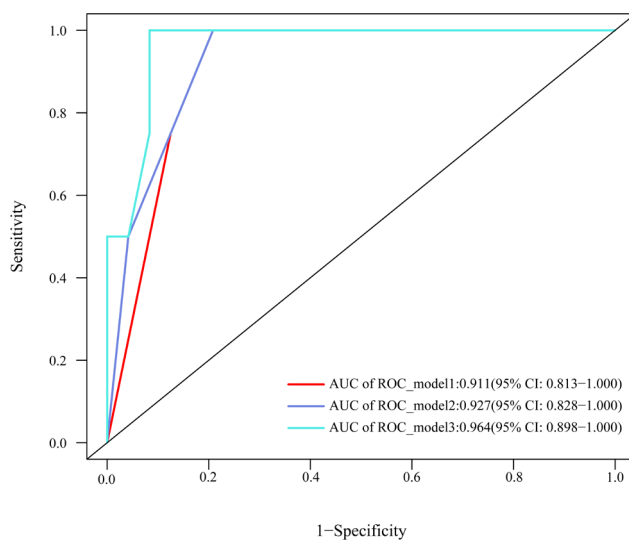


**Figure S1** Overall flow of model construction. LR, logistic regression; AUC, area under the ROC curve; ROC, receiver operating characteristic.

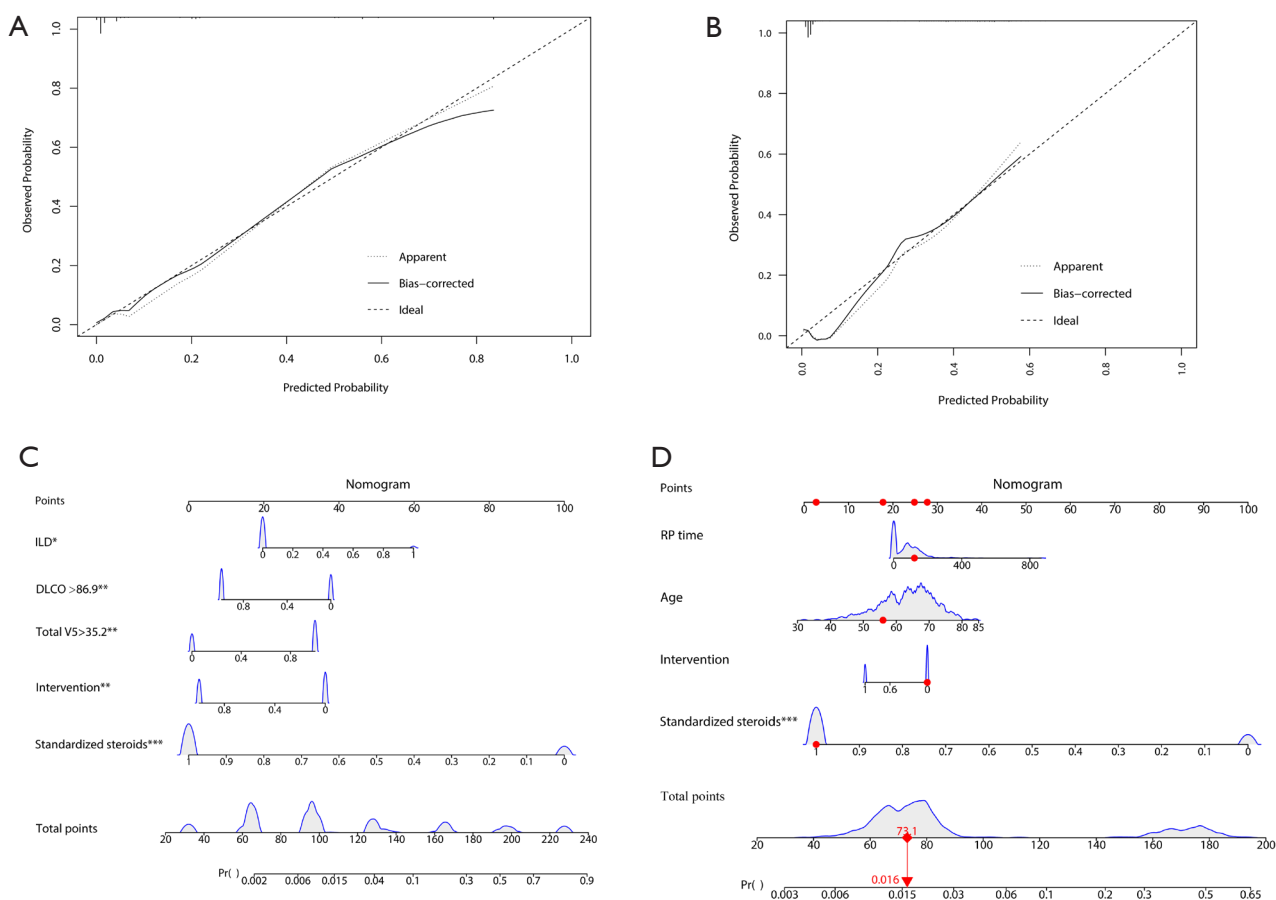
**Table S1** Univariate and multivariate analysis of the correlation between independent variables and grade 3 or higher RP in the training cohort

