monitor patient response non-invasively during treatment, which could help inform physicians about whether a patient may require treatment adaption. This study demonstrated that three delta-radiomics texture features extracted from low-field MR images during SBRT in liver were able to differentiate between local disease control and local control failure.

Table 1: The table below displays the mean delta-radiomic texture features for each group of patients along with the standard deviation. Busyness, dissimilarity, and homogeneity were the only significant features selected, while entropy and complexity were trending towards significant.

Texture Feature	Responder (n=7)		Non-responder (n=3)		p-value
	Mean	STD	Mean	STD	
Busyness	0.05	0.09	-0.05	0.04	0.0167
Dissimilarity	1.25	2.01	-1.85	0.69	0.0304
Homogeneity	0.00	0.01	0.01	0.01	0.0167
Entropy	-0.09	0.22	0.62	0.74	0.0874
Complexity	-7933	36145	107588	141951	0.0874

EP-2024 Assessment of ADC value when comparing two methods to reduce geometrical distortion in DWMRI

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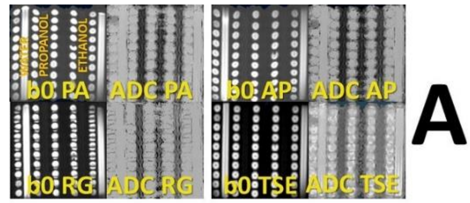
Purpose or Objective
One of the most promising methods to determine tumor response during treatment using functional imaging is apparent diffusion coefficient (ADC), derived from diffusion-weighted imaging (DWI) in MRI. We investigate the use of reversed gradient (RG) algorithm in DWI for reduction in geometric distortion when using echo-planar imaging (EPI), and DWI using turbo spin echo (TSE) acquisition method, that reduces the distortion, but implies longer acquisition times. We compare the ADC values for water, ethanol and propanol using both methods and images for the phantom and for one patient from the HeNeBra project (continuation of ARTFIBio project).
Material and Methods
ADC was measured for RG corrected and original images of a specific phantom containing water, ethanol and propanol. The phantom (Fig. A) was scanned in a 3T Philips Ingenia magnet and for EPI images, b-values were set at 0, 50, 100, 200, 500 and 1000 s/mm², reverting the phase encoding direction (AP: antero-posterior; PA: postero-anterior), while for TSE images, b values were: 0, 500, and 1000 s/mm². Differences in b are because this protocol is being used in HeNeBra project to evaluate tumor response in radiotherapy patients during treatment (Fig. B) and compared results from ADC maps and PET/CT, and we wondered how acquisition method would influence in the obtained ADC. More b-values in TSE protocol are difficult to be considered, because its penalty in acquisition time.
Results
Figure shows how distortion is corrected by RG method in the phantom (Fig. A) and in the patient (Fig. B) and corrected RG images are similar to those obtained by TSE technique. Undistorted images (RG & TSE) from ADC maps and b=0 images can be compared with patient's PET/CT scan and the correspondence between the affected right node in all the image datasets is observed.
No significant difference in calculated ADC in water, ethanol and propanol for corrected and raw images of the phantom were observed, neither from EPI or TSE images. The table shows obtained mean values and one standard deviation from the images considering all the volumes. For low values of ADC, RG images have a greater variability and associated standard deviation increases for ethanol and propanol. However, values from images are very close to expected values measured experimentally.



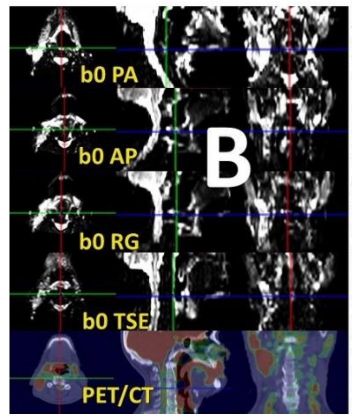


Fig. A shows b0 and ADC maps for a slice of the phantom, where water, ethanol and propanol are visible, obtained by EPI DWI (b0 PA/AP), corrected-distortion images by reversed gradient method (RG), and TSE images.
Fig. B shows a patient from HeNeBra project. Undistorted images (RG, TSE) can be compared with PET/CT, while distortion can be clearly appreciated in spinal cord in EPI images (b0 PA/AP).

	Water	Ethanol	Propanol
Measured diffusion Coeficient at 274,2 K (10^{-9} m²/s) Tofts, P. S. et Al. 2000. Test liquids for quantitative MRI measurements of self-diffusion coefficient in vivo. *MR in Med* 368-374.	2,085	0,999	0,555
<ADC> ± σ from DWI corrected by Reversed Gradients (10^{-9} m²/s)	2,20 ± 0,03	0,94 ± 0,28	0,56 ± 0,22
Difference respect to expected value	5,5%	-5,9%	0,9%
<ADC> ± σ from DWI corrected (Phase Encoding direction: AP) (10^{-9} m²/s)	2,21 ± 0,03	0,99 ± 0,19	0,56 ± 0,07
Difference respect to expected value	6,0%	-0,9%	0,9%
<ADC> ± σ from DWI corrected (Phase Encoding direction: PA) (10^{-9} m²/s)	2,18 ± 0,02	0,98 ± 0,10	0,56 ± 0,10
Difference respect to expected value	4,6%	-1,9%	0,9%
<ADC> ± σ from DWI obtained by TSE (10^{-9} m²/s)	2,15 ± 0,02	0,92 ± 0,09	0,51 ± 0,07
Difference respect to expected value	3,1%	-11,9%	0,9%

Conclusion
Both methods: RG from DWI-EPI and DWI-TSE can be used to evaluate ADC changes in the full range ($0.555 \cdot 10^{-9}$ m²/s - $2.085 \cdot 10^{-9}$ m²/s) of the expected ADC changes of tumor during radiotherapy treatment and an important reduction of distortion can be observed in both cases, but the RG method introduces more noise in the final corrected image and can make more difficult to evaluate changes, especially in ADC range for tumors. Finally, we would like to highlight that if only ADC (not intravoxel incoherent motion) is used to evaluate tumor response and few values of b are required, TSE can be successfully used to measure the desired data.
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EP-2025 Predicting midtreatment FDG PET in head and neck cancer

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