

Additional file

Table S1: Histogram parameters of Apparent diffusion coefficient (*ADC*), Diffusion-coefficient (*D*), Perfusion-coefficient (*D**) & Perfusion-fraction (*f*) observed in different response groups: Good-response (GR) and poor-response (PR) at time points t0 (before chemotherapy), t1 (after 1st cycle of chemotherapy) and t2 (after completion of chemotherapy) and their relative percentage changes between time points t0 & t1 (ΔI) and t0 & t2 (ΔII). Significant values ($p < 0.05$) are in bold.

	Good-response (n=13)					Poor-response (n=22)				
	t0	t1	t2	ΔI (%)	ΔII (%)	t0	t1	t2	ΔI (%)	ΔII (%)
ADC										
Mean	1.30±0.29^{**}	1.53±0.28^{*†}	1.66±0.21[#]	20.08±20.24	31.35±21.99	1.41±0.36^{**}	1.74±0.32^{*†}	1.75±0.30[#]	29.0±31.17	30.01±33.74
SD (10 ⁻¹)	4.1±0.06	4.37±0.06	4.7±0.04	7.87±17.94	21.09±34.06	4.6±1.1	4.41±1.03	4.55±1.26	-1.18±19.72	3.35±27.52
Skewness	0.87±0.51^{**}	0.09±0.56[*]	-0.27±0.43[#]	-72.74±72.42	-112.3±85.95	0.57±0.67^{**}	-0.12±0.74[*]	-0.22±0.60[#]	-31.98±54.66	-56.83±284.8
Kurtosis	4.50±1.57	3.86±1.70	3.38±0.63	-8.61±39.17	-15.82±34.14	4.41±2.15	4.21±1.24	4.01±0.98	6.80±41.29	1.58±36.17
Energy (10 ⁻³)	1.45±0.33	1.22±0.44	1.14±0.25	-14.20±28.51	-17.79±26.74	1.59±1.12	1.26±0.33	1.49±0.78	-6.22±28.68	17.25±86.04
Entropy	6.75±0.21	6.92±0.31	6.96±0.23	2.34±4.16	2.99±4.35	6.86±0.30	6.89±0.25	6.83±0.30	0.59±3.17	-0.28±5.14
90 th percentile	1.85±0.29^{**}	2.09±0.29^{*†}	2.25±0.25[#]	13.84±12.71	24.06±22.05	2.02±0.43^{**}	2.29±0.32^{*†}	2.32±0.30[#]	17.37±22.31	18.61±23.85
75 th percentile	1.53±0.32^{**}	1.82±0.30[*]	2.0±0.22[#]	21.41±19.03	34.96±24.76	1.68±0.42^{**}	2.03±0.35[*]	2.06±0.33[#]	26.58±33.75	29.06±35.63
60 th percentile	1.33±0.32^{**}	1.64±0.30[*]	1.81±0.21[#]	25.74±23.33	40.66±25.29	1.47±0.41^{**}	1.85±0.36[*]	1.86±0.33[#]	32.76±38.60	34.40±41.31
50 th percentile	1.23±0.32^{**}	1.53±0.30[*]	1.69±0.21[#]	27.69±25.83	42.44±25.58	1.36±0.39^{**}	1.74±0.36[*]	1.75±0.34[#]	35.38±39.57	36.85±43.16
25 th percentile	1.02±0.30^{**}	1.24±0.29[*]	1.33±0.26[#]	26.39±30.32	36.61±27.78	1.10±0.33^{**}	1.68±0.29[*]	1.46±0.35[#]	39.81±39.54	41.62±46.13
D										
Mean	1.21±0.28^{**}	1.44±0.28^{*†}	1.57±0.20[#]	21.63±27.15	33.08±18.73	1.35±0.32^{**}	1.68±0.29^{*†}	1.66±0.27[#]	28.68±28.12	27.60±29.48
SD (10 ⁻¹)	4.5±1.1	4.65±1.0	4.75±1.05	6.56±17.91	11.76±36.99	4.5±1.2	4.32±1.1	4.3±1.1	-0.89±20.32	0.44±28.20
Skewness	0.62±0.48^{**}	0.03±0.64[*]	-0.23±0.51[#]	-155.8±163.35	-207.8±293.9	0.54±0.74^{**}	-0.12±0.76[*]	-0.31±0.51[#]	-282.67±142.9	-179.4±299.5
Kurtosis	4.23±1.50	3.97±1.10	3.82±0.88	1.23±33.61	-1.81±34.60	4.81±2.48	4.72±1.96	4.22±1.54	10.71±49.92	0.08±40.74
Energy (10 ⁻³)	1.77±3.5	1.45±0.59	1.31±0.35	0.02±57.67	-11.24±37.64	2.24±2.96	1.45±0.48	1.54±0.63	-8.49±37.96	-3.0±47.75
Entropy	6.64±0.51	6.86±0.19	6.83±0.25	4.01±10.68	3.67±11.06	6.75±0.27	6.79±0.34	6.73±0.36	0.58±4.45	-0.19±5.58
90 th percentile	1.80±0.22^{**}	2.01±0.23^{*†}	2.13±0.19[#]	12.31±12.48	20.08±17.51	1.93±0.36^{**}	2.21±0.28^{*†}	2.19±0.24[#]	16.59±18.50	15.79±18.62
75 th percentile	1.47±0.28^{**}	1.74±0.27^{*†}	1.89±0.18[#]	19.95±18.97	31.57±19.76	1.62±0.37^{**}	1.96±0.31^{*†}	1.96±0.27[#]	24.89±28.43	25.01±28.28
60 th percentile	1.27±0.29^{**}	1.56±0.30^{*†}	1.72±0.19[#]	24.99±24.22	38.88±20.91	1.42±0.36^{**}	1.79±0.33^{*†}	1.78±0.3[#]	31.46±33.60	31.14±35.19
50 th percentile	1.16±0.30^{**}	1.45±0.31^{*†}	1.60±0.21[#]	27.41±27.76	42.04±21.63	1.32±0.35^{**}	1.69±0.33^{*†}	1.68±0.31[#]	34.43±35.34	34.02±38.21
25 th percentile	0.89±0.38^{**}	1.13±0.34^{*†}	1.27±0.26[#]	104.38±305.1	93.08±183.54	1.05±0.32^{**}	1.42±0.32^{*†}	1.40±0.32[#]	41.94±40.99	41.68±46.89
D*										
Mean	23.76±7.56^{**}	19.77±4.20	17.76±6.02[#]	-14.86±26.63	-18.93±32.52	30.95±10.80^{**}	25.32±12.47	23.44±10.65[#]	-10.45±50.65	-20.05±31.78
SD	23.69±4.26	21.93±3.09	20.46±5.12	-5.41±18.57	-9.84±33.56	26.01±3.24	22.38±6.18	22.22±5.96	-12.27±27.46	-13.40±23.41
Skewness	1.10±0.60[†]	1.42±0.51	1.65±0.68	73.99±133.01	132.6±253.8	0.67±0.65[†]	1.23±1.07	1.20±0.70	44.18±208.63	227.9±334.8