| Variables                                  | Univariable analysis |             |         | Multivariable analysis |               |         |
|--|----------------------|-------------|---------|------------------------|---------------|---------|
|  | OR                   | 95% CI      | P value | OR                     | 95% CI        | P value |
| Age >70 years                              | 1.357                | 0.718–2.454 | 0.328   |                        |               |         |
| Age  | 1.032                | 0.998–1.069 | 0.073   |                        |               |         |
| Gender                                     | 0.686                | 0.370–1.343 | 0.249   |                        |               |         |
| Smoker                                     | 0.603                | 0.349–1.042 | 0.071   |                        |               |         |
| ECOG PS                                    |                      |             |         |                        |               |         |
| 0  | 0.666                | 0.269–1.421 | 0.331   |                        |               |         |
| 1  | 0.957                | 0.520–1.863 | 0.892   |                        |               |         |
| 2  | 2.049                | 0.802–4.593 | 0.102   |                        |               |         |
| Lung disease                               |                      |             |         |                        |               |         |
| Subclinical ILD                            | 4.016                | 1.508–9.634 | 0.003   | 33.519                 | 2.122–932.257 | 0.015   |
| COPD                                       | 0.625                | 0.100–2.143 | 0.527   |                        |               |         |
| Emphysema                                  | 1.217                | 0.654–2.178 | 0.520   |                        |               |         |
| Surgery                                    | 0.534                | 0.229–1.097 | 0.112   |                        |               |         |
| Pathology                                  |                      |             |         |                        |               |         |
| NSCLC                                      | 1.142                | 0.594–2.382 | 0.705   |                        |               |         |
| SCLC                                       | 0.894                | 0.429–1.720 | 0.750   |                        |               |         |
| Stage                                      |                      |             |         |                        |               |         |
| Stage I–III NSCLC                          | 0.870                | 0.502–1.534 | 0.624   |                        |               |         |
| Stage IV NSCLC                             | 1.292                | 0.648–2.421 | 0.443   |                        |               |         |
| LS-SCLC                                    | 1.465                | 0.647–2.996 | 0.324   |                        |               |         |
| ES-SCLC                                    | 0.234                | 0.013–1.110 | 0.155   |                        |               |         |
| Treatment                                  |                      |             |         |                        |               |         |
| CCRT                                       | 0.500                | 0.148–1.266 | 0.193   |                        |               |         |
| SCRT                                       | 1.310                | 0.695–2.653 | 0.426   |                        |               |         |
| Radiotherapy alone                         | 1.408                | 0.559–3.086 | 0.425   |                        |               |         |
| Radiotherapy and others                    | 0.462                | 0.026–2.272 | 0.454   |                        |               |         |
| Chemotherapy                               | 0.662                | 0.313–1.574 | 0.310   |                        |               |         |
| Chemotherapy regimen                       |                      |             |         |                        |               |         |
| Gemcitabine                                | 1.113                | 0.445–2.414 | 0.801   |                        |               |         |
| Paclitaxel                                 | 1.090                | 0.605–1.910 | 0.768   |                        |               |         |
| Immunotherapy                              | 1.015                | 0.521–1.867 | 0.964   |                        |               |         |
| Targeted therapy                           | 0.574                | 0.032–2.878 | 0.594   |                        |               |         |
| Lymphocyte before >1.60×10 <sup>9</sup> /L | 0.572                | 0.319–1.000 | 0.054   |                        |               |         |
| Lymphocyte after >0.84×10 <sup>9</sup> /L  | 0.551                | 0.304–0.968 | 0.042   | 0.783                  | 0.208–2.894   | 0.711   |
| Standardized steroids                      | 0.024                | 0.010–0.050 | 0.000   | 0.003                  | 0.000–0.019   | 0.000   |
| Radiotherapy dose >60 Gy                   | 0.762                | 0.400–1.380 | 0.387   |                        |               |         |
| FEV1 >81.5%                                | 0.576                | 0.304–1.067 | 0.083   |                        |               |         |
| DLCO >87%                                  | 0.407                | 0.183–0.857 | 0.021   | 0.159                  | 0.035–0.584   | 0.009   |
| Limited PTV margin                         | 0.692                | 0.360–1.277 | 0.250   |                        |               |         |
| Whole lung volume >2,500 cm <sup>3</sup>   | 0.369                | 0.208–0.669 | 0.001   | 0.724                  | 0.184–2.903   | 0.642   |
| Total lung V5 >35%                         | 1.699                | 0.940–3.233 | 0.090   |                        |               |         |
| Total lung V20 >23%                        | 1.563                | 0.893–2.706 | 0.113   |                        |               |         |
| Total lung V30 >16%                        | 1.137                | 0.649–1.968 | 0.648   |                        |               |         |
| Total lung MLD >13 Gy                      | 1.545                | 0.754–2.959 | 0.208   |                        |               |         |
| Contralateral lung V5 >26%                 | 1.263                | 0.678–2.262 | 0.444   |                        |               |         |
| Contralateral lung V20 >4%                 | 1.105                | 0.639–1.909 | 0.719   |                        |               |         |
| Contralateral lung V30 >2%                 | 1.120                | 0.639–1.939 | 0.687   |                        |               |         |
| Contralateral lung MLD >2 Gy               | 1.009                | 0.580–1.742 | 0.974   |                        |               |         |
| Ipsilateral lung V5 >62%                   | 1.540                | 0.887–2.664 | 0.122   |                        |               |         |
| Ipsilateral lung V20 >40%                  | 1.883                | 1.089–3.301 | 0.025   | 4.133                  | 0.553–48.937  | 0.203   |
| Ipsilateral lung V30 >29%                  | 1.934                | 1.111–3.447 | 0.022   | 0.722                  | 0.116–3.959   | 0.711   |
| Ipsilateral lung MLD >18 Gy                | 1.800                | 1.204–3.476 | 0.046   | 1.738                  | 0.158–17.042  | 0.633   |

