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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
|  | **Training set** | | | |  | **Testing set** | |  | **Validation set** | |
|  | **112 Patients** | | | |  | **112 Patients** | |  | **48 Patients** | |
| **Factor** | No/mean±SD | | % | |  | No/mean±SD | % |  | No/mean±SD | % |
| Age (years) | | 42.1±11.6 | |  |  | 39.3±11.7 |  |  | 41.2±9.8 |  |
| <45 | | 63 | | 56.3 |  | 77 | 68.8 |  | 27 | 56.3 |
| ≥45 to ≤55  >55 | | 35  14 | | 31.3  12.5 |  | 25  10 | 22.3  8.9 |  | 19  2 | 39.6  4.2 |
| Sex | |  | |  |  |  |  |  |  |  |
| Female | | 76 | | 67.9 |  | 79 | 70.5 |  | 35 | 72.9 |
| Male | | 36 | | 32.1 |  | 33 | 29.5 |  | 13 | 27.1 |
| BMI (kg/m2) | | 23.3±3.4 | |  |  | 23.4±3.0 |  |  | 23.7±3.6 |  |
| <24 | | 65 | | 58.0 |  | 66 | 58.9 |  | 26 | 54.2 |
| ≥24 | | 47 | | 42.0 |  | 46 | 41.1 |  | 22 | 45.8 |
| Largest tumor size | | 28.7±10.0 | |  |  | 28.1±8.6 |  |  | 28.0±9.9 |  |
| >4 cm | | 16 | | 14.3 |  | 13 | 11.6 |  | 11 | 22.9 |
| ≥2 cm to ≤4 cm  <2 cm | | 78  18 | | 69.6  16.1 |  | 80  19 | 71.4  17.0 |  | 29  8 | 60.4  16.7 |
| Overall tumor size | | 32.7±11.5 | |  |  | 30.6±11.2 |  |  | 30.1±13.7 |  |
| >4 cm | | 29 | | 25.9 |  | 20 | 17.9 |  | 15 | 31.3 |
| ≥2 cm to ≤4 cm | | 70 | | 62.5 |  | 77 | 68.8 |  | 26 | 57.8 |
| <2 cm | | 13 | | 11.6 |  | 15 | 13.4 |  | 7 | 14.6 |
| Intra-thyroid PTC | | | |  |  |  |  |  |  |  |
| Single | | 94 | | 83.9 |  | 96 | 85.7 |  | 39 | 81.2 |
| Multiple | | 18 | | 16.1 |  | 16 | 14.3 |  | 9 | 18.8 |
| BRAF V600E mutation | |  | |  |  |  |  |  |  |  |
| Positive | | 40 | | 35.7 |  | 40 | 35.7 |  | 12 | 25.0 |
| Negative  Not tested | | 48  24 | | 42.9  21.4 |  | 42  30 | 37.5  26.8 |  | 19  17 | 39.6  35.4 |
| T classification | | | |  |  |  |  |  |  |  |
| T1 | | 2 | | 1.8 |  | 3 | 2.7 |  | 1 | 2.0 |
| T2 | | 10 | | 8.9 |  | 10 | 8.9 |  | 4 | 8.3 |
| T3 | | 24 | | 21.4 |  | 22 | 19.6 |  | 11 | 2.3 |
| T4a  T4b | | 43  33 | | 38.4  29.5 |  | 48  29 | 42.9  25.9 |  | 21  11 | 43.8  22.9 |
| N classification | |  | |  |  |  |  |  |  |  |
| N0 | | 7 | | 6.3 |  | 3 | 2.7 |  | 2 | 4.2 |
| N1a | | 21 | | 18.8 |  | 18 | 16.1 |  | 6 | 12.5 |
| N1b | | 84 | | 75.0 |  | 91 | 81.3 |  | 40 | 83.3 |
| Distant metastasis | | | |  |  |  |  |  |  |  |
| No | | 86 | | 76.8 |  | 87 | 77.7 |  | 36 | 75.0 |
| Yes | | 26 | | 23.2 |  | 25 | 22.3 |  | 12 | 25.0 |
| LMR | | 5.7±2.1 | |  |  | 5.9±2.0 |  |  | 5.4±2.8 |  |
| **Supplemental Table 1. Baseline demographics and clinicopathological characteristics of PTC patients.**  Different age ratios may exist among these three set.  Abbreviations: BMI, body mass index; T, tumor invasion depth; N, lymph node involvement, TNM, tumor node metastasis; LMR, lymphocyte-to-monocyte ratio. | | | | | | | | | | |