Kurtosis	3.58±1.79	4.48±2.43	5.76±3.50	38.03±51.79	100.8±145.6	2.61±1.30	5.21±5.41	4.19±2.54	129.01±260.22	72.93±102.28
Energy (10 ⁻³)	0.41±0.32	0.71±1.09	0.65±0.51	108.52±385.9	186.2±233.5	1.15±3.51	0.34±0.37	0.44±0.51	130.21±140.1	225.2±238.9
Entropy	8.46±0.89[†]	8.67±0.67	8.12±0.80	3.75±16.59	-3.51±9.71	9.08±0.78[†]	8.86±0.91	8.58±0.91	-2.0±11.32	-5.01±11.69
90 th percentile	60.28±14.15^{#†}	55.43±10.33	49.59±16.35[#]	-3.40±29.10	-11.58±41.65	70.64±11.25^{#†}	58.28±21.58[*]	57.91±18.58[#]	-14.92±35.63	-16.42±26.76
75 th percentile	38.71±15.69^{#†}	29.72±9.16	26.26±13.31[#]	-15.19±34.12	-22.43±45.68	49.85±16.69^{#†}	39.18±21.74[*]	36.05±17.79[#]	-11.84±60.03	-22.83±34.95
60 th percentile	23.14±11.82[#]	15.86±6.91	14.16±8.41[#]	-16.42±44.01	-27.30±43.79	33.56±18.27^{#†}	26.14±18.33[*]	22.43±15.41[#]	7.08±117.93	-18.99±60.46
50 th percentile	14.92±9.14	10.29±5.61	8.84±5.27	-10.11±57.92	-23.05±49.48	24.56±17.04	19.33±15.42	15.96±13.65	31.19±94.92	-10.66±73.38
25 th percentile	4.28±3.74	3.53±2.26	2.97±1.77	-8.39±41.27	-12.49±78.23	8.35±8.54	6.97±6.84	5.75±5.95	95.94±179.54	26.62±164.04

