

Impact of molar concentration of intravenous gadolinium-chelates on the vascular signal intensity on time-resolved MR angiography: Preliminary results

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Purpose: To evaluate the effect of different molar concentration of Gd-based contrast agents (1 M vs 0.5 M) on signal time curves and image contrast of arteries and dural sinuses on time-resolved MR angiography.

Materials and Methods: Six normal volunteers were included and divided into two groups of different Gd-chelates in same molar amount (0.1 mmol/kg) and rate (3 cc/sec) of intravenous injection followed by saline infusion (20 cc at 3 cc/sec). 3D elliptical centric time resolved imaging on contrast kinetics (ECTRICKS) CE MRA was carried out in a 1.5 Tesla MR machine (Signa Twinspeed, GE medical system, Milwaukee, Wis). Total 50 phases of time-resolved sequences were obtained with a 1.5 second acquisition time per phase. Signal intensity time curves were evaluated from the ROI located at common carotid artery, cavernous segment of internal carotid artery, superior sagittal sinus and torcula. Maximum enhancement, Signal-to-noise ratio (SNR) and Contrast-to-noise ratio (CNR) of the vessels between two groups were statistically compared.

Results: At the internal carotid artery, significantly higher SNR and CNR were observed with 1 M contrast compared to those with 0.5 M contrast (SNR 41-50 vs 11-33, CNR 36-44 vs 7-28, $p=0.04$). Higher maximum enhancement, SNR and CNR were found with 1 M Gd-chelate at the remaining vessels, yet these were not statistically significant.

Conclusion: Preliminary findings indicate that higher molar Gd-chelate gives advantage in the evaluation of ICA with better SNR and CNR. Tendency to higher maximum enhancement, SNR and CNR of other vessels using 1 M Gd-chelate, yet without statistical significance, need to be further evaluated in a larger number of cases.