**Supplementary table S1** Logistic regression analysis for relationships between clinicopathological factors and pre-RT Hb, post-RT Hb and △Hb levels, respectively.
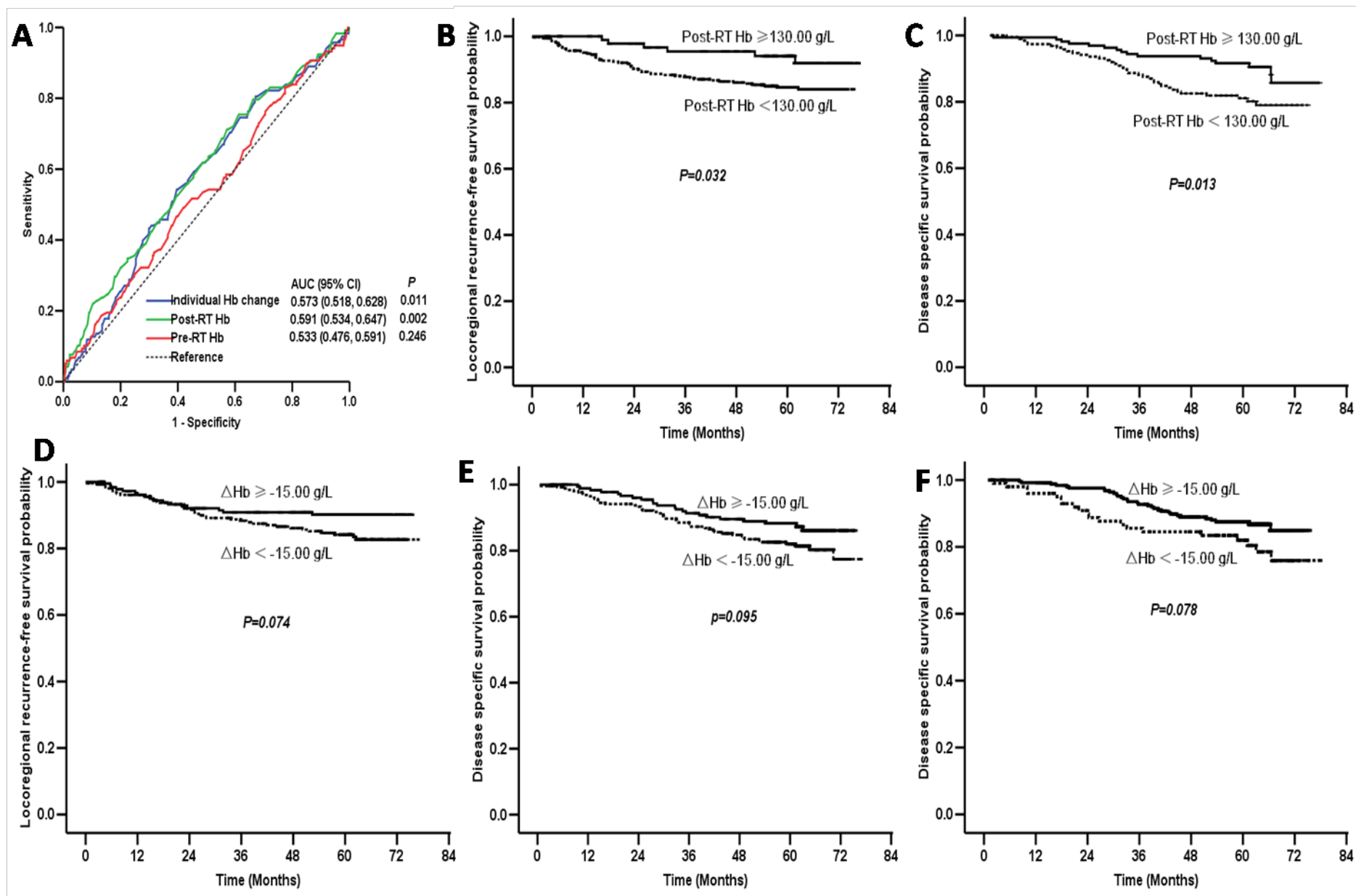
| Factors | Pre-RT Hb level[a] | | | | Post-RT Hb level[b] | | | | △Hb level[c] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B[#] | P value | OR | 95% CI of OR | B[#] | P value | OR | 95% CI of OR | B[#] | P value | OR | 95% CI of OR |
| Gender(female vs. male) | 1.452 | <0.001 | 4.272 | 3.022-6.040 | 1.642 | <0.001 | 5.165 | 3.202-8.332 | -0.531 | 0.003 | 0.588 | 0.416-0.831 |
| Age (≥44 yrs vs. <44 yrs) | - | - | - | - | 0.524 | 0.002 | 1.689 | 1.206-2.365 | - | - | - | - |
| T stage[*] | - | 0.006 | - | - | - | <0.001 | - | - | - | - | - | - |
| $T_1$ | R | - | - | - | R | - | - | - | - | - | - | - |
| $T_2$ | -0.129 | 0.672 | 0.879 | 0.483-1.598 | 0.311 | 0.291 | 1.364 | 0.766-2.428 | - | - | - | - |
| $T_3$ | 0.151 | 0.605 | 1.163 | 0.656-2.063 | 0.587 | 0.042 | 1.798 | 1.022-3.164 | - | - | - | - |
