**Supplementary Table S1** Patient and tumour characteristics according to muscle change (n = 245).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Characteristics** | **SMI loss (n = 50)** | **Stable SMI (n = 147)** | **SMI gain (n = 48)** | ***p*-value** |
| **Age (years), mean ± SD** | 64.8 ± 12.7 | 62.9 ± 12.7 | 61.2 ± 12.8 | 0.39 |
| **ECOG performance status, n (%)** |  |  |  | 0.84 |
|  0 | 44 (88.0) | 132 (89.8) | 44 (91.7) |  |
|  1 | 6 (12.0) | 15 (10.2) | 4 (8.3) |  |
| **Weight (kg), mean ± SD** | 57.1 ± 10.4 | 57.7 ± 8.6 | 58.3 ± 11.8 | 0.82 |
| **Pre-treatment WHO BMI (kg/m2), mean ± SD** | 23.3 ± 4.3 | 23.3 ± 3.7 | 23.6 ± 5.2 | 0.91 |
| **Pre-treatment WHO BMI categories (kg/m2), n (%)** |  |  |  | 0.86 |
|  < 18.5 | 7 (14.0) | 18 (12.2) | 9 (18.8) |  |
|  18.5-24.9 | 26 (52.0) | 76 (51.7) | 23 (47.9) |  |
|  ≥ 25 | 17 (34.0) | 53 (36.1) | 16 (33.3) |  |
| **Pre-treatment sarcopenia, n (%)** | 23 (46.0) | 79 (53.7) | 25 (52.1) | 0.64 |
| **SMD change (HU), mean ± SD** | -1.6 ± 4.0 | -0.1 ± 3.8 | 0.2 ± 3.9 | 0.03 |
| **SATI change (%/150 days), mean ± SD**  | -5.9 ± 15.5 | -2.5 ± 15.5 | -0.1 ± 13.3 | 0.16 |
| **VATI change (%/150 days), mean ± SD**  | -5.5 ± 14.1 | -1.3 ± 19.9 | 1.4 ± 18.2 | 0.18 |
| **Smoking, n (%)** |  |  |  | 0.41 |
|  No (never smoked or quitted) | 36 (72.0) | 119 (81.0) | 38 (79.2) |  |
|  Yes (current smoker) | 14 (28.0) | 28 (19.0) | 10 (20.8) |  |
| **FIGO stage, n (%)** |  |  |  | 0.77 |
|  IB-II | 37 (74.0) | 109 (74.1) | 38 (79.2) |  |
|  III-IVA | 13 (26.0) | 38 (25.9) | 10 (20.8) |  |
| **Pathology, n (%)** |  |  |  | 0.004 |
|  Squamous cell carcinoma | 37 (74.0) | 136 (92.5) | 42 (87.5) |  |
|  Adenocarcinoma | 13 (26.0) | 11 (7.5) | 6 (12.5) |  |
| **PLNs involvement, n (%)** |  |  |  | 0.69 |
|  Positive | 20 (40.0) | 69 (46.9) | 21 (43.8) |  |
|  Negative | 30 (60.0) | 78 (53.1) | 27 (56.3) |  |
| **Radiation field, n (%)** |  |  |  | 0.002 |
|  Extended-field radiotherapy | 13 (26.0) | 77 (52.4) | 27 (56.3) |  |
|  Pelvic radiotherapy | 37 (74.0) | 70 (47.6) | 21 (43.8) |  |
| **Hb** |  |  |  | 0.58 |
| ≥ 10 mmol/L | 39 (78.0) | 124 (84.4) | 39 (81.3) |  |
|  < 10 mmol/L | 11 (22.0) | 23 (15.6) | 9 (18.8) |  |
| **SCC-Ag level, n (%)** |  |  |  | 0.88 |
|  > 10 ng/mL  | 19 (38.0) | 50 (34.0) | 17 (35.4) |  |
|  ≤ 10 ng/mL  | 31 (62.0) | 97 (66.0) | 31 (64.6) |  |
| **Chemotherapy, n (%)** |  |  |  | 0.03 |
|  Yes  | 38 (76.0) | 129 (87.8) | 45 (93.8) |  |
|  No | 12 (24.0) | 18 (12.2) | 3 (6.3) |  |
| **CCRT weekly chemotherapy cycles, n (%)** | n = 38 | n = 129 | n = 45 | 0.78 |
|  5-6 | 29 (76.3) | 98 (76.0) | 33 (73.3) |  |
|  1-4 | 9 (23.7) | 31 (24.0) | 12 (26.7) |  |
| **Overall treatment duration (day), median (range)** | 59 (43-79) | 59 (44-79) | 59 (44-65) | 0.73 |

Abbreviations: BMI, body mass index; CCRT, concurrent chemoradiotherapy; ECOG, Eastern Cooperative Oncology Group; FIGO, International Federation of Gynecology and Obstetrics; Hb, haemoglobin level; PLN, pelvic lymph node; SCC-Ag, Squamous cell carcinoma antigen; SD, standard deviation; SMI, skeletal muscle index.

