**Supplementary Table S1: Extraction of radiomics features**

| Feature classes | Parameter |
|---|---|
| First order features =18 | Maximum<br>Minimum<br>Median<br>Mean<br>Variance<br>Energy<br>Total Energy<br>Standard deviation<br>Skewness<br>Kurtosis<br>Root mean square (RMS)<br>Mean Absolute Deviation<br>Inter quartile range<br>Range<br>Entropy<br>Uniformity<br>10Percentile<br>90Percentile<br>Shape=17 |
| Texture Features=836 | Gray Level Cooccurence Matrix (GLCM=24)<br>Gray Level Run Length Matrix (GLRLM=16)<br>Gray Level Size Zone Matrix (GLSZM=16)<br>Gray Level Dependece Matrix (GLDM=14)<br>Neighboring Gray Tone Difference Matrix (NGTDM=5)<br>Wavelet features=744 |

**Supplementary Table S2: All univariate survival features were included to discriminate patients with recurrence from those without recurrence ($p < 0.05$).**

*Included as a separate Excel file.*

**Supplementary Table S3: Results of radiomics feature selection and Radiomic-score building.**

| Radiomic Risk Score | Feature | Coefficient |
|---|---|---|
| AP | original glcm Cluster Shade | 0.217 |
| VP | original glcm MCC | 1.23 |
| VP | wavelet HHH glcm Cluster Shade | -3.21 |
| VP | wavelet. HHH glszm Large Area Low Gray Level Emphasis | 4.6 |
| VP | wavelet. HHH ngtdm Busyness | 0.0003 |

AP =Arterial phase, VP=venous phase.

**Supplementary Table S4: Interpretation of the semantic and agnostic RRS features**

| Features classification | Feature name | Interpretation |
|---|---|---|
| GLCM[1] | Cluster Shade<br>MCC<br>glcm Cluster Shade | Reflect the image gray level information, but also express the occurrence frequency of specific pixel values in a given spatial relationship |
| GLSZM[2] | Large Area Low Gray Level Emphasis | Local brightness and complexity of the lesion, and reflects the texture heterogeneity between pixels |
| NGTDM[3-5] | HHH ngtdm Busyness | Captures intensity values of a neighborhood of pixels to characterize the difference between a center voxel within the neighborhood. |

GLCM: gray-level co-occurrence matrices, GLSZM: gray level region size matrix, NGTDM: neighboring gray-tone difference matrix

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