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Visualization of Leptin effect on Angiogenesis using Gd-DTPA-anti-VEGFR2 antibody enhanced MRI in a Matrigel Mouse Model

Hayder Karim, 채권우, 전홍영, 최규실, 박성훈, 윤권하
원광대학교 의과대학 영상의학과 및 익산방사선영상과학연구소

Purpose: To visualize the angiogenic effect of leptin using a novel Gd-DTPA-anti-VEGFR2 antibody enhanced MRI in a matrigel mouse model.

Materials and Methods: Ten balb/C mice bearing matrigel with (+Leptin:50 µg/ml) or (-Leptin) were performed MRI enhanced Gd-DTPA-anti-VEGFR2 antibody. The anti-VEGFR2 antibody was purified from the culture supernatant of rat hybridoma, coupled with DTPA and then conjugated with Gd. The leptin effect on angiogenesis in the matrigel was also assessed with intravital microscopy (IVM). The MR imaging with the 4.7T MRI unit was obtained on day 7 of implantation at 10 min and 6, 12, 24, 48, and 72 hours following intravenous administration of the contrast agent with 300 nmol of Gd. Immunohistopathological analysis was performed with survivin and PECAM staining.

Results: The angiogenesis-specific T1 enhancement was imaged with the Gd-DTPA-anti-VEGFR2 antibody in the matrigel bearing mice. MR images were seen as increased T1 signal intensity in the matrigel mice with (+Leptin) than those of (-Leptin) at 48 and 72 hours after Gd-DTPA-anti-VEGFR2 antibody injection. IVM revealed clear angiogenic response and formation of neovessels in (+Leptin) than those of (-Leptin). Histopathological examination revealed that increase neovessels formation, high survivin expression, and increased PECAM stain localized at the endothelial cells on the matrigel of (+Leptin) than those of (-Leptin).

Conclusion: MR imaging enhanced Gd-DTPA-anti-VEGFR2 antibody could be useful to visualize the angiogenic effect of leptin in matrigel mouse model.