f										
Mean	13.31±2.68	13.36±2.04	12.55±1.24	3.15±20.28	-2.16±21.90	14.05±2.99	12.89±2.69	13.22±2.54	-5.56±21.42	-2.74±23.86
SD	8.25±2.63	8.12±3.30	7.68±1.73	-0.16±25.84	-2.62±45.07	8.53±3.21[*]	6.81±1.98[*]	7.12±1.74	-14.22±26.75	-6.61±33.21
Skewness	0.95±0.33	1.03±0.30	1.07±0.42	15.49±40.23	23.49±53.03	1.08±0.41	0.96±0.43	1.08±0.47	21.08±132.94	72.87±119.23
Kurtosis	4.82±2.07	5.19±1.55	5.52±2.59	14.13±29.17	21.92±46.09	5.34±1.67	5.40±2.12	5.86±2.05	9.14±55.91	18.66±54.38
Energy (10 ⁻³)	0.19±0.10	0.26±0.30	0.30±0.20	50.48±219.6	83.85±156.6	0.48±0.95	0.21±0.23	0.29±0.23	29.51±137.5	133.6±160.6
Entropy	8.66±0.90[†]	9.07±0.77	8.53±0.74	6.13±19.05	-0.96±8.74	9.06±0.69[†]	8.99±0.81	8.64±0.79	-0.54±7.27	-4.33±8.77
90 th percentile	24.17±5.86	23.69±6.22	22.02±4.37	-0.86±17.02	-5.25±27.98	25.06±6.45	21.53±5.15	22.33±4.55	-10.24±23.92	-5.81±27.49
75 th percentile	18.24±3.95	18.00±3.93	16.54±2.54	0.08±16.37	-6.26±22.61	18.68±4.26	16.81±3.94	17.21±3.42	-7.11±22.73	-4.01±25.48
60 th percentile	14.48±2.94	14.32±2.04	13.44±1.45	1.59±19.34	-3.82±21.75	14.92±3.45	13.92±3.14	14.17±2.97	-3.79±22.73	-1.52±25.72
50 th percentile	12.23±2.67	12.24±1.37	11.70±0.92	4.90±28.05	0.63±26.91	12.82±3.08	12.24±2.75	12.43±2.76	-1.56±22.85	0.39±26.42
25 th percentile	7.07±2.13	7.12±1.84	7.03±1.02	6.31±35.30	8.21±35.73	7.77±2.32	7.83±2.4	7.89±2.30	5.93±26.07	8.60±33.03