**Supplementary Table S2** Univariable Cox proportional hazards model for overall survival and cancer-specific survival (n = 245).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Overall survival** |  |  | **Cancer-specific survival** |  |
| **Variable** | **Hazard ratio (95% CI)** | ***p*-value** |  | **Hazard ratio (95% CI)** | ***p*-value** |
| **Age, continuous** | 1.02 (0.99-1.05) | 0.07 |  | 1.01 (0.98-1.03) | 0.68 |
| **ECOG performance status** |  |  |  |  |  |
| 0 | Reference |  |  | Reference |  |
|  1 | 1.40 (0.60-3.31) | 0.44 |  | 0.96 (0.29-3.15) | 0.95 |
| **Pre-treatment BMI, categorical** |  |  |  |  |  |
| 18.5-24.9 kg/m2 | Reference |  |  | Reference |  |
| <18.5 kg/m2 | 1.37 (0.61-3.06) | 0.45 |  | 1.68 (0.69-4.08) | 0.25 |
| ≥25.0 kg/m2 | 0.94 (0.49-1.79) | 0.84 |  | 0.83 (0.37-1.88) | 0.66 |
| **Pre-treatment SMI, categorical** |  |  |  |  |  |
|  Non-sarcopenia | Reference |  |  | Reference |  |
|  Sarcopenia | 1.13 (0.63-2.02) | 0.68 |  | 0.93 (0.47-1.86) | 0.83 |
| **SMI change, categorical** |  |  |  |  |  |
|  SMI stable (± 10.0%) | Reference |  |  | Reference |  |
|  SMI loss (> –10.0%) | 8.05 (4.23-15.33) | <0.001 |  | 6.25 (2.92-13.39) | <0.001 |
|  SMI gain (> +10.0%) | 0.86 (0.28-2.62) | 0.79 |  | 1.09 (0.35-3.41) | 0.89 |
| **Pre-treatment SMD, categorical** |  |  |  |  |  |
|  High SMD | Reference |  |  | Reference |  |
|  Low SMD | 1.44 (0.76-2.74) | 0.27 |  | 1.08 (0.52-2.24) | 0.84 |
| **SMD change, per 1 HU increase** | 0.80 (0.74-0.88) | <0.001 |  | 0.85 (0.76-0.94) | 0.001 |
| **Pre-treatment SATIa, categorical** |  |  |  |  |  |
|  High SATI | Reference |  |  | Reference |  |
|  Low SATI | 1.89 (0.94-3.80) | 0.08 |  | 1.83 (0.79-4.24) | 0.16 |
| **SATI change (%/150 days)** | 0.99 (0.97-1.01) | 0.13 |  | 0.99 (0.97-1.02) | 0.56 |
| **Pre-treatment VATIa, categorical** |  |  |  |  |  |
|  High VATI | Reference |  |  | Reference |  |
|  Low VATI | 1.14 (0.61-2.14) | 0.68 |  | 1.10 (0.52-2.33) | 0.80 |
| **VATI change (%/150 days)** | 0.99 (0.98-1.01) | 0.38 |  | 1.00 (0.98-1.02) | 0.75 |
| **Smoking** |  |  |  |  |  |
| No (never smoked or quitted) | Reference |  |  | Reference |  |
|  Yes (current smoker) | 1.45 (0.76-2.76) | 0.26 |  | 1.64 (0.78-3.46) | 0.20 |
| **FIGO stage** |  |  |  |  |  |
| IB-II | Reference |  |  | Reference |  |
| III-IVA | 1.89 (1.03-3.47) | 0.04 |  | 2.13 (1.04-4.37) | 0.04 |
| **PLN status** |  |  |  |  |  |
|  Negative | Reference |  |  | Reference |  |
|  Positive | 1.03 (0.58-1.85) | 0.92 |  | 1.53 (0.76-3.06) | 0.23 |
| **Radiation field** |  |  |  |  |  |
| Pelvic radiotherapy | Reference |  |  | Reference |  |
| Extended-field radiotherapy | 0.39 (0.20-0.76) | 0.005 |  | 0.30 (0.13-0.70) | 0.005 |
| **Pathology** |  |  |  |  |  |
| SCC | Reference |  |  | Reference |  |
|  Adenocarcinoma | 3.15 (1.59-6.23) | 0.001 |  | 3.91 (1.79-8.52) | 0.001 |
| **Hb** |  |  |  |  |  |
| ≥ 10 mmol/L | Reference |  |  | Reference |  |
|  < 10 mmol/L | 1.30 (0.63-2.70) | 0.48 |  | 1.25 (0.51-3.03) | 0.63 |
| **Chemotherapy** |  |  |  |  |  |
| No | Reference |  |  | Reference |  |
| Yes | 0.31 (0.16-0.59) | <0.001 |  | 0.90 (0.31-2.56) | 0.84 |

