

Figure S1. Esophageal contouring. Yellow contours delineate the esophagus. (A) Axial CT simulation image at the superior contour border. (B) Axial CT simulation image at the inferior contour border. (C) Coronal view of the esophageal contour. (D) Axial CT simulation image at the superior contour border, with the esophagus indicated by a white arrow. (E) Axial CT simulation image at the the inferior contour border, with the esophagus indicated by a white arrow. (F) Sagittal view of the esophageal contour. CT, computed tomography.

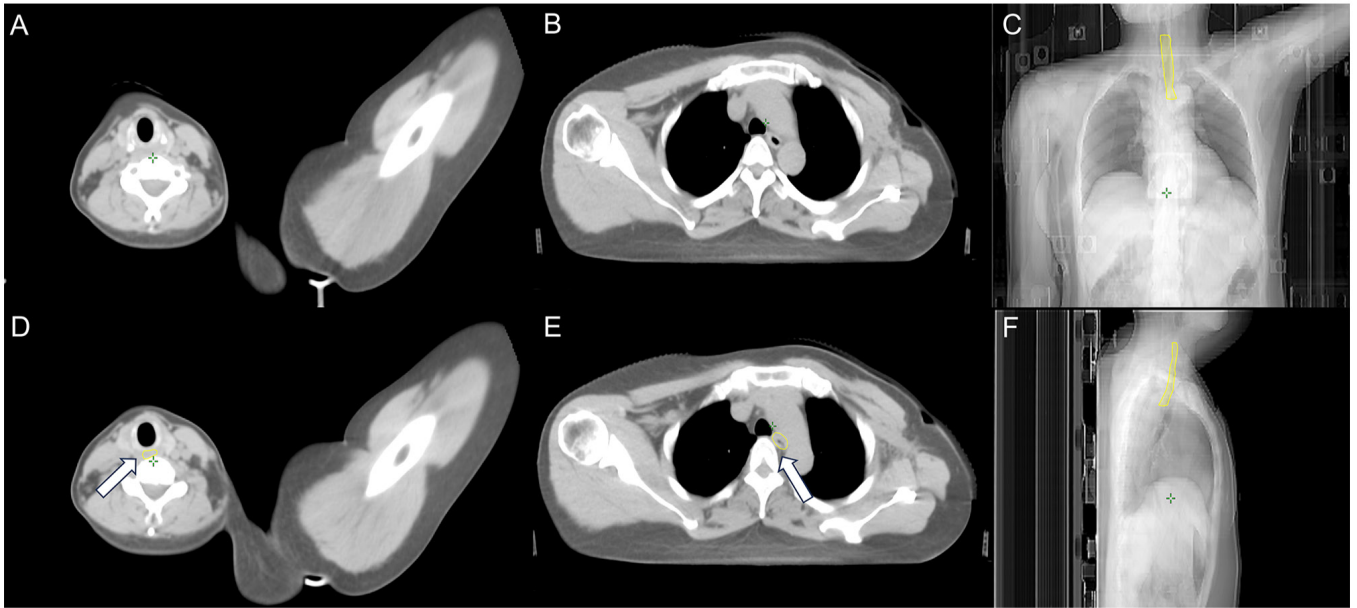


Figure S2. Dose distribution for a representative intensity-modulated radiotherapy plan. Light-blue and dark-blue contours represent the planning target volumes for the supraclavicular/infralavicular fossa and chest wall, respectively. (A) Axial, (B) coronal and (C) sagittal views show the dose distribution (color wash from blue to red indicates increasing dose). cGy, centigray.