D*, f										
	t0	t1	t2	ΔI (%)	ΔII (%)	t0	t1	t2	ΔI (%)	ΔII (%)
Mean	3.85±1.90[#]	2.97±1.02[†]	2.53±1.37[#]	-12.12±34.90	-26.64±49.64	5.12±2.52^{#†}	4.49±2.31^{*†}	3.50±1.86[#]	-4.90±39.22	-23.72±30.43
SD	4.97±2.15	4.37±1.81	4.32±1.73	-6.30±35.25	3.72±73.41	5.81±1.76	4.30±1.80	4.36±1.47	-21.66±32.99	-19.48±28.79
Skewness	2.80±1.11	3.24±0.84	3.40±0.64	25.69±38.05	37.82±58.30	2.27±0.93	2.91±1.44	3.02±0.83	47.80±105.12	53.84±77.26
Kurtosis	15.86±10.10	19.33±8.32	19.68±6.84	52.05±82.71	78.81±145.24	11.33±7.16	18.68±14.77	17.46±7.33	123.9±252.6	105.75±141.12
Energy (10 ⁻³)	3.82±3.73	4.97±7.40	4.32±2.63	74.54±214.8	155.5±240.8	3.08±4.57	2.68±2.85	2.56±2.11	161.8±379.8	167.7±308.8
Entropy	6.88±0.85^{#†}	6.88±0.42	6.54±0.62[#]	1.47±15.12	-4.02±11.26	7.55±0.78^{#†}	7.16±0.87	6.96±0.63[#]	-4.31±14.53	-7.12±10.70
90 th percentile	10.02±5.69	8.34±3.88	7.46±3.57	-3.50±42.69	-2.60±75.03	12.55±5.09^{#†}	9.49±4.73[*]	8.31±3.95[#]	-16.58±44.47	-25.03±39.12
75 th percentile	5.29±3.21	4.67±2.42	3.37±1.81	-8.80±42.62	-16.43±60.41	7.21±4.02^{#†}	5.3±3.74[*]	4.50±2.96[#]	-8.90±59.83	-25.64±41.71
60 th percentile	2.92±1.85[#]	1.97±0.60	1.71±0.91[#]	-8.55±47.75	-22.54±45.61	4.50±3.23[#]	3.43±3.02	2.68±2.31[#]	3.58±88.45	-24.29±43.92
50 th percentile	1.87±1.33	1.24±0.49	1.05±0.52	-0.67±68.67	-19.29±51.46	3.17±2.63[#]	2.49±2.50	1.90±1.91[#]	15.9±118.5	-19.27±53.82
25 th percentile	0.50±0.50	0.41±0.29	0.30±0.22[†]	-0.56±75.27	-16.38±85.26	0.98±1.06	0.84±1.11	0.69±0.81[†]	26.74±133.16	54.38±136.22

Mean, SD (Standard-Deviation), 90th, 70th, 50th and 25th percentiles values of ADC, D, D* and D*f are in x10⁻³mm²/s; Mean, SD (Standard-Deviation), 90th, 70th, 50th and 25th percentiles values of f are in percentage (%).

* Intra-group significant change (p<0.05) according to paired t-test between time point t0 and t1

Intra-group significant change (p<0.05) according to paired t-test between time point t0 and t2

† Inter-group significant difference (p<0.05) according to independent sample t test at individual time points t0, t1 and t2

Table S2: Variance inflation factor (VIF), Harrell's c-index and the corresponding generalization of Somers' *D* rank correlation (SDRC) for statistically significant ($p < 0.05$) imaging parameters by univariate cox regression analyses for association with Event free survival (EFS) in patient cohort.

