

## Supplementary

Table S1 Acquisition parameters

Patient	Manufacturer	Model name	Slice thickness (mm)	kVp (KV)	Tube current (mA)	Exposure time (ms)	Milliamperere-seconds (mAs)
1	GE Medical Systems	Discovery CT750 HD	1.25	120	195	500	97.5
2	GE Medical Systems	Discovery CT750 HD	1.25	120	317	699	221.6
3	GE Medical Systems	Discovery CT750 HD	1.25	120	406	400	162.4
4	GE Medical Systems	Discovery CT750 HD	1.25	120	288	500	144.0
5	GE Medical Systems	Discovery CT750 HD	1.25	120	115	600	69.0
6	GE Medical Systems	Discovery CT750 HD	1.25	120	149	699	104.2
7	GE Medical Systems	Discovery CT750 HD	1.25	120	175	600	105.0
8	GE Medical Systems	Discovery CT750 HD	1.25	120	100	500	50.0
9	GE Medical Systems	Discovery CT750 HD	1.25	120	274	699	191.5
10	GE Medical Systems	Discovery CT750 HD	1.25	120	153	500	76.5
11	GE Medical Systems	Discovery CT750 HD	1.25	120	356	500	178.0
12	GE Medical Systems	Discovery CT750 HD	1.25	120	152	600	91.2
13	GE Medical Systems	Discovery CT750 HD	1.25	120	219	600	131.4
14	GE Medical Systems	Discovery CT750 HD	1.25	120	100	500	50.0
15	GE Medical Systems	Discovery CT750 HD	1.25	120	133	500	66.5
16	GE Medical Systems	Discovery CT750 HD	1.25	120	484	500	242.0
17	GE Medical Systems	Discovery CT750 HD	1.25	120	100	500	50.0
18	GE Medical Systems	Discovery CT750 HD	1.25	120	129	500	64.5
20	GE Medical Systems	Discovery CT750 HD	1.25	120	296	500	148.0
21	GE Medical Systems	Discovery CT750 HD	1.25	120	400	600	240.0
22	GE Medical Systems	Discovery CT750 HD	1.25	120	100	500	50.0
23	GE Medical Systems	Discovery CT750 HD	1.25	120	180	600	108.0
24	GE Medical Systems	Discovery CT750 HD	1.25	120	162	500	81.0
25	GE Medical Systems	Discovery CT750 HD	1.25	120	345	500	172.5
26	GE Medical Systems	Discovery CT750 HD	1.25	120	183	500	91.5
27	GE Medical Systems	Discovery CT750 HD	1.25	120	119	500	59.5
28	GE Medical Systems	Discovery CT750 HD	1.25	120	467	699	326.4
29	GE Medical Systems	Discovery CT750 HD	1.25	120	378	600	226.8
30	GE Medical Systems	Discovery CT750 HD	1.25	120	219	500	109.5
31	GE Medical Systems	Discovery CT750 HD	1.25	120	256	500	128.0
32	GE Medical Systems	Discovery CT750 HD	1.25	120	276	699	192.9
33	GE Medical Systems	Discovery CT750 HD	1.25	120	178	699	124.4
34	GE Medical Systems	Discovery CT750 HD	1.25	120	210	500	105.0
35	GE Medical Systems	Discovery CT750 HD	1.25	120	143	500	71.5
37	GE Medical Systems	Discovery CT750 HD	1.25	120	421	500	210.5
38	GE Medical Systems	Discovery CT750 HD	1.25	120	472	500	236.0
39	GE Medical Systems	Discovery CT750 HD	1.25	120	115	500	57.5
40	GE Medical Systems	Discovery CT750 HD	1.25	120	205	699	143.3
41	GE Medical Systems	Discovery CT750 HD	1.25	120	419	500	209.5
42	GE Medical Systems	Discovery CT750 HD	1.25	120	100	500	50.0
43	GE Medical Systems	Discovery CT750 HD	1.25	120	248	500	124.0
44	GE Medical Systems	Discovery CT750 HD	1.25	120	283	500	141.5
45	GE Medical Systems	Discovery CT750 HD	1.25	120	210	500	105.0
46	GE Medical Systems	Discovery CT750 HD	1.25	120	570	500	285.0
47	GE Medical Systems	Discovery CT750 HD	1.25	120	356	500	178.0
48	GE Medical Systems	Discovery CT750 HD	1.25	120	455	500	227.5
49	GE Medical Systems	Discovery CT750 HD	1.25	120	229	500	114.5
50	GE Medical Systems	Discovery CT750 HD	1.25	120	314	500	157.0
51	GE Medical Systems	Discovery CT750 HD	1.25	120	499	500	249.5
52	GE Medical Systems	Discovery CT750 HD	1.25	120	649	500	324.5
53	GE Medical Systems	Discovery CT750 HD	1.25	120	196	500	98.0
54	GE Medical Systems	Discovery CT750 HD	1.25	120	342	500	171.0
55	GE Medical Systems	Discovery CT750 HD	1.25	120	198	500	99.0