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|  |  | **PTC-free Survival** | | | | | | | | | | |
|  |  | **Training set** | |  | **Testing set** | |  | **Validation set** | | | | |
| Factors |  | HR (95% CI) | *P* | HR (95% CI) | *P* | HR (95% CI) | *P* | | |
| Age (years) |  |  | 0.986 |  |  | 0.661 |  |  | | | 0.187 | |
| ≤55 |  | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | | |  | |
| >55 |  | 1.008 (0.419 to 2.423) |  |  | 1.232 (0.485 to 3.131) |  |  | 2.702 (0.617 to 11.840) | | |  | |
| Gender |  |  | 0.705 |  |  | 0.200 |  |  | | | 0.475 | |
| Female |  | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | | |  | |
| Male |  | 1.147 (0.564 to 2.331) |  |  | 0.667 (0.359 to 1.239) |  |  | 0.715 (0.285 to 1.794) | | |  | |
| BMI (kg/m2) | |  | 0.791 |  |  | 0.304 |  |  | | | 0.962 | |
| <24 | | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | | |  | |
| ≥24 | | 1.093 (0.566 to 2.110) |  |  | 1.369 (0.752 to 2.494) |  |  | 1.022 (0.422 to 2.472) | | |  | |
| Largest tumor size | |  | 0.016\* |  |  | 0.017\* |  |  | | | 0.045\* | |
| <4 cm | | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | | |  | |
| ≥4 cm | | 2.461 (1.184 to 5.114) |  |  | 1.430 (1.083 to 2.389) |  |  | 1.811(1.094 to 4.722) | | |  | |
| Total tumor size | |  | 0.021\* |  |  | 0.863 |  |  | | | 0.557 | |
| <4 cm | | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | | |  | |
| ≥4 cm | | 2.199 (1.123 to 4.306) |  |  | 1.070 (0.496 to 2.309) |  |  | 1.317 (0.525 to 3.306) | | |  | |
| Intra-thyroid PTC |  |  | 0.160 |  |  | 0.138 |  |  | | | 0.694 | |
| Single |  | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | | |  | |
| Multiple |  | 1.609 (0.829 to 3.123) |  |  | 1.622 (0.857 to 3.073) |  |  | 1.226 (0.445 to 3.374) | | |  | |
| T classification |  |  | 0.013\* |  |  | 0.259 |  |  | | | 0.948 | |
| T1-T3 |  | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | | |  | |
| T4 |  | 3.314 (1.288 to 8.529) |  |  | 1.484 (0.748 to 2.944) |  |  | 0.970 (0.386 to 2.436) | | |  | |
| N classification |  |  | 0.069 |  |  | 0.622 |  |  | | | 0.814 | |
| N0/N1a |  | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | | |  | |
| N1b |  | 2.401 (0.933 to 6.177) |  |  | 1.226 (0.545 to 2.755) |  |  | 1.158 (0.339 to 3.956) | | |  | |
| Distant metastasis |  |  | 0.031\* |  |  | <0.001\* |  |  | | | 0.023\* | |
| No |  | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | | |  | |
| Yes |  | 2.377(1.664 to 8.856) |  |  | 3.470 (1.853 to 6.496) |  |  | 2.850 (1.158 to 7.011) | | |  | |
| LNM number |  |  | 0.086 |  |  | 0.228 |  |  | | | 0.278 | |
| <15 |  | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | | |  | |
| ≥15 |  | 1.781 (0.922 to 3.442) |  |  | 1.463 (0.788 to 2.718) |  |  | 1.699 (0.652 to 4.430) | | |  | |
| Largest LNM diameter |  |  | 0.008\* |  |  | 0.048\* |  |  | | 0.011\* | | | |
| <3 cm |  | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | |  | | | |
| ≥3 cm |  | 2.432 (1.259 to 4.699) |  |  | 1.689(1.180 to 3.238) |  |  | 2.909(1.641 to 4.036) | |  | | | |
| Preoperative LMR |  |  | 0.048\* |  |  | 0.018\* |  |  | | 0.042\* | | | |
| Low |  | 1 (reference) |  |  | 1 (reference) |  |  | 1 (reference) | | |  | |
| High |  | 0.466 (0.219 to 0.993) |  |  | 0.436 (0.219 to 0.867) |  |  | 0.420 (0.174 to 0.915) | | |  | |
|  |  |  |  |  |  |  |  |  | | |  | |

**Supplemental Table 2.** Univariate Cox regression analyses of PTC-free survival in three sets of high-risk PTC patients. The largest tumor size, distant metastasis, largest LNM diameter,

and preoperative LMR were risk factors for PTC-free survival in the 3 sets, and the total tumor size and T classification were identified as risk factors in only the training set.

**Abbreviations:** HR, hazard ratio; 95% CI, 95% confidence interval; T, tumor invasion depth; N, lymph node involvement; LNM, lymph node metastasis.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sets  Variables | **Training Set**  HR 95% CI P value | | | | **Testing Set**  HR 95% CI P value | | | | **Validation** **Set**  HR 95% CI P value | | | **Combined Set**  HR 95% CI P value | | |
| Largest tumor size (<4/≥4 cm)  Total tumor size (<4/≥4 cm)  T stage (T1-3/T4)  Distant metastasis (No/Yes)  Largest LNM diameter(<3/>3 cm)  Preoperative LMR (High/low) | | | 1.131  0.986  2.599  1.148  1.993  3.714 | 1.041-2.852  0.295-3.295  1.091-6.955  1.146-4.211  1.006-3.947  1.724-12.441 | 0.049\*  0.981  0.047\*  0.016\*  0.048\*  0.018\* | 2.432  1.375  1.286  3.213  1.500  3.504 | 1.481-12.301  1.108-6.643  0.629-2.629  1.690-6.109  1.167-2.954  1.236-11.077 | 0.038\*  0.042\*  0.491  <0.001\*  0.024\*  0.037\* | 7.411  6.993  0.625  3.722  1.726  2.449 | | 1.001-73.979  0.577-83.333  0.220-1.770  1.311-10.568  1.154-7.180  1.050-3.848 | 0.050\*  0.126  0.376  0.014\*  0.034\*  0.049\* | 2.881  0.662  1.459  1.975  2.234  3.754 | 1.794-4.407  0.298-1.475  0.903-2.358  1.287-3.031  1.065-4.686  1.089-13.322 | 0.045\*  0.313  0.123  0.002\*  0.033\*  0.021\* | |

**Supplemental Table 3. Multivariate Cox regression analyses of PTC-free survival in the training, testing, validation, and combined sets.** The largest tumor size, distant metastasis, largest LNM diameter, and preoperative LMR were identified as independent prognostic factors associated with overall survival in the 3 sets and in the pooled analysis, respectively.