**Supplementary materials**



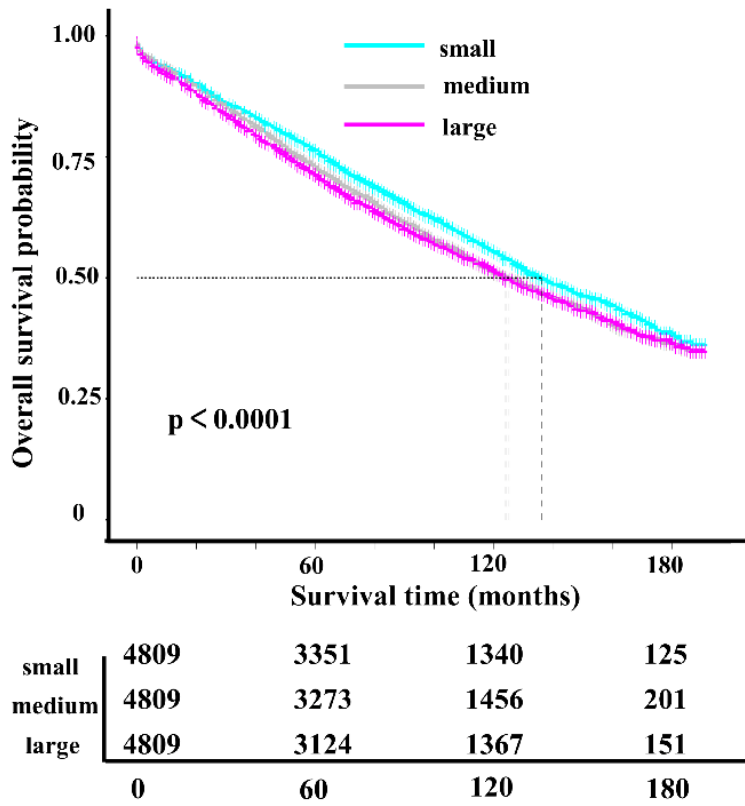| | | | |
|---|---|---|---|
| small | 4809 | 3351 | 1340 | 125 |
| medium | 4809 | 3273 | 1456 | 201 |
| large | 4809 | 3124 | 1367 | 151 |
| | 0 | 60 | 120 | 180 |