56	GE Medical Systems	Discovery CT750 HD	1.25	120	228	500	114.0
57	GE Medical Systems	Discovery CT750 HD	1.25	120	308	500	154.0
58	GE Medical Systems	Discovery CT750 HD	1.25	120	239	500	119.5
59	GE Medical Systems	Discovery CT750 HD	1.25	120	219	500	109.5
60	GE Medical Systems	Discovery CT750 HD	1.25	120	444	500	222.0
61	GE Medical Systems	Discovery CT750 HD	1.25	120	292	500	146.0
62	GE Medical Systems	Discovery CT750 HD	1.25	120	100	500	50.0
63	GE Medical Systems	Discovery CT750 HD	1.25	120	444	500	222.0
64	GE Medical Systems	Discovery CT750 HD	1.25	120	130	500	65.0
65	GE Medical Systems	Discovery CT750 HD	1.25	120	118	500	59.0
66	GE Medical Systems	Discovery CT750 HD	1.25	120	469	500	234.5
67	GE Medical Systems	Discovery CT750 HD	1.25	120	184	500	92.0
68	GE Medical Systems	Discovery CT750 HD	1.25	120	472	699	329.9
69	GE Medical Systems	Discovery CT750 HD	1.25	120	290	500	145.0
70	GE Medical Systems	Discovery CT750 HD	1.25	120	530	500	265.0
71	GE Medical Systems	Discovery CT750 HD	1.25	120	141	500	70.5
72	GE Medical Systems	Discovery CT750 HD	1.25	120	121	500	60.5
73	GE Medical Systems	Discovery CT750 HD	1.25	120	126	500	63.0
74	GE Medical Systems	Discovery CT750 HD	1.25	120	175	500	87.5
75	GE Medical Systems	Discovery CT750 HD	1.25	120	186	500	93.0
76	GE Medical Systems	Discovery CT750 HD	1.25	120	305	500	152.5
77	GE Medical Systems	Discovery CT750 HD	1.25	120	148	500	74.0
78	GE Medical Systems	Discovery CT750 HD	1.25	120	102	500	51.0
79	GE Medical Systems	Discovery CT750 HD	1.25	120	129	500	64.5
80	GE Medical Systems	Discovery CT750 HD	1.25	120	246	500	123.0
81	GE Medical Systems	Discovery CT750 HD	1.25	120	458	500	229.0
82	GE Medical Systems	Discovery CT750 HD	1.25	120	119	500	59.5
83	GE Medical Systems	Discovery CT750 HD	1.25	120	464	500	232.0
84	GE Medical Systems	Discovery CT750 HD	1.25	120	225	500	112.5
85	GE Medical Systems	Discovery CT750 HD	1.25	120	320	500	160.0
86	GE Medical Systems	Discovery CT750 HD	1.25	120	100	500	50.0
87	GE Medical Systems	Discovery CT750 HD	1.25	120	100	500	50.0
88	GE Medical Systems	Discovery CT750 HD	1.25	120	116	500	58.0
89	GE Medical Systems	Discovery CT750 HD	1.25	120	292	500	146.0
90	GE Medical Systems	Discovery CT750 HD	1.25	120	468	500	234.0
91	GE Medical Systems	Discovery CT750 HD	1.25	120	201	500	100.5
92	GE Medical Systems	Discovery CT750 HD	1.25	120	101	600	60.6
93	GE Medical Systems	Discovery CT750 HD	1.25	120	133	500	66.5
94	GE Medical Systems	Discovery CT750 HD	1.25	120	359	500	179.5
95	GE Medical Systems	Discovery CT750 HD	1.25	120	361	600	216.6
96	GE Medical Systems	Discovery CT750 HD	1.25	120	183	500	91.5
97	GE Medical Systems	Discovery CT750 HD	1.25	120	316	500	158.0
98	GE Medical Systems	Discovery CT750 HD	1.25	120	404	500	202.0
99	GE Medical Systems	Discovery CT750 HD	1.25	120	287	500	143.5
100	GE Medical Systems	Discovery CT750 HD	1.25	120	146	500	73.0
101	GE Medical Systems	Discovery CT750 HD	1.25	120	100	500	50.0

Table S2 The list of robust radiomic features

No.	Feature name
1	GTvp_original_shape_VoxelVolume
2	GTvp_original_shape_Compactness1
3	GTvp_original_shape_Flatness
4	GTvp_original_firstorder_10Percentile
5	GTvp_original_firstorder_90Percentile
6	GTvp_original_firstorder_Energy
7	GTvp_original_firstorder_Entropy
8	GTvp_original_firstorder_InterquartileRange
9	GTvp_original_firstorder_Maximum
10	GTvp_original_firstorder_Minimum
11	GTvp_original_firstorder_Range
12	GTvp_original_gldm_ClusterShade
13	GTvp_original_gldm_Contrast
14	GTvp_original_gldm_Correlation
15	GTvp_original_gldm_Idmn
