

**Effect of Gd-DTPA on Morphology of Human Erythrocytes
after Exposure to Magnetic Resonance in vitro**

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Purpose: The shape of human erythrocyte changes in various different environments. The contrast media converts the biconcavity of the normal erythrocytes into echinocyte or desiccocyte. The authors studied the effect of Gadolinium-diethylene triamine penta-acetic acid (Gd-DTPA) and magnetic resonance on the changes of hematocrit, osmolality and morphology of erythrocytes.

Materials and Method: The peripheral whole blood samples of the healthy adults were mixed with Gd-DTPA, for making 10 volume %, 25 volume %, 50 volume % solutions for comparing with Gd-DTPA non-treated control group. The hematocrit and osmolality were measured before and after exposure under the 0.5 tesla magnetic resonance with repetition time 2000 msec, echo time 20 msec and repetition time 4000 msec, echo time 100 msec for 0.5, 1, 2 and 3 hours. The morphologic studies of erythrocytes were done with scanning electron microscope.

Results: The degree of echinocyte transformation of red blood cells was not correlated with the duration of magnetic resonance exposure, repetition and echo times in Gd-DTPA non-treated control group. The hamatocrit was reduced with increasing volume percent of Gd-DTPA and this was not correlated with the duration of magnetic resonance exposure, repetition and echo times. The osmolality was increased with increasing volume percent of Gd-DTPA and this was not correlated with the duration of magnetic resonance exposure, repetition and echo times. Gd-DTPA produced echinocyte transformation of the red blood cells. The degree of transformation was increased with increasing volume percent but I was not correlated with the duration of magnetic resonance exposure, repetition and echo times.

Conclusion: The degree of transformation of erythrocyts was increased with increasing volume percent of Gd-DTPA. Magnetic resonance exposure time and repetition time as well as echo time were not correlated with the change of hematocrit, the osmolality and the degree of the transformation of erythrocyte by Gd-DTPA. Therefore, it is considered that low volume percent of paramagnetic Gd-DTPA should be safe in the study of MRI with 0.5 tesla.