عنوان مقاله:

Potential of Gd-porphyrins as new MR imaging contrast agents for detection of colorectal cell lines

محل انتشار:

هشتمین کنگره فیزیک پزشکی ایران (سال: 1387)

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خلاصه مقاله:

Newl MR imaging contrast agents Gd-tetracarboranylmethoxyphenyl- porphyrin (Gd TCP) and Gd-hematoporphyrin (Gd-H) were synthesized and applied to mice with human colorectal (HT29/219) cells. Their high water solubility and stability under physiological conditions, low propensity for causing phtotoxicity, and intracellular localization in mitochondria for more efficient tumor cell killing, are reasons why these complexes have been used as new tumor specific agents in MR imaging. An animal study was performed for developing pharmacokinetics of these contrast agents. The biodistribution, the T1 relaxation times, and the signal enhancement of the contrast agents are presented and the results are compared. Materials and Methods: The synthetic porphyrin, 1,6,11,16-tetra(3-ocarboranylmethoxy) phenyl-porphyrin or Gd-TCP was produced by modification of the method of Miura et al and the naturally occurring porphyrin, hematoporphyrin IX was also inserted with Gd to yield Gd-H as both of those described previously (1,2). Solutions of GdCl3, Gd-DTPA, and Gd-H were prepared by accurately dissolving the required amount in 0.9% saline solution. Gd-TCP was dissolved in 1 ml of cremophor (CRM) and 2 ml of 1,2-propanediol. This solution was transferred into a 10 ml volumetric flask, and a 0.9% saline solution was added to the mark. The animal studies were performed with mice of 6-8 week old with a mean weight of 25 g. The colorectal cells, HT29/219 (2×106 cells), were injected subcutaneously in the both flanks of mice. Two weeks after tumor implantation, when the tumor diameter was 2-4 mm, mice were injected with the different contrast agents. The animals were sacrificed at 24 hr post IP injection followed by removal of critical organs (tumor, kidney, liver). Using acid digestion procedure, the solution of samples was applied for both NMR and UV-spect experiments. The T1 relaxation times and signal intensities of solution of samples was measured using an inversion recovery (IR) pulse sequence technique using a 11.4 T Bruker instrument (500 MHz, Tarbiat Modarres University, Iran) The values of echo time and repetition time were optimized for different solutions. The UV-spectrophotometer (Spectronic Gene Sys2, Spectronic Instrument) was used to measure the concentration of Gd, which did not uptake by tumors. Results and Discussion: Relaxivity values of Gd-porphyrins are approximately 4 times higher than Gd-DTPA. The reduction of T1 relaxation times of 15 and 12% and ... the percent of injected Gd that localized to the tumor measured by UV-spect was approximately 24 and 18% for G

کلمات کلیدی: