**Supplementary Table 1.** Standardized mean differences for baseline covariates after propensity score matching

|  |  |
| --- | --- |
| Variable | After PSM |
| **Upfront surgery** | **NAT** | **SMD** |
| ***n* = 152 (%)** | ***n* = 152 (%)** |
| Age |  |  |  |
|  < 50 years |  15 (9.9)  |  16 (10.5)  | 0.099 |
|  50 - 64 years |  67 (44.1)  |  65 (42.8)  |
|  65 - 74 years |  54 (35.5)  |  50 (32.9)  |
|  ≥ 75 years |  16 (10.5)  |  21 (13.8)  |
| Sex |  |  |  |
|  Female |  72 (47.4)  |  76 (50.0)  | 0.053 |
|  Male |  80 (52.6)  |  76 (50.0)  |
| Year of diagnosis |  |  |  |
|  2004 - 2009 |  50 (32.9)  |  43 (28.3)  | 0.100 |
|  2010 - 2015 | 102 (67.1)  | 109 (71.7)  |
| Median household income (inflation adjust to 2022) |  |  |  |
|  < $40,000 - $59,999 |  26 (17.1)  |  26 (17.1)  | 0.089 |
|  $60,000 - $89,999 |  74 (48.7)  |  80 (52.6)  |
|  ≥ $90,000 |  52 (34.2)  |  46 (30.3)  |
| Tumor site |  |  |  |
|  Head |  97 (63.8)  |  94 (61.8)  | 0.068 |
|  Body/Tail |  29 (19.1)  |  28 (18.4)  |
|  Overlapping/Other |  26 (17.1)  |  30 (19.7)  |
| Grade |  |  |  |
|  I: Well differentiated  |  15 (9.9)  |  14 (9.2)  | 0.099 |
|  II: Moderately differentiated |  57 (37.5)  |  56 (36.8)  |
|  III: Poorly differentiated |  36 (23.7)  |  38 (25.0)  |
|  IV: Undifferentiated |  1 (0.7)  |  0 (0.0)  |
|  Unknown |  43 (28.3)  |  44 (28.9)  |
| N stage |  |  |  |
|  N0 |  68 (44.7)  |  58 (38.2)  | 0.098 |
|  N1 |  84 (55.3)  |  93 (61.2)  |
|  NX |  0 (0.0)  |  1 (0.7)  |
| AT |  90 (59.2)  |  89 (58.6)  | 0.013 |

Categorical variables were presented as n (%).

NAT; neoadjuvant therapy; AT, adjuvant therapy; PSM, propensity score matching; SMD, standardized mean difference

**Supplementary Table 2.** Comparison of baseline characteristics and survival probabilities between neoadjuvant chemotherapy and neoadjuvant chemoradiation therapy for T4 pancreatic ductal adenocarcinoma patients

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | NAC | NACRT | *P* value |
| ***n* = 83 (%)** | ***n* = 158 (%)** |
| Age |  |  |  |
|  < 50 years |  9 (10.8)  |  17 (10.8)  | 0.191 |
|  50 - 64 years | 33 (39.8)  |  83 (52.5)  |
|  65 - 74 years | 34 (41.0)  |  44 (27.8)  |
|  ≥ 75 years |  7 (8.4)  |  14 (8.9)  |
| Sex |  |  |  |
|  Female | 44 (53.0)  |  71 (44.9)  | 0.291 |
|  Male | 39 (47.0)  |  87 (55.1)  |
| Year of diagnosis |  |  |  |
|  2004 - 2009 |  9 (10.8)  |  36 (22.8)  | **0.037** |
|  2010 - 2015 | 74 (89.2)  | 122 (77.2)  |
| Median household income (inflation adjust to 2022) |  |  |  |
|  < $40,000 - $59,999 | 10 (12.0)  |  28 (17.7)  | 0.504 |
|  $60,000 - $89,999 | 46 (55.4)  |  84 (53.2)  |
|  ≥ $90,000 | 27 (32.5)  |  46 (29.1)  |
| Tumor site |  |  |  |
|  Head | 51 (61.4)  |  98 (62.0)  | 0.944 |
|  Body/Tail | 17 (20.5)  |  34 (21.5)  |
|  Overlapping/Other | 15 (18.1)  |  26 (16.5)  |
| Grade |  |  |  |
|  I: Well differentiated  |  6 (7.2)  |  15 (9.5)  | 0.642 |
|  II: Moderately differentiated | 24 (28.9)  |  48 (30.4)  |
|  III: Poorly differentiated | 12 (14.5)  |  30 (19.0)  |
|  IV: Undifferentiated |  0 (0.0)  |  1 (0.6)  |
|  Unknown | 41 (49.4)  |  64 (40.5)  |
| N stage |  |  |  |
|  N0 | 36 (43.4)  |  76 (48.1)  | 0.573 |
|  N1 | 47 (56.6)  |  82 (51.9)  |
|  NX |  0 (0.0)  |  0 (0.0)  |
| AT | 32 (38.6)  |  68 (43.0)  | 0.594 |
| Median survival duration (month, range) | 26 [3, 103] | 27 [3, 117] | 0.579 |
| 1-year survival probability (95% CI) | 0.830 [0.753, 0.915] | 0.867 [0.816, 0.922] | - |
| 2-year survival probability (95% CI) | 0.537 [0.439, 0.657] | 0.588 [0.516, 0.700] | - |
| 3-year survival probability (95% CI) | 0.354 [0.264, 0.474] | 0.403 [0.333, 0.487] | - |
| 4-year survival probability (95% CI) | 0.281 [0.198, 0.397] | 0.281 [0.219, 0.361] | - |
| 5-year survival probability (95% CI) | 0.195 [0.126, 0.303] | 0.198 [0.145, 0.271] | - |

Continuous variables were presented as median [range]; Categorical variables were presented as n (%); Survival probabilities were presented with 95% CI.

*P* values of categorical variables were calculated by χ2 or Fisher’s exact test; *P* values of median follow-up duration were calculated by Log-rank test. Bold values indicate statistical significance at the *P* < 0.05 level.

NAC, neoadjuvant chemotherapy; NACRT, neoadjuvant chemoradiotherapy; AT, adjuvant therapy; CI, confidence interval

**Supplementary Table 3.** Comparison of baseline characteristics and survival probabilities between neoadjuvant therapy with and without adjuvant therapy for T4 pancreatic ductal adenocarcinoma patients

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | NAT without AT | NAT with AT | *P* value |
| ***n* = 141 (%)** | ***n* = 100 (%)** |
| Age |  |  |  |
|  < 50 years |  12 (8.5)  |  14 (14.0)  | 0.479 |
|  50 - 64 years |  72 (51.1)  |  44 (44.0)  |
|  65 - 74 years |  44 (31.2)  |  34 (34.0)  |
|  ≥ 75 years |  13 (9.2)  |  8 (8.0)  |
| Sex |  |  |  |
|  Female |  67 (47.5)  |  48 (48.0)  | 1.000 |
|  Male |  74 (52.5)  |  52 (52.0)  |
| Year of diagnosis |  |  |  |
|  2004 - 2009 |  20 (14.2)  |  25 (25.0)  | 0.051 |
|  2010 - 2015 | 121 (85.8)  |  75 (75.0)  |
| Median household income (inflation adjust to 2022) |  |  |  |
|  < $40,000 - $59,999 |  25 (17.7)  |  13 (13.0)  | 0.442 |
|  $60,000 - $89,999 |  77 (54.6)  |  53 (53.0)  |
|  ≥ $90,000 |  39 (27.7)  |  34 (34.0)  |
| Tumor site |  |  |  |
|  Head |  90 (63.8)  |  59 (59.0)  | 0.213 |
|  Body/Tail |  32 (22.7)  |  19 (19.0)  |
|  Overlapping/Other |  19 (13.5)  |  22 (22.0)  |
| Grade |  |  |  |
|  I: Well differentiated  |  11 (7.8)  |  10 (10.0)  | 0.299 |
|  II: Moderately differentiated |  36 (25.5)  |  36 (36.0)  |
|  III: Poorly differentiated |  25 (17.7)  |  17 (17.0)  |
|  IV: Undifferentiated |  1 (0.7)  |  0 (0.0)  |
|  Unknown |  68 (48.2)  |  37 (37.0)  |
| N stage |  |  |  |
|  N0 |  71 (50.4)  |  41 (41.0)  | 0.192 |
|  N1 |  70 (49.6)  |  59 (59.0)  |
|  NX |  0 (0.0)  |  0 (0.0)  |
| NAT modality |  |  |  |
|  NAC |  51 (36.2)  |  32 (32.0)  | 0.594 |
|  NACRT |  90 (63.8)  |  68 (68.0)  |
| Median survival duration (month, range) | 27 [3, 106] | 27 [6, 117] | 0.524 |
| 1-year survival probability (95% CI) | 0.865 [0.810, 0.923] | 0.840 [0.771, 0.915] | - |
| 2-year survival probability (95% CI) | 0.572 [0.495, 0.660] | 0.569 [0.480, 0.675] | - |
| 3-year survival probability (95% CI) | 0.414 [0.340, 0.505] | 0.346 [0.263, 0.453] | - |
| 4-year survival probability (95% CI) | 0.293 [0.226, 0.379] | 0.264 [0.190, 0.367] | - |
| 5-year survival probability (95% CI) | 0.214 [0.156, 0.294] | 0.173 [0.112, 0.266] | - |

Continuous variables were presented as median [range]; Categorical variables were presented as n (%); Survival probabilities were presented with 95% CI.

*P* values of categorical variables were calculated by χ2 or Fisher’s exact test; *P* values of median follow-up duration were calculated by Log-rank test. Bold values indicate statistical significance at the *P* < 0.05 level.

NAC, neoadjuvant chemotherapy; NACRT, neoadjuvant chemoradiotherapy; AT, adjuvant therapy; CI, confidence interval



**Supplementary Figure 1**. Forest plot of covariate associations with overall survival in T4 pancreatic ductal adenocarcinoma (AT, adjuvant therapy; NAT, neoadjuvant therapy; PSM, propensity score matching; HR, hazard ratio; CI, confidence interval).