**Figure S1.** Kaplan-Meier analysis of OS between three tumor size groups from SEER database after PSM.
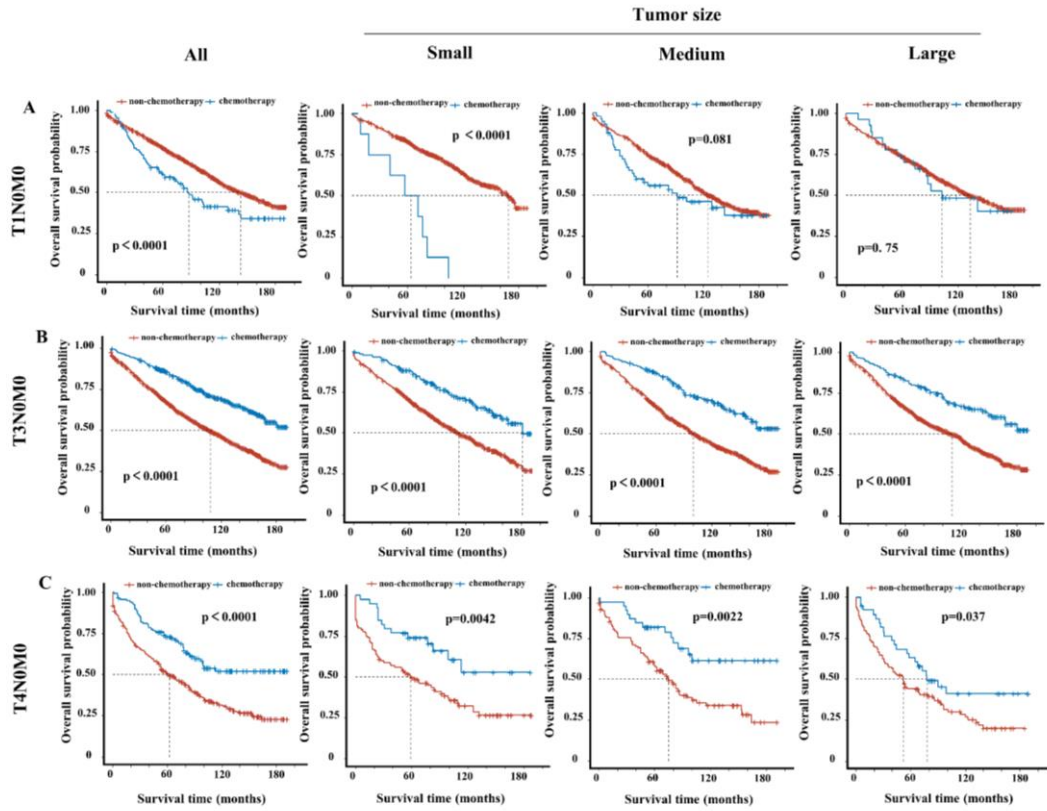
**Figure S2**. OS curve of chemotherapy group vs. non-chemotherapy group before PSM in (A) T1N0M0 patients, (B) T3N0M0 patients and (C) T4N0M0 patients among overall and three tumor size groups.
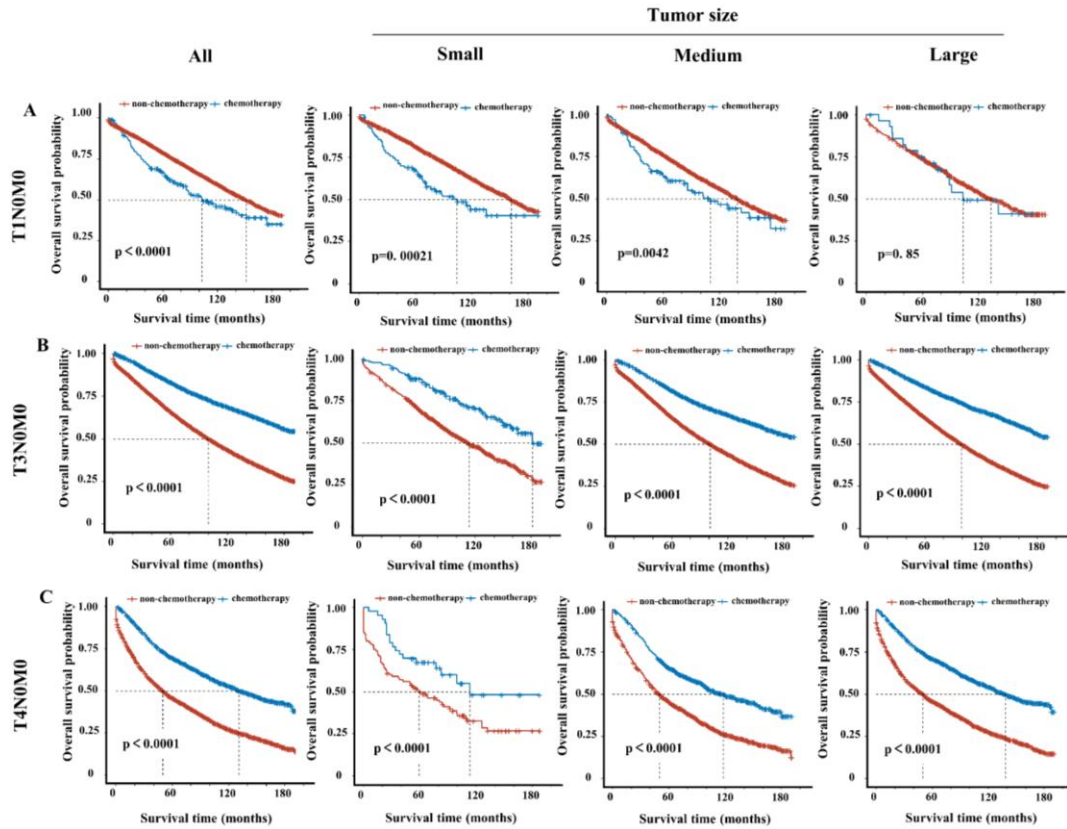
**Figure S3.** OS curve of chemotherapy group vs. non-chemotherapy group after PSM in (A) T1N0M0 patients, (B) T3N0M0 patients and (C) T4N0M0 patients among overall and three tumor size groups.

**Table S1.** Descriptive analysis of the validation cohort

| Variables | cases(n=168) | percentage |
|---|---|---|
| Gender | | |
| Male | 83 | 49.41% |
| Female | 85 | 50.60% |
| Age | | 0.00% |
| ≤65 | 79 | 47.02% |
| > 65 | 89 | 52.98% |
| Histology | | 0.00% |
| Classical adenocarcinoma | 146 | 86.91% |
| Other types | 22 | 13.10% |
| Grade | | 0.00% |
| I/II | 136 | 80.95% |
| III/IV | 32 | 19.05% |
| Tumor size | | 0.00% |
| ≤16mm | 9 | 5.36% |
| 16-49mm | 88 | 52.38% |
| >49mm | 71 | 42.26% |
| T stage | | 0.00% |
| T1 | 10 | 5.95% |
| T2 | 55 | 32.74% |
| T3 | 83 | 49.41% |
| T4 | 20 | 11.91% |
| Chemotherapy | | 0.00% |
| No/Unknown | 62 | 36.91% |
| Yes | 106 | 63.10% |