RP, radiation pneumonitis; OR, odds ratio; CI, confidence interval; ECOG, Eastern Cooperative Oncology Group; PS, performance status; ILD, interstitial lung disease; COPD, chronic obstructive pulmonary disease; NSCLC, non-small cell lung cancer; SCLC, small cell lung cancer; LS-SCLC, limited stage small cell lung cancer; ES-SCLC, extensive stage small cell lung cancer; CCRT, concurrent chemoradiation therapy; SCRT, sequential chemoradiation therapy; FEV1, forced expiratory volume in 1 second; DLCO, diffusing capacity of the lung for carbon monoxide; PTV, planning target volume; V5, lung volume exceeding 5 Gy; V20, lung volume exceeding 20 Gy; V30, lung volume exceeding 30 Gy; MLD, mean lung dose.



**Figure S2** The ROC curves of the models in the test cohort. AUC, area under the ROC curve; ROC, receiver operating characteristic.



**Figure S3** Assessment of model 1 and 3 in the training cohort. (A) The calibration curve of model 1. (B) The calibration curve of model 3. (C) The nomogram of model 1. (D) The nomogram of model 3. \*\*,  $P < 0.01$ ; \*\*\*,  $P < 0.001$ . ILD, interstitial lung disease; DLCO, diffusing capacity of the lung for carbon monoxide.