16	GTvp_original_gldm_Imc1
17	GTvp_original_gldm_LongRunLowGrayLevelEmphasis
18	GTvp_original_glszm_SizeZoneNonUniformityNormalized
19	GTvp_original_gldm_LargeDependenceLowGrayLevelEmphasis
20	GTvp_original_gldm_SmallDependenceHighGrayLevelEmphasis
21	GTvp_log-sigma-0-5-mm-3D_firstorder_10Percentile
22	GTvp_log-sigma-0-5-mm-3D_firstorder_90Percentile
23	GTvp_log-sigma-0-5-mm-3D_firstorder_Kurtosis
24	GTvp_log-sigma-0-5-mm-3D_firstorder_Maximum
25	GTvp_log-sigma-0-5-mm-3D_firstorder_Mean
26	GTvp_log-sigma-0-5-mm-3D_firstorder_Minimum
27	GTvp_log-sigma-0-5-mm-3D_firstorder_Skewness
28	GTvp_log-sigma-0-5-mm-3D_gldm_Correlation
29	GTvp_log-sigma-0-5-mm-3D_gldm_Imc1
30	GTvp_log-sigma-0-5-mm-3D_gldm_LongRunHighGrayLevelEmphasis
31	GTvp_log-sigma-0-5-mm-3D_gldm_RunEntropy
32	GTvp_log-sigma-0-5-mm-3D_glszm_SizeZoneNonUniformityNormalized
33	GTvp_log-sigma-0-5-mm-3D_glszm_ZoneEntropy
34	GTvp_log-sigma-0-5-mm-3D_gldm_LargeDependenceLowGrayLevelEmphasis
35	GTvp_log-sigma-1-0-mm-3D_firstorder_Kurtosis
36	GTvp_log-sigma-1-0-mm-3D_firstorder_Maximum
37	GTvp_log-sigma-1-0-mm-3D_firstorder_Minimum
38	GTvp_log-sigma-1-0-mm-3D_firstorder_Skewness
39	GTvp_log-sigma-1-0-mm-3D_gldm_Correlation
40	GTvp_log-sigma-1-0-mm-3D_gldm_Idmn
41	GTvp_log-sigma-1-0-mm-3D_gldm_Imc1
42	GTvp_log-sigma-1-0-mm-3D_gldm_MCC
43	GTvp_log-sigma-1-0-mm-3D_gldm_LongRunHighGrayLevelEmphasis
44	GTvp_log-sigma-1-0-mm-3D_gldm_RunEntropy
45	GTvp_log-sigma-1-0-mm-3D_glszm_SizeZoneNonUniformityNormalized
46	GTvp_log-sigma-1-0-mm-3D_gldm_DependenceEntropy
47	GTvp_log-sigma-1-5-mm-3D_firstorder_Kurtosis
48	GTvp_log-sigma-1-5-mm-3D_firstorder_Minimum
49	GTvp_log-sigma-1-5-mm-3D_gldm_Autocorrelation
50	GTvp_log-sigma-1-5-mm-3D_gldm_Imc1
51	GTvp_log-sigma-1-5-mm-3D_glszm_SizeZoneNonUniformityNormalized
52	GTvp_log-sigma-1-5-mm-3D_glszm_GrayLevelZoneEmphasis
53	GTvp_log-sigma-2-0-mm-3D_firstorder_Minimum
54	GTvp_log-sigma-2-0-mm-3D_gldm_Autocorrelation
55	GTvp_log-sigma-2-0-mm-3D_gldm_RunEntropy
56	GTvp_log-sigma-2-0-mm-3D_glszm_SizeZoneNonUniformityNormalized
57	GTvp_log-sigma-2-0-mm-3D_glszm_SmallAreaLowGrayLevelEmphasis
58	GTvp_log-sigma-2-0-mm-3D_ngtdm_Complexity
59	GTvp_log-sigma-2-5-mm-3D_firstorder_Minimum
60	GTvp_log-sigma-2-5-mm-3D_firstorder_Range
61	GTvp_log-sigma-2-5-mm-3D_gldm_Autocorrelation
62	GTvp_log-sigma-2-5-mm-3D_glszm_GrayLevelZoneEmphasis
63	GTvp_log-sigma-2-5-mm-3D_glszm_SmallAreaLowGrayLevelEmphasis
64	GTvp_wavelet-LLH_firstorder_10Percentile
65	GTvp_wavelet-LLH_firstorder_90Percentile
66	GTvp_wavelet-LLH_firstorder_Kurtosis
67	GTvp_wavelet-LLH_firstorder_Maximum
68	GTvp_wavelet-LLH_firstorder_Mean
69	GTvp_wavelet-LLH_firstorder_Minimum
70	GTvp_wavelet-LLH_firstorder_Skewness
71	GTvp_wavelet-LLH_gldm_Correlation
72	GTvp_wavelet-LLH_gldm_Imc1
73	GTvp_wavelet-LLH_gldm_MCC
74	GTvp_wavelet-LLH_gldm_LongRunHighGrayLevelEmphasis
75	GTvp_wavelet-LLH_glszm_SizeZoneNonUniformityNormalized
76	GTvp_wavelet-LHL_firstorder_10Percentile
77	GTvp_wavelet-LHL_firstorder_90Percentile
78	GTvp_wavelet-LHL_firstorder_Kurtosis
79	GTvp_wavelet-LHL_firstorder_Maximum
80	GTvp_wavelet-LHL_firstorder_Skewness
81	GTvp_wavelet-LHL_gldm_Correlation
82	GTvp_wavelet-LHL_gldm_Imc1
83	GTvp_wavelet-LHL_gldm_MCC
84	GTvp_wavelet-LHL_glszm_SizeZoneNonUniformityNormalized
85	GTvp_wavelet-LHL_gldm_LargeDependenceLowGrayLevelEmphasis
86	GTvp_wavelet-LHH_firstorder_Kurtosis
87	GTvp_wavelet-LHH_firstorder_Maximum
88	GTvp_wavelet-LHH_firstorder_Mean
89	GTvp_wavelet-LHH_firstorder_Minimum
90	GTvp_wavelet-LHH_firstorder_Skewness