Abbreviations: BMI, body mass index; CI, confidence interval; ECOG, Eastern Cooperative Oncology Group; FIGO, International Federation of Gynecology and Obstetrics; Hb, haemoglobin level; HU, Hounsfield unit; PLN, pelvic lymph node; SATI, subcutaneous adipose tissue index; SCC, squamous cell carcinoma; SMD, skeletal muscle density; SMI, skeletal muscle index; VATI, visceral adipose tissue index.

aSATI < 67.3 cm2/m2 and VATI < 41.6 cm2/m2 were defined as low SATI and VATI, respectively.

**Supplementary Table S3** Univariable and multivariable Cox proportional hazards model for overall survival and cancer-specific survival for patients with squamous cell carcinoma (n = 215).

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Overall survival** |  | **Cancer-specific survival** |
|  | Univariable |  |  | Multivariable |  |  | Univariable |  |  | Multivariable |  |
| **Variable** | Hazard ratio (95% CI) | *p*-value |  | Hazard ratio (95% CI) | *p*-value |  | Hazard ratio (95% CI) | *p*-value |  | Hazard ratio (95% CI) | *p*-value |
| **Age, continuous** | 1.04 (1.01-1.07) | 0.01 |  | 1.02 (0.99-1.05) | 0.26 |  | 1.02 (0.98-1.05) | 0.38 |  |  |  |
| **ECOG performance status** |  |  |  |  |  |  |  |  |  |  |  |
| 0 | Reference |  |  |  |  |  | Reference |  |  |  |  |
|  1 | 1.89 (0.79-4.57) | 0.16 |  |  |  |  | 1.35 (0.40-4.56) | 0.63 |  |  |  |
| **Pre-treatment BMI, categorical** |  |  |  |  |  |  |  |  |  |  |  |
| 18.5-24.9 kg/m2 | Reference |  |  |  |  |  | Reference |  |  |  |  |
| <18.5 kg/m2 | 1.31 (0.51-3.36) | 0.57 |  |  |  |  | 1.56 (0.54-4.49) | 0.41 |  |  |  |
| ≥25.0 kg/m2 | 1.14 (0.55-2.38) | 0.72 |  |  |  |  | 0.92 (0.36-2.37) | 0.86 |  |  |  |
| **Pre-treatment SMI, categorical** |  |  |  |  |  |  |  |  |  |  |  |
|  Non-sarcopenia | Reference |  |  |  |  |  | Reference |  |  |  |  |
|  Sarcopenia | 1.17 (0.60-2.28) | 0.64 |  |  |  |  | 1.06 (0.47-2.40) | 0.89 |  |  |  |
| **SMI change, categorical** |  |  |  |  |  |  |  |  |  |  |  |
|  SMI stable (± 10.0%/150 days) | Reference |  |  | Reference |  |  | Reference |  |  | Reference |  |
|  SMI loss (> –10.0%/150 days) | 7.82 (3.82-16.0) | <0.001 |  | 5.65 (2.65-12.02) | <0.001 |  | 4.71 (1.96-11.33) | 0.001 |  | 3.23 (1.29-8.11) | 0.01 |
|  SMI gain (> +10.0%/150 days) | 0.78 (0.22-2.75) | 0.69 |  | 0.96 (0.27-3.42) | 0.94 |  | 0.93 (0.26-3.38) | 0.91 |  | 1.04 (0.29-3.78) | 0.95 |
| **Pre-treatment SMD, categorical** |  |  |  |  |  |  |  |  |  |  |  |
|  High SMD | Reference |  |  |  |  |  | Reference |  |  |  |  |
|  Low SMD | 1.19 (0.58-2.43) | 0.64 |  |  |  |  | 0.83 (0.36-1.93) | 0.67 |  |  |  |
| **SMD change, per 1 HU increase** | 0.97 (0.89-1.05) | 0.41 |  |  |  |  | 0.94 (0.85-1.05) | 0.25 |  |  |  |
| **Pre-treatment SATIa, categorical** |  |  |  |  |  |  |  |  |  |  |  |
|  High SATI | Reference |  |  |  |  |  | Reference |  |  |  |  |
|  Low SATI | 1.58 (0.74-3.36) | 0.24 |  |  |  |  | 1.52 (0.60-3.84) | 0.38 |  |  |  |
| **SATI change (%/150 days)** | 0.98 (0.96-1.00) | 0.09 |  |  |  |  | 0.99 (0.96-1.01) | 0.28 |  |  |  |
| **Pre-treatment VATIa, categorical** |  |  |  |  |  |  |  |  |  |  |  |
|  High VATI | Reference |  |  |  |  |  | Reference |  |  |  |  |
|  Low VATI | 0.98 (0.49-1.97) | 0.96 |  |  |  |  | 0.97 (0.41-2.28) | 0.94 |  |  |  |
| **VATI change (%/150 days)** | 0.99 (0.97-1.01) | 0.18 |  |  |  |  | 0.99 (0.97-1.01) | 0.29 |  |  |  |
| **Smoking** |  |  |  |  |  |  |  |  |  |  |  |
| No (never smoked or quitted) | Reference |  |  |  |  |  | Reference |  |  |  |  |
|  Yes (current smoker) | 1.42 (0.68-2.96) | 0.35 |  |  |  |  | 1.52 (0.63-3.70) | 0.36 |  |  |  |
| **FIGO stage** |  |  |  |  |  |  |  |  |  |  |  |
| IB-II | Reference |  |  | Reference |  |  | Reference |  |  | Reference |  |
| III-IVA | 2.16 (1.09-4.30) | 0.03 |  | 2.86 (1.38-5.92) | 0.01 |  | 2.83 (1.24-6.47) | 0.01 |  | 3.41 (1.47-7.93) | 0.004 |
| **PLN status** |  |  |  |  |  |  |  |  |  |  |  |
|  Negative | Reference |  |  |  |  |  | Reference |  |  |  |  |
|  Positive | 1.11 (0.57-2.16) | 0.76 |  |  |  |  | 1.73 (0.76-3.96) | 0.19 |  |  |  |
| **Radiation field** |  |  |  |  |  |  |  |  |  |  |  |
| Pelvic radiotherapy | Reference |  |  | Reference |  |  | Reference |  |  | Reference |  |
| Extended-field radiotherapy | 0.35 (0.16-0.75) | 0.01 |  | 0.54 (0.24-1.23) | 0.14 |  | 0.28 (0.10-0.75) | 0.01 |  | 0.30 (0.11-0.87) | 0.03 |
| **Hb** |  |  |  |  |  |  |  |  |  |  |  |
| ≥ 10 mmol/L | Reference |  |  |  |  |  | Reference |  |  |  |  |
|  < 10 mmol/L | 1.50 (0.66-3.45) | 0.34 |  |  |  |  | 2.16 (0.85-5.50) | 0.10 |  |  |  |
| **Chemotherapy** |  |  |  |  |  |  |  |  |  |  |  |
| No | Reference |  |  | Reference |  |  | Reference |  |  |  |  |
| Yes | 0.24 (0.12-0.49) | <0.001 |  | 0.45 (0.19-1.07) | 0.07 |  | 0.86 (0.26-2.92) | 0.81 |  |  |  |

