RESULTS OF CLINICAL TRIALS WITH NEW NANOCRYSTALLINE IRON OXIDE BASED PER-ORAL CONTRAST AGENT FOR MRI DIAGNOSTICS OF SMALL BOWEL AND ADJACENT AREAS

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Abstract

Magnetic Resonance Imaging (MRI) is nowadays one of the most powerful diagnostic tools in medicine and medical science. Lack of ionizing radiation, multiplanar imaging, static and dynamic imaging capabilities and superior soft tissue contrast make MRI a potentially ideal technique for the initial evaluation and follow-up of several bowel diseases (tumors, inflammatory bowel diseases) and for improvement of the quality in diagnoses of bowel adjacent tissues and organs. However, a good distension of the intestine is crucial. Therefore the use of oral contrast agent is mandatory. Nowadays several per-oral contrast agents are commercially available but still not used routinely. Super Paramagnetic Iron Oxides (SPIO) including nanoparticles of maghemite or magnetite are strong proton enhancers in T2-weighted images causing the negative signal of the whole lumen. In this study, we describe the new negative per-oral contrast agent consisting of superparamagnetic maghemite nanoparticles prepared from iron(II) acetate, which are adsorbed on bentonite sheets (smectite mineral). Such prepared nontoxic biocompatible nanocomposite showing a high effective negative contrast was clinically tested on the three groups of patients: a) MREg (MR enterography) on healthy patients b) MRCP (MR cholangiopancreaticography) on patients with pancreatic and choledoch diseases and c) MREg on patients with various small bowel diseases. From the statistic analyses the results of the clinical tests unambiguously demonstrate a desirable applicability and high efficiency in imaging the abdomen mainly in MRCP investigation.

Keywords: MRI, per-oral contrast agent, maghemite

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