91	GTvp_wavelet-LHH_gldm_Correlation
92	GTvp_wavelet-LHH_gldm_Imc1
93	GTvp_wavelet-LHH_gldm_MCC
94	GTvp_wavelet-LHH_gldm_RunEntropy
95	GTvp_wavelet-LHH_gldm_RunEntropy
96	GTvp_wavelet-HLL_firstorder_10Percentile
97	GTvp_wavelet-HLL_firstorder_90Percentile
98	GTvp_wavelet-HLL_firstorder_Kurtosis
99	GTvp_wavelet-HLL_firstorder_Maximum
100	GTvp_wavelet-HLL_firstorder_Minimum
101	GTvp_wavelet-HLL_firstorder_Skewness
102	GTvp_wavelet-HLL_gldm_Correlation
103	GTvp_wavelet-HLL_gldm_MCC
104	GTvp_wavelet-HLL_glszm_SizeZoneNonUniformityNormalized
105	GTvp_wavelet-HLL_firstorder_Kurtosis
106	GTvp_wavelet-HLH_firstorder_Maximum
107	GTvp_wavelet-HLH_firstorder_Mean
108	GTvp_wavelet-HLH_firstorder_Minimum
109	GTvp_wavelet-HLH_firstorder_Skewness
110	GTvp_wavelet-HLH_gldm_ClusterShade
111	GTvp_wavelet-HLH_gldm_Correlation
112	GTvp_wavelet-HLH_gldm_Imc1
113	GTvp_wavelet-HLH_gldm_MCC
114	GTvp_wavelet-HLH_gldm_RunEntropy
115	GTvp_wavelet-HLH_glszm_SizeZoneNonUniformityNormalized
116	GTvp_wavelet-HHL_firstorder_Kurtosis
117	GTvp_wavelet-HHL_firstorder_Maximum
118	GTvp_wavelet-HHL_firstorder_Minimum
119	GTvp_wavelet-HHL_firstorder_Skewness
120	GTvp_wavelet-HHL_gldm_ClusterShade
121	GTvp_wavelet-HHL_gldm_Correlation
122	GTvp_wavelet-HHL_gldm_MCC
123	GTvp_wavelet-HHL_gldm_RunEntropy
124	GTvp_wavelet-HHL_glszm_SizeZoneNonUniformityNormalized
125	GTvp_wavelet-HHL_gldm_LargeDependenceLowGrayLevelEmphasis
126	GTvp_wavelet-HHH_firstorder_Kurtosis
127	GTvp_wavelet-HHH_firstorder_Maximum
128	GTvp_wavelet-HHH_firstorder_Minimum
129	GTvp_wavelet-HHH_firstorder_Skewness
130	GTvp_wavelet-HHH_gldm_ClusterShade
131	GTvp_wavelet-HHH_gldm_Correlation
132	GTvp_wavelet-HHH_gldm_Imc1
133	GTvp_wavelet-HHH_gldm_MCC
134	GTvp_wavelet-HHH_gldm_Idmn
135	GTvp_wavelet-HHH_gldm_InverseVariance
136	GTvp_wavelet-HHH_gldm_RunEntropy
137	GTvp_wavelet-HHH_glszm_SizeZoneNonUniformityNormalized
138	GTvp_wavelet-HHH_gldm_ZoneEntropy
139	GTvp_wavelet-HHH_gldm_DependenceEntropy
140	GTvp_wavelet-HHH_gldm_DependenceVariance
141	GTvp_wavelet-HHH_gldm_DependenceNonUniformityNormalized
142	GTvp_wavelet-LLL_firstorder_Maximum
143	GTvp_wavelet-LLL_gldm_MCC
144	GTvp_wavelet-LLL_glszm_LargeAreaLowGrayLevelEmphasis
145	GTvp_wavelet-LLL_glszm_SizeZoneNonUniformityNormalized
146	Rim_original_shape_Compactness1
147	Rim_original_shape_Elongation
148	Rim_original_firstorder_10Percentile
149	Rim_original_firstorder_Entropy
150	Rim_original_firstorder_InterquartileRange
151	Rim_original_firstorder_Maximum
152	Rim_original_firstorder_Minimum
153	Rim_original_gldm_Contrast
154	Rim_original_gldm_Correlation
155	Rim_original_gldm_Id
156	Rim_original_gldm_Idmn
157	Rim_original_gldm_Imc1
158	Rim_original_glszm_LargeAreaLowGrayLevelEmphasis
159	Rim_original_glszm_SizeZoneNonUniformityNormalized
160	Rim_original_glszm_ZoneEntropy
161	Rim_original_ngtdm_Busyness
162	Rim_log-sigma-0-5-mm-3D_firstorder_Kurtosis
163	Rim_log-sigma-0-5-mm-3D_firstorder_Mean
164	Rim_log-sigma-0-5-mm-3D_firstorder_Minimum
165	Rim_log-sigma-0-5-mm-3D_firstorder_Skewness
166	Rim_log-sigma-0-5-mm-3D_gldm_Correlation
167	Rim_log-sigma-0-5-mm-3D_gldm_Idmn
168	Rim_log-sigma-0-5-mm-3D_gldm_Imc1
169	Rim_log-sigma-0-5-mm-3D_gldm_MCC
170	Rim_log-sigma-0-5-mm-3D_glszm_LargeAreaEmphasis
171	Rim_log-sigma-0-5-mm-3D_glszm_SizeZoneNonUniformityNormalized
172	Rim_log-sigma-0-5-mm-3D_gldm_SmallDependenceLowGrayLevelEmphasis
173	Rim_log-sigma-1-0-mm-3D_firstorder_Maximum
174	Rim_log-sigma-1-0-mm-3D_firstorder_Minimum
175	Rim_log-sigma-1-0-mm-3D_gldm_Correlation
176	Rim_log-sigma-1-0-mm-3D_gldm_Idmn
