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ECR 2006 / C-717

T1-selective imaging for best visualization of pathological changes of brain

Congress: ECR 2006

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Type: Scientific

Topic: Physics in Radiology

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Fig. 1 -

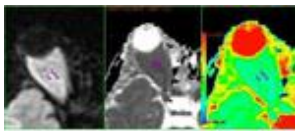


Fig. 2: Diffusion-weighted image (A) (b=1000 s/mm2) and ADC maps (B,C) of a patient...

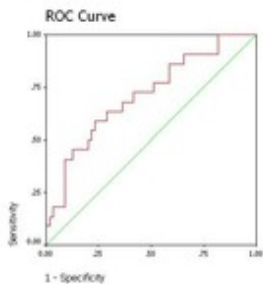


Fig. 3: ROC Curve with cutpoint of ADC.

Item	Q1	Min	Max	Mean	P.D.	P value
Image	0.0	0.0	0.0	0.0		
Image	0.0	0.0	0.0	0.0		

Fig. 4 -

Purpose

The purpose of research is to obtain the MR images “cleared” of normal tissues. It is useful for the best visualization and 3D-reconstruction of the pathological formations having T1, distinct from what have normal tissues. The problem consists in constructing MRI research so that the excess information does not reach the MR image. The similar problem is solved in a NMR spectroscopy where there is wide experience of the solving of the given problem. The Table 1 demonstrates...

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Material and methods

To create bell-shape T1-profile, we use double inversion recovery pulse sequence (DIR) with turbo spin echo acquisition method. DIR pulse sequence diagram is 1800-TIw-1800-TIF-900-acquisition [1,2]. TSE is well known method of multiple spin echo stimulation to accelerate K-space filling [3]. The MR signal is determined by the relation $S \sim M_z M_{xy}$, where M_z – longitudinal magnetization before 900 pulse, and $M_{xy} \sim \exp(-TE_{eff}/T_2)$ - amplitude of spin echo signal. If $TIF \ll TIW$ and...

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Results

By means of pulse sequences DIR-TSE and multiplication of images, we obtained the images emulating simultaneous suppression of signals from some normal tissues. Due to suppression of strong background signals, the receiver well adapted for to receive of signals from tissues with some selected values T1. Simplification of contrast improves visualization of pathological formations - tumors, hemorrhages, etc and gives additional information about their structure - Fig. 8,9. In addition to...

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Conclusion

Offered version of T1-selective imaging is based on using of scanning pulse sequences with bell-form T1-excitation profile and realized on the base of T1-selective suppression of some normal tissue signals. The method provides simplification of MR image contrast and removes useless information from MRI data. The method is especially useful for dynamic observation. Disadvantage of the method is decrease of signal/noise ratio (about in 1.6 times) in comparison with well-known FLAIR or STIR...

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References

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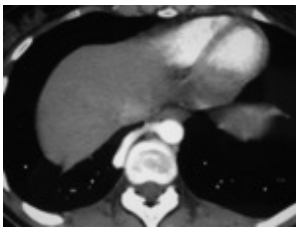
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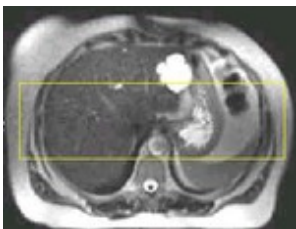
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