| $T_4$ | 0.628 | 0.039 | 1.874 | 1.033-3.398 | 1.285 | <0.001 | 3.615 | 1.936-6.751 | - | - | - | - |
| N stage[*] | - | 0.001 | - | - | - | <0.001 | - | - | - | - | - | - |
| $N_0$ | R | - | - | - | R | - | - | - | - | - | - | - |
| $N_1$ | 0.265 | 0.312 | 1.303 | 0.780-2.177 | 0.579 | 0.017 | 1.783 | 1.107-2.873 | - | - | - | - |
| $N_2$ | 0.844 | 0.002 | 2.327 | 1.350-4.008 | 1.063 | <0.001 | 2.894 | 1.696-4.939 | - | - | - | - |
| $N_{3a-b}$ | 1.024 | 0.022 | 2.784 | 1.159-6.684 | 2.710 | 0.001 | 15.025 | 3.245-69.559 | - | - | - | - |
| Treatment(CCRT vs. NACT+RT) | - | - | - | - | 1.156 | <0.001 | 3.177 | 2.264-4.460 | 1.311 | <0.001 | 3.708 | 2.748-5.005 |
| Pathology | - | - | - | - | - | 0.030 | - | - | - | - | - | - |
| U | - | - | - | - | R | - | - | - | - | - | - | - |
| D | - | - | - | - | -0.577 | 0.078 | 0.562 | 0.295-1.068 | - | - | - | - |
| K | - | - | - | - | -1.040 | 0.037 | 0.354 | 0.133-0.941 | - | - | - | - |