Parameters	VIF score	c-index	SDRC	p-value
Derived from Apparent diffusion coefficient (ADC)				
ADC-Mean	1587	0.640	0.279	0.046
ADC-90 th percentile	220	0.630	0.260	0.050
ADC-75 th percentile	1613	0.626	0.252	0.081
ADC-60 th percentile	8336	0.632	0.264	0.061
ADC-50 th percentile	4825	0.62	0.241	0.087
ADC-25 th percentile	759	0.644	0.287	0.049
Derived from Diffusion coefficient (D)				
D-Mean	336	0.642	0.283	0.049
D-90 th percentile	95	0.640	0.279	0.040
D-75 th percentile	1172	0.620	0.241	0.099
D-60 th percentile	4822	0.636	0.272	0.069
D-50 th percentile	2442	0.632	0.264	0.081
D-25 th percentile	70	0.624	0.249	0.085
Derived from Perfusion coefficient (D*)				
D*-Mean	396	0.322	-0.356	0.001
D*-skewness	35	0.678	0.356	0.001
D*-75 th percentile	380	0.322	-0.356	0.001
D*-60 th percentile	715	0.339	-0.322	0.004
D*-50 th percentile	821	0.335	-0.329	0.003
D*-25 th percentile	44	0.337	-0.326	0.003
D*.f-60 th percentile	297	0.356	-0.287	0.014
D*.f-50 th percentile	467	0.366	-0.268	0.017
D*.f-25 th percentile	32	0.331	-0.337	0.003

Table S3: Variance inflation factor (VIF), Harrell's c-index and the corresponding generalization of Somers' *D* rank correlation (SDRC) for statistically significant ($p < 0.05$) imaging parameters by univariate cox regression analyses for association with Overall survival (OS) in patient cohort.

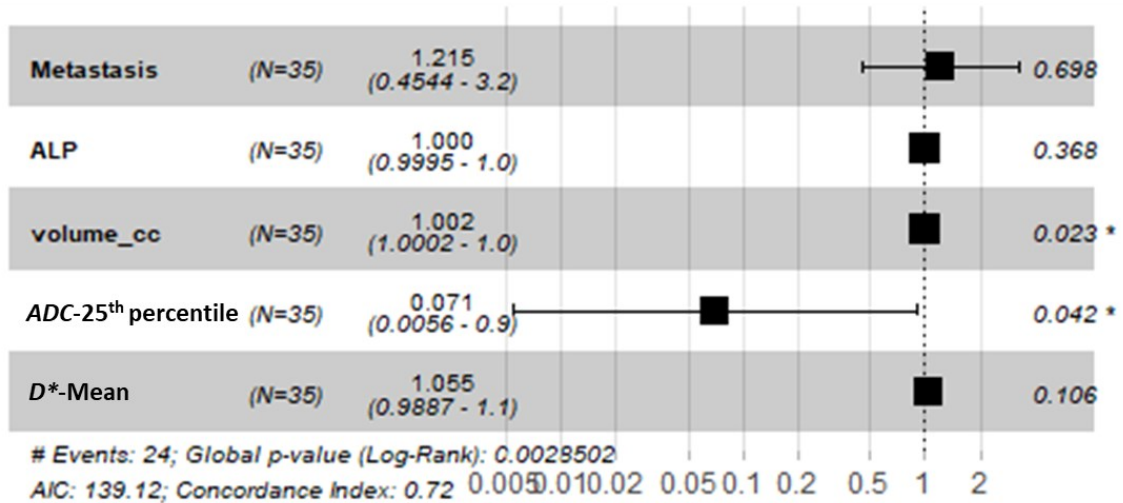
Parameters	VIF score	c-index	SDRC	p-value
Derived from Apparent diffusion coefficient (ADC)				

Derived from Diffusion coefficient (D)				