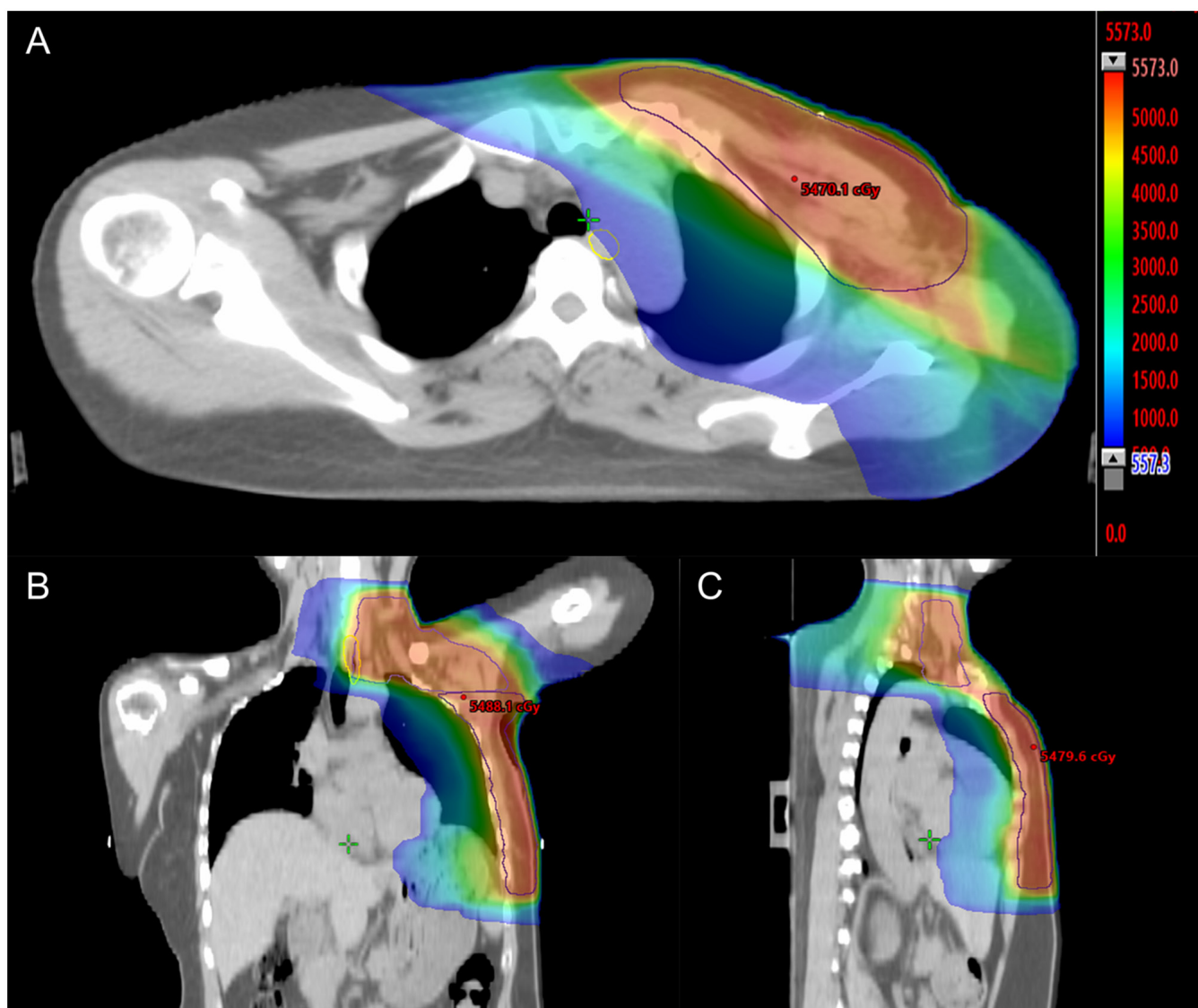


Figure S3. Univariable performance and correlation of candidate predictors in the training cohort. (A) AUC for each candidate predictor. (B) Pearson correlation heatmap among candidate predictors. AUC, area under the curve.