177	Rim_log-sigma-1-0-mm-3D_gldm_Imc1
178	Rim_log-sigma-1-0-mm-3D_gldm_MCC
179	Rim_log-sigma-1-0-mm-3D_gldm_LongRunHighGrayLevelEmphasis
180	Rim_log-sigma-1-0-mm-3D_glszm_GrayLevelNonUniformityNormalized
181	Rim_log-sigma-1-0-mm-3D_gldm_SizeZoneNonUniformityNormalized
182	Rim_log-sigma-1-5-mm-3D_gldm_LargeDependenceLowGrayLevelEmphasis
183	Rim_log-sigma-1-5-mm-3D_firstorder_Maximum
184	Rim_log-sigma-1-5-mm-3D_firstorder_Minimum
185	Rim_log-sigma-1-5-mm-3D_firstorder_Range
186	Rim_log-sigma-1-5-mm-3D_gldm_Correlation
187	Rim_log-sigma-1-5-mm-3D_gldm_Idmn
188	Rim_log-sigma-1-5-mm-3D_gldm_Imc1
189	Rim_log-sigma-1-5-mm-3D_gldm_MCC
190	Rim_log-sigma-1-5-mm-3D_gldm_LongRunHighGrayLevelEmphasis
191	Rim_log-sigma-2-0-mm-3D_firstorder_Minimum
192	Rim_log-sigma-2-0-mm-3D_firstorder_Range
193	Rim_log-sigma-2-0-mm-3D_gldm_Correlation
194	Rim_log-sigma-2-0-mm-3D_glszm_GrayLevelNonUniformityNormalized
195	Rim_log-sigma-2-0-mm-3D_glszm_HighGrayLevelZoneEmphasis
196	Rim_log-sigma-2-0-mm-3D_glszm_LowGrayLevelZoneEmphasis
197	Rim_log-sigma-2-0-mm-3D_glszm_SizeZoneNonUniformityNormalized
198	Rim_log-sigma-2-0-mm-3D_glszm_SmallAreaLowGrayLevelEmphasis
199	Rim_log-sigma-2-5-mm-3D_gldm_SmallDependenceLowGrayLevelEmphasis
200	Rim_log-sigma-2-5-mm-3D_firstorder_Range
201	Rim_log-sigma-2-5-mm-3D_glszm_GrayLevelNonUniformityNormalized
202	Rim_log-sigma-2-5-mm-3D_glszm_HighGrayLevelZoneEmphasis
203	Rim_log-sigma-2-5-mm-3D_glszm_LowGrayLevelZoneEmphasis
204	Rim_log-sigma-2-5-mm-3D_glszm_SizeZoneNonUniformityNormalized
205	Rim_log-sigma-2-5-mm-3D_glszm_SmallAreaLowGrayLevelEmphasis
206	Rim_wavelet-LLH_firstorder_10Percentile
207	Rim_wavelet-LLH_firstorder_Kurtosis
208	Rim_wavelet-LLH_firstorder_Mean
209	Rim_wavelet-LLH_firstorder_Minimum
210	Rim_wavelet-LLH_firstorder_Skewness
211	Rim_wavelet-LLH_gldm_ClusterShade
212	Rim_wavelet-LLH_gldm_Correlation
213	Rim_wavelet-LLH_gldm_Idmn
214	Rim_wavelet-LLH_gldm_Imc1
215	Rim_wavelet-LLH_gldm_MCC
216	Rim_wavelet-LLH_gldm_RunEntropy
217	Rim_wavelet-LLH_glszm_LargeAreaEmphasis
218	Rim_wavelet-LLH_glszm_SizeZoneNonUniformityNormalized
219	Rim_wavelet-LHL_gldm_LargeDependenceLowGrayLevelEmphasis
220	Rim_wavelet-LHL_firstorder_10Percentile
221	Rim_wavelet-LHL_firstorder_Kurtosis
222	Rim_wavelet-LHL_firstorder_Maximum
223	Rim_wavelet-LHL_firstorder_Minimum
224	Rim_wavelet-LHL_firstorder_Skewness
225	Rim_wavelet-LHL_gldm_ClusterShade
226	Rim_wavelet-LHL_gldm_Correlation
227	Rim_wavelet-LHL_gldm_Imc1
228	Rim_wavelet-LHL_gldm_MCC
229	Rim_wavelet-LHL_gldm_Idmn
230	Rim_wavelet-LHL_gldm_Imc1
231	Rim_wavelet-LHL_glszm_LargeAreaEmphasis
232	Rim_wavelet-LHL_glszm_SizeZoneNonUniformityNormalized
233	Rim_wavelet-LHL_gldm_LargeDependenceLowGrayLevelEmphasis
234	Rim_wavelet-LHH_firstorder_10Percentile
235	Rim_wavelet-LHH_firstorder_Kurtosis
236	Rim_wavelet-LHH_firstorder_Maximum
237	Rim_wavelet-LHH_firstorder_Minimum
238	Rim_wavelet-LHH_firstorder_Skewness
239	Rim_wavelet-LHH_gldm_ClusterShade
240	Rim_wavelet-LHH_gldm_Correlation
241	Rim_wavelet-LHH_gldm_Imc1
242	Rim_wavelet-LHH_gldm_MCC
243	Rim_wavelet-LHH_gldm_Idmn
244	Rim_wavelet-LHH_glszm_SizeZoneNonUniformityNormalized
245	Rim_wavelet-LHL_firstorder_Kurtosis
246	Rim_wavelet-LHL_firstorder_Mean
247	Rim_wavelet-LHL_firstorder_Minimum
248	Rim_wavelet-LHL_firstorder_Skewness
249	Rim_wavelet-LHL_gldm_ClusterShade
250	Rim_wavelet-LHL_gldm_Correlation
251	Rim_wavelet-LHL_gldm_Imc1
252	Rim_wavelet-LHL_gldm_MCC
253	Rim_wavelet-LHL_gldm_Idmn
254	Rim_wavelet-LHL_gldm_LargeDependenceLowGrayLevelEmphasis
