN count≥30.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Stage | AJCC stage | |  | rAJCC stage | |
|  |
| Internal validation set-1 | 5-Y OS(95%CI) | HR |  | 5-Y OS(95%CI) | HR |
| I | 85.3(80.6-90.3) | 1.0(Ref.) | rI | 82.0(77.2-87.0) | 1.0(Ref.) |
| II | 66.3(60.4-72.7) | 2.2 | rII | 59.6(54.8-64.7) | 2.4 |
| III | 35.8(31.8-40.2) | 5.3 | rIII | 26.6(22.2-32.0) | 6.0 |
| Internal validation set-2 | 3-Y OS(95%CI) | HR |  | 3-Y OS(95%CI) | HR |
| I | 88.7(80.9-97.2) | 1.0(Ref.) | rI | 86.9(79.8-94.6) | 1.0(Ref.) |
| II | 74.2(66.0-83.4) | 2.3 | rII | 72.2(65.2-80.0) | 1.9 |
| III | 56.0(48.7-64.3) | 4.6 | rIII | 44.7(35.6-56.3) | 5.1 |
| External validation set-1 | 3-Y OS(95%CI) | HR |  | 3-Y OS(95%CI) | HR |
| I | 90.0(73.2-100.0) | 1.0(Ref.) | rI | 90.9(75.4-100.0) | 1.0(Ref.) |
| II | 62.3(34.1-100.0) | 2.8 | rII | 74.6(53.0-100.0) | 1.9 |
| III | 49.7(35.4-69.8) | 5.9 | rIII | 33.9(19.5-58.9) | 10.3 |
| External validation set-2 | 5-Y OS(95%CI) | HR |  | 5-Y OS(95%CI) | HR |
| I | 93.4(87.7-99.5) | 1.0(Ref.) | rI | 96.5(93.2-99.9) | 1.0(Ref.) |
| II | 84.5(76.6-93.2) | 3.1 | rII | 93.7(88.9-98.7) | 2.6 |
| III | 67.8(61.2-75.2) | 8.1 | rIII | 73.4(67.1-80.2) | 8.9 |