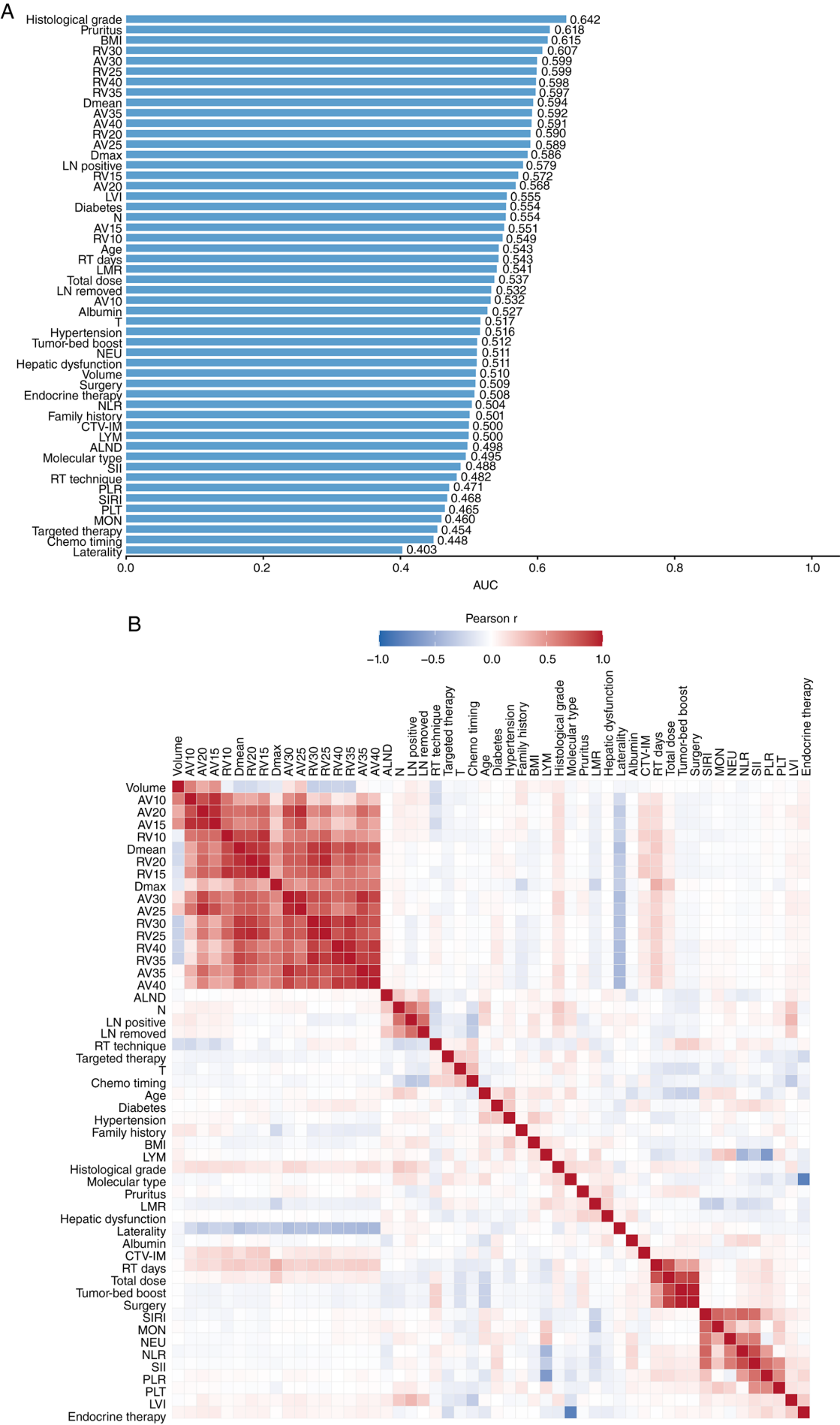


Figure S4. Model performance within the training cohort. (A) ROC curves for the 10 machine-learning models. CatBoost achieved a training-cohort AUC of 0.923 (95% CI, 0.887-0.959). These training-cohort ROC estimates are distinct from the dedicated bootstrap apparent and optimism-corrected AUCs reported for the three pre-selected models in Table III. (B) DCA. (C) Calibration curves. AUC, area under the curve; ROC, receiver operating characteristic curve; DCA, decision curve analysis; LR, logistic regression; SVM, support vector machine, GBM, gradient boosting machine, XGBoost, extreme gradient boosting; KNN, K-Nearest Neighbors; LightGBM, light gradient boosting machine; CatBoost, categorical boosting; CI, confidence interval.