255	Rim_wavelet-LHL_gldm_Kurtosis
256	Rim_wavelet-LHL_gldm_Maximum
257	Rim_wavelet-LHL_gldm_Mean
258	Rim_wavelet-LHL_gldm_Minimum
259	Rim_wavelet-LHL_gldm_Skewness
260	Rim_wavelet-LHL_gldm_ClusterShade
261	Rim_wavelet-LHL_gldm_Correlation
262	Rim_wavelet-LHL_gldm_Idmn
263	Rim_wavelet-LHL_gldm_Imc1
264	Rim_wavelet-LHL_glszm_SizeZoneNonUniformityNormalized
265	Rim_wavelet-LHL_gldm_Kurtosis
266	Rim_wavelet-LHL_gldm_Maximum
267	Rim_wavelet-LHL_gldm_Mean
268	Rim_wavelet-LHL_gldm_Minimum
269	Rim_wavelet-LHL_gldm_Skewness
270	Rim_wavelet-LHL_gldm_ClusterShade
271	Rim_wavelet-LHL_gldm_Correlation
272	Rim_wavelet-LHL_gldm_Idmn
273	Rim_wavelet-LHL_gldm_Imc1
274	Rim_wavelet-LHL_gldm_MCC
275	Rim_wavelet-LHL_gldm_Idmn
276	Rim_wavelet-LHL_glszm_SizeZoneNonUniformityNormalized
277	Rim_wavelet-HHL_ngtdm_Contrast
278	Rim_wavelet-HHL_firstorder_Kurtosis
279	Rim_wavelet-HHH_firstorder_Maximum
280	Rim_wavelet-HHH_firstorder_Minimum
281	Rim_wavelet-HHH_firstorder_Skewness
282	Rim_wavelet-HHH_gldm_ClusterShade
283	Rim_wavelet-HHH_gldm_Correlation
284	Rim_wavelet-HHH_gldm_Imc1
285	Rim_wavelet-HHH_gldm_MCC
286	Rim_wavelet-HHH_gldm_Idmn
287	Rim_wavelet-HHH_glszm_LargeAreaEmphasis
288	Rim_wavelet-HHH_glszm_SizeZoneNonUniformityNormalized
289	Rim_wavelet-HHH_gldm_DependenceVariance
290	Rim_wavelet-LLL_gldm_Imc1
291	Rim_wavelet-LLL_glszm_LargeAreaLowGrayLevelEmphasis
292	Exterior_original_shape_Compactness1
293	Exterior_original_shape_SurfaceVolumeRatio
294	Exterior_original_shape_Flatness
295	Exterior_original_firstorder_10Percentile
296	Exterior_original_firstorder_90Percentile
297	Exterior_original_firstorder_Maximum
298	Exterior_original_firstorder_Minimum
299	Exterior_original_gldm_Idmn
300	Exterior_original_glszm_LargeAreaEmphasis
301	Exterior_original_glszm_SizeZoneNonUniformityNormalized
302	Exterior_original_ngtdm_Busyness
303	Exterior_log-sigma-0-5-mm-3D_firstorder_Mean
304	Exterior_log-sigma-0-5-mm-3D_firstorder_Minimum
305	Exterior_log-sigma-0-5-mm-3D_firstorder_Skewness
306	Exterior_log-sigma-0-5-mm-3D_gldm_Correlation
307	Exterior_log-sigma-0-5-mm-3D_gldm_ClusterShade
308	Exterior_log-sigma-0-5-mm-3D_gldm_Correlation
309	Exterior_log-sigma-0-5-mm-3D_gldm_Idmn
310	Exterior_log-sigma-0-5-mm-3D_gldm_Imc1
311	Exterior_log-sigma-0-5-mm-3D_gldm_Imc2
312	Exterior_log-sigma-0-5-mm-3D_gldm_MCC
313	Exterior_log-sigma-0-5-mm-3D_gldm_LongRunHighGrayLevelEmphasis
314	Exterior_log-sigma-0-5-mm-3D_gldm_SmallDependenceLowGrayLevelEmphasis
315	Exterior_log-sigma-0-5-mm-3D_glszm_SizeZoneNonUniformityNormalized
316	Exterior_log-sigma-0-5-mm-3D_glszm_GrayLevelNonUniformityNormalized
317	Exterior_log-sigma-0-5-mm-3D_gldm_SmallDependenceLowGrayLevelEmphasis
318	Exterior_log-sigma-1-0-mm-3D_firstorder_Kurtosis
319	Exterior_log-sigma-1-0-mm-3D_firstorder_Minimum
320	Exterior_log-sigma-1-0-mm-3D_firstorder_Skewness
321	Exterior_log-sigma-1-0-mm-3D_gldm_ClusterShade
322	Exterior_log-sigma-1-0-mm-3D_gldm_Correlation
323	Exterior_log-sigma-1-0-mm-3D_gldm_Idmn
324	Exterior_log-sigma-1-0-mm-3D_gldm_Imc1
325	Exterior_log-sigma-1-0-mm-3D_gldm_Imc2
326	Exterior_log-sigma-1-0-mm-3D_gldm_MCC
327	Exterior_log-sigma-1-0-mm-3D_gldm_LongRunHighGrayLevelEmphasis
328	Exterior_log-sigma-1-0-mm-3D_gldm_LongRunLowGrayLevelEmphasis
329	Exterior_log-sigma-1-0-mm-3D_gldm_SizeZoneNonUniformityNormalized
330	Exterior_log-sigma-1-0-mm-3D_gldm_SmallDependenceLowGrayLevelEmphasis
331	Exterior_log-sigma-1-5-mm-3D_firstorder_Minimum
332	Exterior_log-sigma-1-5-mm-3D_gldm_Correlation
333	Exterior_log-sigma-1-5-mm-3D_gldm_Idmn
