DWI of liver lesions: IVIM model with different combination of 11 b values

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Aim
To investigate diffusion coefficients evaluated with intravoxel incoherent motion (IVIM) model in liver lesions, in their different parameters: apparent diffusion coefficient(ADC), perfusion fraction(f), diffusion and pseudodiffusion coefficients (D and D*) and to calculate their optimal b values.
Method
96 patients undergoing MRI between June 2011 and September 2012 with HCC (n=28), colorectal carcinoma metastasis (CCM) (n=24) or FNH (n=44) were examined on a 1.5-T scanner (Siemens Avanto) and DWI sequence was EPI (TR/TE=4361/54ms) with 11 b-values.
Using MatLab estimations of D, D* e f were carried out for different combination of b-values (C1, C2, C3).
Statistics Analysis: scatter plot; 2 sample t test; Kruskal-Wallis test.
Results
ADC and D values were not significantly different between lesions. D* and f were not significantly different between HCC (160x10-3 mm^2/sec; 22%) and FNH (114x10-3 mm^2/sec; 18%) respectively, whereas were significantly higher than in CCM (81x10-3 mm^2/sec; 8%) ($p< 0.05$).
With lesser b values (C2, C3) D does not change, D* shows a significant ($p< 0.05$) decrease in HCC (88x10-3 mm^2/sec) but not in FNH and CCM, thus loosing the difference between the above groups. f does not show a significantly decrease in the above groups, thus maintaining the statistical difference. f of background liver parenchyma were not different between lesions.
Conclusions
IVIM data are dependent of b values being utilized. The *D** and *f* values are useful for the characterization of hyper (HCC; FNH) and hypovascular lesions (CCM). A standardization of techniques is necessary in order to compare results between different studies.