Derived from Perfusion coefficient (D*)				
D*-Mean	5563	0.308	-0.385	$<10^{-3}$
D*-skewness	80	0.676	0.351	0.002
D*-90 th percentile	266	0.312	-0.375	0.004
D*-75 th percentile	600	0.308	-0.385	0.001
D*-60 th percentile	1437	0.356	-0.288	0.012
D*-50 th percentile	1247	0.349	-0.303	0.010
D*-25 th percentile	262	0.341	-0.317	0.006
D*.f-skewness	103	0.630	0.259	0.060
D*.f-kurtosis	59	0.627	0.254	0.055
D*.f-entropy	5	0.349	-0.303	0.016
D*.f-60 th percentile	372	0.368	-0.264	0.025
D*.f-50 th percentile	598	0.361	-0.278	0.014
D*.f-25 th percentile	37	0.339	-0.322	0.003

Fig. S1: Hazard ratio Forest plot for multivariate cox regression analysis in patient cohort (n=35) for Event free survival (EFS) for a) EFS-Model-1 and b) EFS-Model-2.

a. Hazard ratio for event free survival analysis for EFS-Model-1



b. Hazard ratio for event free survival analysis for EFS-Model-2

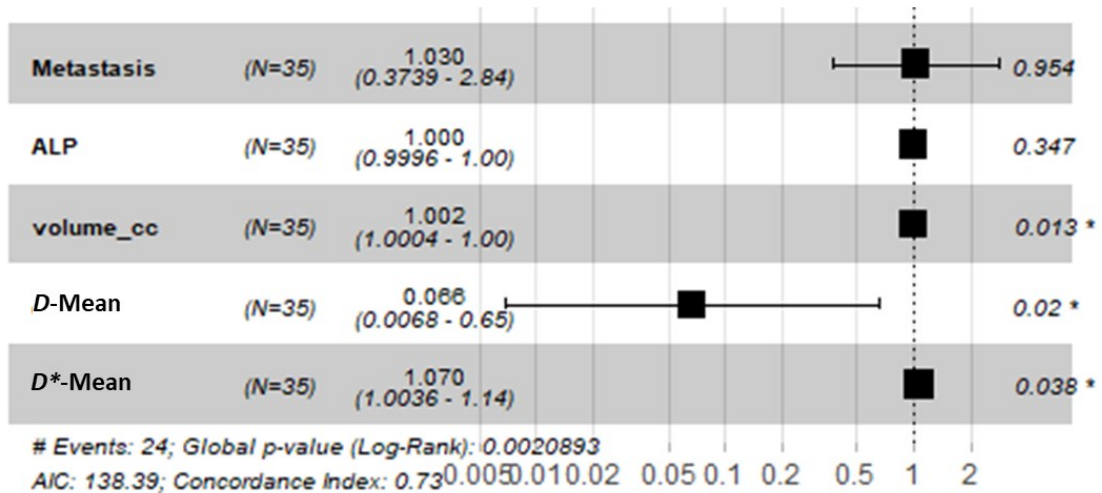
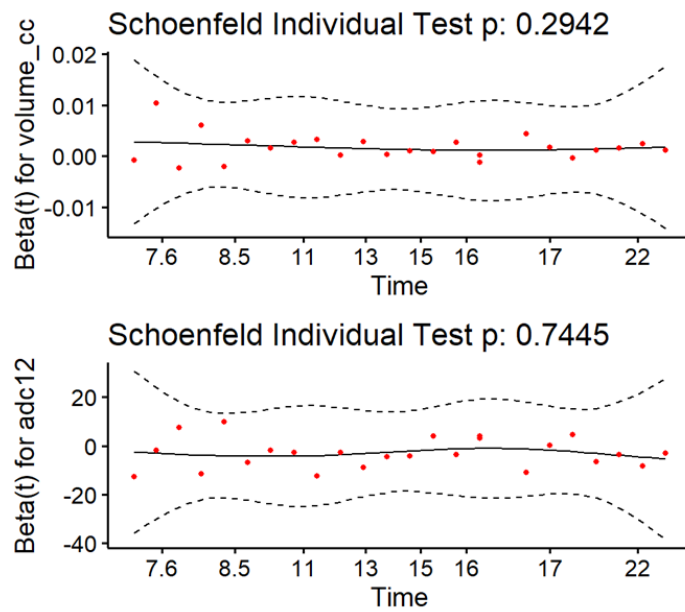


