Table 1. Multivariable analyses of the prognostic value of tumor deposits and different methods of N categories in patients with locally advanced rectal cancer with neoadjuvant chemoradiotherapy

Multivariable	OS			LRFS			DMFS			DFS		
Analyses	HR	95% CI	P	HR	95% CI	P	HR	95% CI	P	HR	95% CI	P
(a) All patients												
TD			0.014			0.038			0.095			0.008
negative	1.000			1.000			1.000			1.000		
positive	1.774	1.124	2.800	2.072	1.040	4.127	1.433	.939	2.187	1.638	1.135	2.363
(b) Lymph nodes negative patients												
TD			0.008			0.184			0.005			0.001
negative	1.000			1.000			1.000			1.000		
positive	2.622	1.267	5.021	2.109	.701	6.343	2.338	1.286	4.251	2.463	1.472	4.121
(c) N categories												
pN (method 1)			0.242			0.708			0.079			0.098
N0	1.000			1.000			1.000			1.000		
N1	1.454	.864	2.445	0.159	1.252	0.572	2.740	0.573	0.031	1.653	1.047	0.031
N2	1.678	.851	3.308	0.135	1.499	0.563	3.993	0.418	0.107	1.686	0.893	0.107
n1N (method 2)			0.003			0.202			0.001			< 0.001
N0	1.000			1.000			1.000			1.000		
N1	2.237	1.357	3.689	0.002	1.630	0.785	3.386	0.190	2.161	1.403	3.329	0.000
N2	2.807	1.378	5.720	0.004	2.353	0.995	6.187	0.063	2.396	1.268	4.528	0.007
n2N (method 3)			0.003			0.079			0.001			< 0.001
N0	1.000			1.000			1.000			1.000		
N1	2.139	1.273	3.595	0.004	1.450	0.674	3.123	0.342	2.100	1.344	3.282	0.001
N2	2.766	1.496	5.188	0.001	2.724	1.129	6.572	0.026	2.478	1.422	4.319	0.001

Conclusion

Tumor deposits are independent poor prognostic factors in LARC patients following neo-CRT and surgery. The N1c category is also applicable in lymph nodes negative patients. However, it needs further studies to investigate whether one positive TD could be considered as one positive lymph node.

PO-0792 Rectal cancer: multiparametric MRI assessment of tumour heterogeneity and chemoradiotherapy response

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Purpose or Objective

Imaging prediction of chemoradiotherapy (CRT) response in locally advanced rectal cancer would enable stratification of management. Tumours are heterogeneous in their response to treatment and assessment of this heterogeneity may improve therapeutic response prediction. The purpose of this study was to prospectively evaluate multi-parametric MRI using a 3-dimensional quantitative histogram analysis for assessment of tumour heterogeneity and response to CRT in rectal cancer.

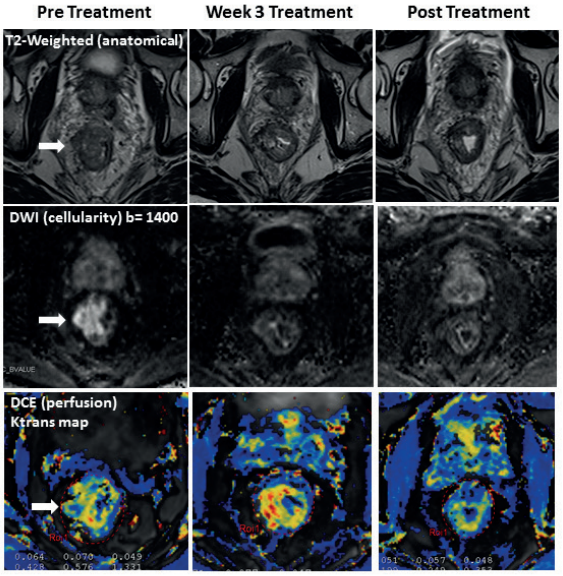
Material and Methods

Thirty-nine patients with locally advanced rectal cancer (Stage II-III) undergoing pre-operative CRT followed by surgery were enrolled on this study. MRI was performed pre-CRT, week 3 CRT and post-CRT (pre-surgery). The protocol consisted of diffusion weighted imaging (DWI) using a read-out segmented sequence, and dynamic contrast enhanced (DCE) with pre-contrast T1-weighted scans for T1 calculation, followed by 60 phases at high temporal resolution after gadolinium (Gadoversetamide) injection. CRT response was defined according to AJCC 7th Edition tumour regression grade (TRG). The whole original tumour site was embedded for microscopic assessment. Two dedicated gastrointestinal pathologists examined each case and reached consensus on TRG. TRG 0–1 were classified as responders and TRG 2–3 as non-responders. Semi-automated segmentation was used to define the whole hyperintense tumour on b-value 1400s/mm^2 images. A voxel-by-voxel analysis of whole tumour was used to produce histograms of ADC from DWI and K^{trans} from DCE, and combined scatterplots for each time-point. The ADC and K^{trans} 10th, 25th, 50th, 75th and 90th percentiles by response status were assessed using two-sample t-tests.

Results

Of 39 patients, 6 had Stage II and 33 had Stage III disease at diagnosis. Three patients had pathologic complete response TRG 0 (7.7%), 12 had TRG 1 (30.8%), 14 had TRG 2 (35.9%), and 3 had TRG 3 (7.7%). One patient who refused surgery had a clinical complete response (2.6%) on colonoscopy and biopsy at 18 months. Five patients with mucinous pathology (12.8%) and 1 (2.6%) who did not have response status were excluded from analysis. The ADC and K^{trans} histograms demonstrated intra-tumour heterogeneity in response to CRT. Of the histogram quantiles tested, post-CRT ADC 75th (responders vs. non-responders 1620x10^{-6} vs. 1547x10^{-6}, p=0.036) and 90th percentiles (responders vs. non-responders 1859x10^{-6} vs 1753x10^{-6}, p=0.019) were the best histogram parameters for predicting response. K^{trans} was not significantly different between responders and non-responders (p>0.10). There was no bivariate pattern on combined scatterplots of ADC and K^{trans} by response status.

Figure 1 Multi-parametric MRI at 3 time-points for a pathologic complete responder (AJCC TRG 0).The arrow indicates the rectal tumour.



Conclusion

Post-CRT ADC 75th and 90th quantiles were promising parameters for prediction of CRT response in patients with locally advanced rectal cancer. DCE-MRI and multi-parametric scatterplots did not add value in predicting response.