**Table S2.** Subgroup analyses of OS between three tumor size groups

| Character | Median OS (months) | | | Hazard ratio (95%CI) medium refer to small | p-value | Hazard ratio (95%CI) large refer to small | p-value |
|---|---|---|---|---|---|---|---|
| | small tumor | medium tumor | large tumor | | | | |
| Gender | | | | | | | |
| Male | 148 | 111 | 109 | 1.42 (1.363-1.480) | <0.001 | 1.462 (1.401-1.526) | <0.001 |
| Female | 159 | 121 | 106 | 1.407 (1.347-1.469) | <0.001 | 1.636 (1.565-1.711) | <0.001 |
| Race | | | | | | | |
| White | 149 | 112 | 103 | 1.414 (1.369-1.461) | <0.001 | 1.553 (1.501-1.606) | <0.001 |
| Black | 154 | 129 | 122 | 1.286 (1.170-1.414) | <0.001 | 1.374 (1.246-1.514) | <0.001 |
| Others | 158 | 154 | 151 | 1.524 (1.346-1.726) | <0.001 | 1.666 (1.464-1.896) | <0.001 |
| Age | | | | | | | |
| ≤65 | NA | NA | NA | 1.346 (1.252-1.447) | <0.001 | 1.563 (1.452-1.682) | <0.001 |
| >65 | 110 | 87 | 76 | 1.313 (1.271-1.357) | <0.001 | 1.509 (1.459-1.561) | <0.001 |
| Histology | | | | | | | |
| Classical adenocarcinoma | 157 | 118 | 109 | 1.412 (1.369-1.457) | <0.001 | 1.543 (1.494-1.593) | <0.001 |
| Mucinous adenocarcinoma | 124 | 101 | 100 | 1.217 (1.074-1.379) | 0.00209 | 1.231 (1.088-1.392) | <0.001 |
| Signet-ring cell carcinoma | 135 | 107 | 100 | 1.177 (0.6954-1.991) | 0.544 | 1.269 (0.7589-2.122) | 0.364 |
| Other types | 139 | 110 | 73 | 1.393 (0.7448-2.604) | 0.2997 | 2.085 (1.1384-3.819) | 0.0173 |
| Grade | | | | | | | |
| I (Well) | 157 | 125 | 117 | 1.375 (1.282-1.475) | <0.001 | 1.488 (1.378-1.608) | <0.001 |
| II (Moderately) | 156 | 117 | 110 | 1.408 (1.359-1.459) | <0.001 | 1.506 (1.451-1.563) | <0.001 |
| III (Poorly) | 132 | 104 | 95 | 1.312 (1.184-1.455) | <0.001 | 1.458 (1.317-1.615) | <0.001 |
| IV (Undifferentiated) | 107 | 104 | 94 | 1.058 (0.7933-1.411) | 0.7011 | 1.302 (0.9821-1.726) | 0.0666 |
| T stage | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| T1 | 161 | 139 | 133 | 1.254(1.193-1.318) | <0.001 | 1.316(1.181-1.465) | <0.001 |
| T2 | 137 | 126 | 126 | 1.127(1.057-1.202) | <0.001 | 1.161(1.079-1.250) | <0.001 |
| T3 | 125 | 110 | 110 | 1.113(1.027-1.205) | 0.00872 | 1.113(1.028-1.206) | 0.00839 |
| T4 | 81 | 75 | 64 | 1.1 (0.8837-1.368) | 0.394 | 1.02 (0.8216-1.267) | 0.857 |
| Primary site | | | | | | | |
| Right colon | 137 | 110 | 105 | 1.334 (1.284-1.386) | <0.001 | 1.415 (1.361-1.471) | <0.001 |
| Left colon | 172 | 131 | 115 | 1.48 (1.410-1.554) | <0.001 | 1.692 (1.608-1.781) | <0.001 |

Abbreviations: OS, overall survival; CI, confidence interval; NA, not available.

**Table S3.** Subgroup analyses of OS between three tumor size groups after PSM

| Variables | After PSM | | | | |
|---|---|---|---|---|---|
| | C-index | | | | |
| | ALL | T1N0M0 | T2N0M0 | T3N0M0 | T4N0M0 |
| Histology | 0.508 | 0.514 | 0.504 | 0.507 | 0.52 |
| Grade | 0.511 | 0.516 | 0.507(p>0.05) | 0.515(p>0.05) | 0.547 |
| Tumor size | 0.519 | 0.543 | 0.517 | 0.512(p>0.05) | 0.543(p>0.05) |
| T stage | 0.533 | - | - | - | - |
| Primary site | 0.516 | 0.512 | 0.521 | 0.514 | 0.535 |