**Magnetic resonance imaging-based radiomics nomogram for prediction of the histopathological grade of soft tissue sarcomas: a two-center study**

**Supplementary Files**

**Materials and methods**

**Data collection**

Detailed descriptions of the inclusion and conclusion criteria

The inclusion criteria were surgically confirmed STS with complete pathological data, performance of pretreatment MRI ≤14 days previously, and performance of axial T1WI and FS-T2WI. The exclusion criteria were unavailable or incomplete relevant clinical or MRI data, images with a low signal-to-noise ratio (≤1.0), performance of treatment, development of other unrelated tumors, and censored during follow-up.

**MRI acquisition and region-of-interest segmentation（别忘记删除）**

MRI scanners, acquisition parameters

All 180 patients underwent MRI scanning using a GE MRI 1.5T, GE Signa HDx 3.0T (GE Medical Systems, Milwaukee, WI, USA), Siemens Skyra 3.0T, Siemens Magnetom Prisma 3.0T (Siemens Healthcare GmbH, Erlangen, Germany), or Philips Achieva 1.5T (Philips Medical Systems, Best, the Netherlands). The following scanning parameters were used: T1WI (repetition time [TR] / echo time [TE], 420–680 ms / 6.1–20 ms); FS-T2WI (TR / TE, 2640–5000 ms/ 30–102 ms,); section spacing, 1 mm; section thickness, 3–4 mm, matrix, 320 × 320; field of view, 200–400 mm.

**Patients’ clinical data and MRI features**

The recorded data

The readers recorded the following data: T1WI high-signal matrix (yes or no), T2WI low signal (yes or no), heterogeneity (>30% of the entire tumor volume was defined as heterogeneous), myxoid matrix (yes or no), fibrous tissue signal (yes or no), margin (well- or ill-defined), septations (yes or no), fat tissue signal (yes or no), vessels (yes or no), hemorrhage (yes or no), maximal depth of >8 cm (yes or no), peritumoral edema (yes or no, bone involvement (yes or no), capsule (yes or no), and neurovascular bundle involvement (yes or no).

**Statistical analysis**

The packages we used in R software

The “glmnet” package was applied to analyze the LASSO logistic regression, and each patient’s rad-score was calculated accordingly. The ROC curves were plotted using the “pROC” package, and the DeLong test was used to assess the differences in ROC curves. The “Resource Selection” package was applied for the Hosmer–Lemeshow test. The “rms” package was applied to analyze nomograms and calibration curves, and the “rmda” package was applied to implement the DCA. The “survival” package was applied for survival analyses, and the class output offered by the “caret” package was applied for dichotomization. Univariate logistic regression was applied to evaluate the correlation of tumor grading using the “survival” package.

**Results**

The stratified analysis

Tumor grading significantly stratified patients for PFS (log rank P = 0.008 and 0.004 in the training set and external validation set, respectively; Fig. 4c, d). We dichotomized the patient cohort into low-risk and high-risk groups using the classification of the established radiomics grading models. The clinical model showed a survival difference in the external validation set (log rank P = 0.037; Fig. 4b), but not in the training set (log rank P = 0.290; Fig. 4a). There were no significant differences in the survival curves between the training and external validation sets in the following models [RS-T1 model, log rank P = 0.100 and 0.100 (Fig. 4e, f); RS-FST2 model, log rank P = 0.510 and 0.500 (Fig. 4g, h); RS-Combined model, log rank P = 0.950 and 0.095 (Fig. 4i, j)].