[*] According to the AJCC staging system 2010 clinical classification. [#] β, meaning the regression coefficient. R, as the reference in a category. [a] P=0.546 in the Hosmer-Lemeshow test; [b] P=0.057 in the Hosmer-Lemeshow test; [c] P=0.827 in the Hosmer-Lemeshow test. Abbreviation: OR, odds ratio; CI, confidence index; RT, radiotherapy; Hb, hemoglobin; CCRT, concurrent chemoradiotherapy; NACT+RT, neoadjuvant chemotherapy followed by radiotherapy alone; U, undifferentiated non-keratinized carcinoma; D, differentiated non-keratinized carcinoma; K, keratinized carcinoma.

**Supplementary table S2** Literature* summary on the prognostic role of Hb levels for cancers treated with radiotherapy or chemoradiotherapy.

| Authors | Journals | Countries | Cancers | Stratification criteria | Prognostic role |
|---|---|---|---|---|---|
| MacRae R [6] | Radiother oncol 2002 | USA | Stage III non-small cell lung cancer | The percentage change in Hb during CRT of <10%, 10~30%, and >30%, respectively. | Related to poor OS |
| Rades D [3] | Int J Radiat Oncol Biol Phys 2008 | Germany | Locally advanced stage IV head and neck squamous cell cancer | Pre-RT Hb (≥ 120 g/L vs. <120 g/L) | Pre-RT Hb≥ 120 g/L was linked to improved OS and local control (LC). |
| Rutkowski T [5] | Int J Radiat Oncol Biol Phys 2007 | Poland | Laryngeal cancer treated with post-operative radiotherapy (PORT) | (a) Pre-PORT Hb (≥ 133 g/L vs. <133 g/L) (b) Post-PORT Hb (≥ 133 g/L vs. <133 g/L) (c) dHb (> 0 g/L vs. ≤ 0 g/L) | (a) and (b) were both negative prognostic factors. (c) dHb> 0 g/L predicted improved LC. |
| Serkies K [4] | Acta Oncol 2006 | Poland | FIGO IB-IIIB cervical cancer | (a) Pre-RT Hb (≥ 120 g/L vs. <120 g/L) (b) Post-RT Hb (≥ 120 g/L vs. <120 g/L) | (a) Pre-RT Hb≥ 120 g/L was predictive of improved DMFS, DFS and LC. (b) Post-RT Hb< 120 g/L impaired DFS and LC. |
| Roldan GB [7] | Dis Colon Rectum 2010 | Canada | The anal canal carcinoma | (a) pre-treatment Hb (≥ 130 g/L vs. <130 g/L) (b) on-treatment Hb (≥ 121 g/L vs. <121 g/L) | (a) Hb < 130 g/L was associated with poor DMFS, PFS and OS. (b) Hb <121 g/L was associated with inferior PFS and OS. |
| Cefaro GA [8] | Strahlenther Onkol 2011 | Italy | High-grade glioma treated with post-operative chemoradiotherapy (POCRT) | Pre-POCRT Hb (>120 g/L vs. ≤120 g/L) | Pre-RT Hb >120 g/L linked to favorable OS. |
| Zenda S [10] | Dis Esophagus 2008 | Japan | T4/M1 lymph node esophageal cancer | Pre-CRT Hb (>130 g/L vs. ≤130 g/L) | Pre-CRT Hb >130 g/L was a favorable prognostic factor. |
| Pehlivan B [11] | Ann Surg Oncol | Switzerland | Locally advanced head and neck cancer | Pre-PORT Hb decrease (>38 g/L vs. ≤38 g/L) | OS was lower in the subgroup with Hb decrease >38 g/L. |
| Tarnawski R [13] | Int J Radiat Oncol Biol Phys 1997 | Poland | laryngeal supraglottic squamous cell carcinoma | Hb decrease during radiotherapy | Independent predictive factor for LC |
| Yurut-Caloglu V [9] | Asian Pac J Cancer Prev 2009 | Turkey | Bladder cancer with extravesical involvement | Pre-RT/CRT Hb (≥120 g/L vs. < 120 g/L) | Hb ≥120 g/L predicted favorable LC, DMFS and OS. |
| Chua DT [31] | Cancer 2004 | HongKong | Locally advanced nasopharyngeal carcinoma | Mid-RT Hb (>110 g/L vs. ≤110 g/L) | Hb ≤110 g/L was associated with poor LC and disease-specific survival rates. |
| Altun M [26] | In Vivo 2003 | Turkey | Locally advanced nasopharyngeal carcinoma | (a) Pre-RT severe anemia (Hb<110 g/L) (b) Massive Hb decrease ≥15 g/L | (a) Impaired LC, DFS and OS. (b) Worsened LC, DFS and OS. |
| Gao J [32] | Int J Radiat Oncol Biol Phys 2011 | China | Early stage nasopharyngeal carcinoma | Hb decrease >11.5 g/L | Deteriorated LRFS and DSS |

*Cited in the manuscript.

**Supplementary Figure S1** The receiver operating characteristic curve analysis for pre-RT Hb level, post-RT Hb level and individual Hb change (△Hb level) for disease specific survival, respectively (A); locoregional recurrence-free survival curves of patients with post-RT Hb ≥130.00 g/L and post-RT Hb <130.00 g/L in the CCRT group (B); disease specific survival curves of patients with post-RT Hb ≥130.00 g/L and post-RT Hb <130.00 g/L in the NACT+RT group (C); locoregional recurrence-free survival curves of patients with △Hb level ≥-15.00 g/L and △Hb level <-15.00 g/L in the CCRT group (D); disease specific survival curves of patients with △Hb level ≥-15.00 g/L and △Hb level <-15.00 g/L in the CCRT group (E) and the NACT+RT group (F), respectively. Abbreviation: RT, radiotherapy; Hb, hemoglobin; CCRT, concurrent chemoradiotherapy; NACT+RT, neoadjuvant chemotherapy followed by radiotherapy alone.