Fig. S2: Schoenfeld residual test to check proportional hazard function for Event free survival (EFS) for a) EFS-Model-1 (Tumour-volume, ADC -25th percentile) and b) EFS-Model-2 (Tumour-volume, D -Mean, D^* -Mean). This test infers that the hazards run proportionally to each other when the p -values are large ($p > 0.05$). The proportionality assumption is met for both the models as all covariates are between the residuals and the parallel lines. (volume_cc: Tumour-volume; adc12: ADC -25th percentile; d1: D -Mean; dp1: D^* -Mean).

a. EFS-Model-1

Global Schoenfeld Test p: 0.5729



b. EFS-Model-2

Global Schoenfeld Test p: 0.1886

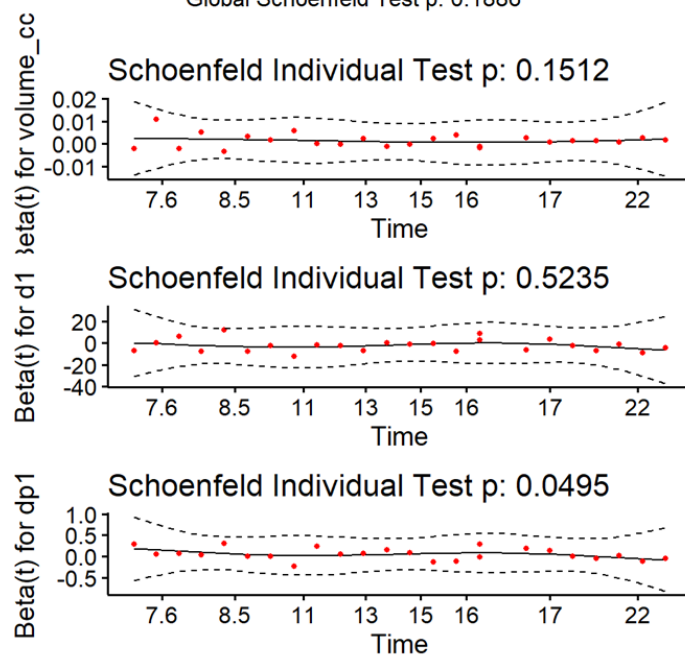
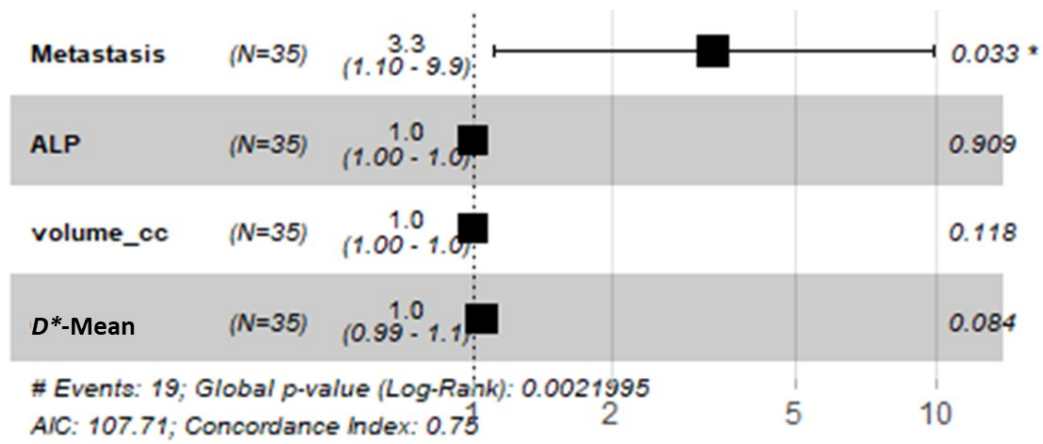