334	Exterior_log-sigma-1-5-mm-3D_gldm_InverseVariance
335	Exterior_log-sigma-1-5-mm-3D_gldm_LongRunHighGrayLevelEmphasis
336	Exterior_log-sigma-1-5-mm-3D_glszm_SizeZoneNonUniformityNormalized
337	Exterior_log-sigma-1-5-mm-3D_gldm_SmallDependenceLowGrayLevelEmphasis
338	Exterior_log-sigma-2-0-mm-3D_firstorder_Minimum
339	Exterior_log-sigma-2-0-mm-3D_gldm_Idmn
340	Exterior_log-sigma-2-0-mm-3D_gldm_InverseVariance
341	Exterior_log-sigma-2-0-mm-3D_gldm_LongRunHighGrayLevelEmphasis
342	Exterior_log-sigma-2-0-mm-3D_gldm_LongRunLowGrayLevelEmphasis
343	Exterior_log-sigma-2-0-mm-3D_glszm_GrayLevelNonUniformityNormalized
344	Exterior_log-sigma-2-0-mm-3D_glszm_SizeZoneNonUniformityNormalized
345	Exterior_log-sigma-2-5-mm-3D_gldm_SmallDependenceLowGrayLevelEmphasis
346	Exterior_log-sigma-2-5-mm-3D_firstorder_Range
347	Exterior_log-sigma-2-5-mm-3D_gldm_Idmn
348	Exterior_log-sigma-2-5-mm-3D_gldm_InverseVariance
349	Exterior_log-sigma-2-5-mm-3D_gldm_LongRunLowGrayLevelEmphasis
350	Exterior_log-sigma-2-5-mm-3D_gldm_LongRunHighGrayLevelEmphasis
351	Exterior_log-sigma-2-5-mm-3D_glszm_LowGrayLevelZoneEmphasis
352	Exterior_log-sigma-2-5-mm-3D_glszm_SmallAreaLowGrayLevelEmphasis
353	Exterior_log-sigma-2-5-mm-3D_gldm_SmallDependenceHighGrayLevelEmphasis
354	Exterior_log-sigma-2-5-mm-3D_gldm_SmallDependenceLowGrayLevelEmphasis
355	Exterior_wavelet-LLH_firstorder_90Percentile
356	Exterior_wavelet-LLH_firstorder_Kurtosis
357	Exterior_wavelet-LLH_firstorder_Mean
358	Exterior_wavelet-LLH_firstorder_Minimum
359	Exterior_wavelet-LLH_firstorder_Maximum
360	Exterior_wavelet-LLH_firstorder_Skewness
361	Exterior_wavelet-LLH_gldm_ClusterShade
362	Exterior_wavelet-LLH_gldm_Correlation
363	Exterior_wavelet-LLH_gldm_Idmn
364	Exterior_wavelet-LLH_gldm_Imc1
365	Exterior_wavelet-LLH_glszm_LargeAreaLowGrayLevelEmphasis
366	Exterior_wavelet-LLH_glszm_SizeZoneNonUniformityNormalized
367	Exterior_wavelet-LLH_ngtdm_Busyness
368	Exterior_wavelet-LLH_ngtdm_Contrast
369	Exterior_wavelet-LHL_firstorder_90Percentile
370	Exterior_wavelet-LHL_firstorder_Kurtosis
371	Exterior_wavelet-LHL_firstorder_Maximum
372	Exterior_wavelet-LHL_firstorder_Minimum
373	Exterior_wavelet-LHL_firstorder_Skewness
374	Exterior_wavelet-LHL_gldm_ClusterShade

**Table S3** Performance of radiomics model and combined model in prediction of EGFR mutation

Random Forest	Radiomics model						Combined model					
	S1	S2	S3	S4	S5	Mean	S1	S2	S3	S4	S5	Mean
Training set (mutation+)	79 (37)	79 (37)	79 (37)	79 (36)	80 (37)		79 (37)	79 (37)	79 (37)	79 (36)	80 (37)	
Validation set (mutation+)	20 (9)	20 (9)	20 (9)	20 (10)	19 (9)		20 (9)	20 (9)	20 (9)	20 (10)	19 (9)	
Training												
Accuracy	0.65	0.79	0.87	0.61	0.94	0.77	0.75	0.80	0.76	0.72	0.71	0.75
Recall	0.97	0.81	0.97	0.94	0.92	0.92	0.78	0.78	0.62	0.69	0.51	0.68
Precision	0.57	0.75	0.80	0.54	0.94	0.72	0.71	0.78	0.88	0.74	0.88	0.76
Specificity	0.36	0.76	0.79	0.33	0.95	0.64	0.71	0.81	0.88	0.74	0.88	0.81
F1	0.72	0.78	0.88	0.69	0.93	0.80	0.74	0.78	0.71	0.69	0.62	0.71
AUC	0.67	0.79	0.88	0.64	0.94	0.78	0.75	0.80	0.75	0.72	0.70	0.74
Validation												
Accuracy	0.65	0.80	0.65	0.80	0.79	0.74	0.75	0.85	0.80	0.95	0.84	0.84
Recall	0.89	1.00	0.67	1.0	0.78	0.87	0.67	0.89	0.67	1.00	0.78	0.80
Precision	0.57	0.69	0.60	0.71	0.78	0.67	0.75	0.80	0.86	0.91	0.88	0.84
Specificity	0.46	0.64	0.64	0.60	0.80	0.63	0.82	0.82	0.91	0.90	0.90	0.87
F1	0.70	-0.82	0.63	0.83	0.78	0.75	0.71	0.84	0.75	0.95	0.82	0.81
AUC	0.67	0.82	0.65	0.80	0.79	0.75	0.74	0.85	0.79	0.95	0.84	0.83

EGFR, epidermal growth factor receptor; AUC, area under the curve.