Abbreviations: BMI, body mass index; CI, confidence interval; ECOG, Eastern Cooperative Oncology Group; FIGO, International Federation of Gynecology and Obstetrics; Hb, haemoglobin level; HU, Hounsfield unit; PLN, pelvic lymph node; SATI, subcutaneous adipose tissue index; SCC, squamous cell carcinoma; SMD, skeletal muscle density; SMI, skeletal muscle index; VATI, visceral adipose tissue index.

aSATI < 67.3 cm2/m2 and VATI < 41.6 cm2/m2 were defined as low SATI and VATI, respectively.

**Supplementary Table S4** Acute toxicities by SATI and VATI groups (n = 245).

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Pre-treatment SATIa** |  | **Pre-treatment VATIa** |
| **Toxicity** | **High SATI** **(n = 81)** | **Low SATI** **(n = 164)** | ***p*-value** |  | **High VATI (n = 82)** | **Low VATI (n = 163)** | ***p*-value** |
| **Grade 2 GIb** | 25 (30.9) | 65 (39.6) | 0.18 |  | 25 (30.5) | 65 (39.9) | 0.15 |
| **Grade 2 GUb** | 9 (11.1) | 16 (9.8) | 0.74 |  | 9 (11.0) | 16 (9.8) | 0.78 |
| **Grade ≥3 HT**  | 32 (39.5) | 75 (45.7) | 0.36 |  | 34 (41.5) | 73 (44.8) | 0.62 |

Abbreviations: GI, gastrointestinal; GU, genitourinary; HT, haematological; SATI, subcutaneous adipose tissue index; VATI, visceral adipose tissue index.

Data are expressed as the absolute number of events (%).

aSATI < 67.3 cm2/m2 and VATI < 41.6 cm2/m2 were defined as low SATI and VATI, respectively.

bNo grade ≥3 acute GI or GU toxicities or treatment-related death occurred during or after treatment.