Fig. S3: Hazard ratio Forest plot for multivariate cox regression analysis in patient cohort (n=35) for overall survival (OS) for a) OS-Model-1 and b) OS-Model-2.

a. Hazard ratio for overall survival analysis for OS-Model-1



b. Hazard ratio for overall survival analysis for OS-Model-2

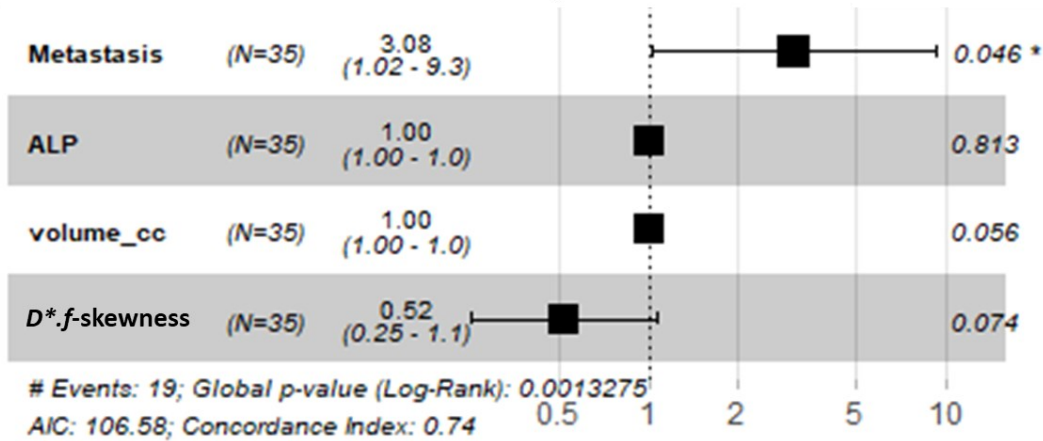
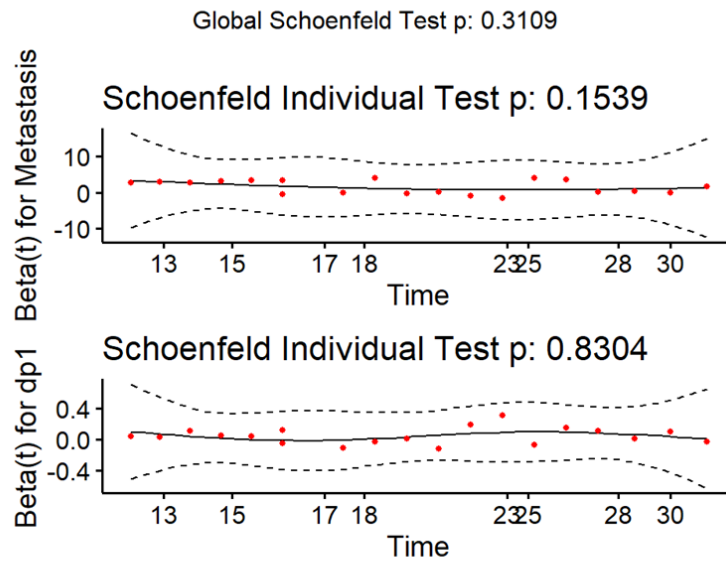


Fig. S4: Schoenfeld residual test to check proportional hazard function for Overall survival (OS) for a) OS-Model-1 (Metastasis, D^* -Mean) and b) OS-Model-2 (Metastasis, Tumour-volume, D^* -Skewness). This test infers that the hazards run proportionally to each other when the p -values are large ($p > 0.05$). The proportionality assumption is met for both the models as all covariates are between the residuals and the parallel lines. (volume_cc: Tumour-volume; dp1: D^* -Mean; dpf4: D^* -Skewness).

a. OS-Model-1



b. OS-Model-2