**Table S4** Selected features and coefficient in each prediction models

Features	S1	S2	S3	S4	S5
Radiomics model					
GTVp_log-sigma-2-5-mm-3D_firstorder_Minimum	<0.0001	n.a	n.a	n.a	n.a
GTVp_wavelet-HLL_firstorder_90Percentile	<0.0001	n.a	n.a	n.a	n.a
GTVp_wavelet-HHH_gldm_DependenceVariance	1	0.69	0.25	1	0.10
Rim_wavelet-HLH_gldm_Correlation	<0.0001	n.a	n.a	n.a	0.15
Exterior_wavelet-LHL_firstorder_90Percentile	<0.0001	0.23	n.a	n.a	0.21
Exterior_wavelet-HHL_firstorder_Kurtosis	<0.0001	n.a	n.a	n.a	0.064
Rim_log-sigma-2-0-mm-3D_gldm_Correlation	n.a	0.088	n.a	n.a	n.a
GTVp_original_firstorder_Entropy	n.a	n.a	0.26	n.a	n.a
GTVp_wavelet-LHH_gldm_Imc1	n.a	n.a	0.20	n.a	n.a
GTVp_wavelet-HHH_gldm_DependenceNonUniformityNormalized	n.a	n.a	0.29	n.a	n.a
Exterior_wavelet-HHL_gldm_MCC	n.a	n.a	n.a	<0.0001	n.a
GTVp_log-sigma-1-0-mm-3D_gldm_DependenceEntropy	n.a	n.a	n.a	n.a	0.088
Rim_wavelet-LHL_gldm_Imc1	n.a	n.a	n.a	n.a	0.098
Exterior_wavelet-HHH_firstorder_Skewness	n.a	n.a	n.a	n.a	0.14
Exterior_wavelet-HHH_gldm_Correlation	n.a	n.a	n.a	n.a	0.15
Combined model					
GTVp_log-sigma-2-5-mm-3D_firstorder_Minimum	0.037	n.a	n.a	n.a	n.a
GTVp_wavelet-HLL_firstorder_90Percentile	<0.0001	n.a	n.a	n.a	n.a
GTVp_wavelet-HHH_gldm_DependenceVariance	0.059	0.26	0.17	0.33	0.20
Rim_wavelet-HLH_gldm_Correlation	<0.0001	n.a	n.a	n.a	<0.0001
Exterior_wavelet-LHL_firstorder_90Percentile	0.59	0.20	n.a	n.a	0.40
Exterior_wavelet-HHL_firstorder_Kurtosis	0.0019	n.a	n.a	n.a	0.20
Sex	0.20	0.026	0.21	0.50	<0.0001
Smoking	0.12	0.25	0.13	<0.0001	<0.0001
Rim_log-sigma-2-0-mm-3D_gldm_Correlation	n.a	0.26	n.a	n.a	n.a
GTVp_original_firstorder_Entropy	<0.0001	<0.0001	0.083	<0.0001	<0.0001
GTVp_wavelet-LHH_gldm_Imc1	n.a	n.a	0.17	n.a	n.a
GTVp_wavelet-HHH_gldm_DependenceNonUniformityNormalized	n.a	n.a	0.25	n.a	n.a
Exterior_wavelet-HHL_gldm_MCC	n.a	n.a	n.a	0.17	n.a
GTVp_log-sigma-1-0-mm-3D_gldm_DependenceEntropy	n.a	n.a	n.a	n.a	<0.0001
Rim_wavelet-LHL_gldm_Imc1	n.a	n.a	n.a	n.a	<0.0001
Exterior_wavelet-HHH_firstorder_Skewness	n.a	n.a	n.a	n.a	<0.0001
Exterior_wavelet-HHH_gldm_Correlation	n.a	n.a	n.a	n.a	0.2

Each coefficient was standardized so that the sum of the selected coefficients in each model was exactly 1. By performing the standardization, we were able to estimate and compare the importance of each feature by considering the average of five sessions. Not applicable (n.a.) was indicated when the feature was not selected in each session but was selected in other sessions, which was considered 0 when the average was calculated. HLL, HHL, LHL, HLH: wavelet filter. GTV, gross tumor volume; log, Laplacian-of-Gaussian.

**Table S5** Performance of clinical model and all-combined model in prediction of EGFR mutation

Random Forest	Clinical model						All-combined model					
	S1	S2	S3	S4	S5	Mean	S1	S2	S3	S4	S5	Mean
Training set (mutation+)	79 (37)	79 (37)	79 (37)	79 (36)	80 (37)		79 (37)	79 (37)	79 (37)	79 (36)	80 (37)	
Validation set (mutation+)	20 (9)	20 (9)	20 (9)	20 (10)	19 (9)		20 (9)	20 (9)	20 (9)	20 (10)	19 (9)	
Training												
Accuracy	0.72	0.73	0.57	0.71	0.66	0.68	0.76	0.79	0.77	0.70	0.78	0.76
Recall	0.78	0.65	0.62	0.78	0.81	0.73	0.73	0.84	0.70	0.69	0.70	0.73
Precision	0.67	0.75	0.54	0.65	0.60	0.64	0.75	0.74	0.79	0.66	0.79	0.74
Specificity	0.67	0.81	0.52	0.65	0.54	0.64	0.79	0.74	0.83	0.70	0.84	0.78
F1	0.73	0.70	0.58	0.71	0.69	0.68	0.74	0.79	0.74	0.68	0.74	0.76
AUC	0.73	0.73	0.57	0.71	0.67	0.68	0.76	0.79	0.79	0.70	0.77	0.74
Validation												
Accuracy	0.80	0.85	0.75	0.80	0.63	0.77	0.70	0.85	0.80	0.95	0.79	0.82
Recall	0.78	0.89	0.78	0.80	0.67	0.78	0.67	1.00	0.67	1.00	0.89	0.84
Precision	0.78	0.80	0.70	0.80	0.60	0.74	0.67	0.75	0.86	0.91	0.73	0.78
Specificity	0.82	0.82	0.73	0.80	0.60	0.75	0.73	0.73	0.91	0.95	0.70	0.79
F1	0.78	0.84	0.74	0.80	0.63	0.76	0.67	0.86	0.86	0.95	0.80	0.81
AUC	0.80	0.85	0.75	0.80	0.63	0.77	0.70	0.86	0.79	0.95	0.79	0.82

EGFR, epidermal growth factor receptor; AUC, area under the curve.