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Editorial

A Brief Note on MRI Contrast Agents and its Classifications

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DESCRIPTION

Magnetic resonance imaging (MRI) contrast agents are classified according to specific characteristics such as chemical composition, including the presence or absence of metal atoms, dosing route, magnetic properties, effects on magnetic resonance imaging, bio distribution, and imaging applications. Most of these active ingredients are either paramagnetic ion complexes or super paramagnetic magnetite particles and contain lanthanoid elements such as gadolinium (Gd^{3+}) and the transition metal manganese (Mn^{2+}). These factors that reduce the T1 or T2 of the relaxation time, increase the signal strength of the T1-weighted image, or decrease the signal strength of the T2-weighted image. Most paramagnetic contrast agents are positive agents. These mean shortening T1 so that the highlighted areas appear brighter in the T1-weighted image. Dysprosium, super paramagnetic agents, and ferro magnets are negative contrast agents. The highlighted area will appear darker in the T2-weighted image. MRI contrast agents, including chelators, reduce storage in the human body, improve excretion, and reduce toxicity. MRI contrast agents can be given orally or intravenously. Depending on their bio distribution and application, MRI contrast agents can be divided into three types: extracellular fluid, blood pools, and target/organ-specific agents. Many contrast media have been developed to selectively distinguish liver pathologies. Some active ingredients can also target other organs. Inflammation and certain tumors are often used to increase the contrast between normal and abnormal tissue. Immediately after the introduction of clinical MRI, the first contrast-enhanced human MRI study using ferric chloride as a contrast agent for the Gastro Intestinal (GI) was reported in 1981. In 1984, cars, etc. is the first use of a gadolinium compound as a diagnostic intravascular MRI contrast agent. Almost half of the MRI examinations performed today are contrast enhancement examinations, and the tendency is increasing. New contrast agents are constantly being discovered and investigated. The safety of contrast media for clinical use is strictly controlled.

MRI contrast agents can be classified according to their magnetic properties, chemical composition, presence or absence of metal atoms, administration route, effect on magnetic resonance imaging, bio distribution, application, and other characteristics. Most MRI contrast agents are either paramagnetic gadolinium ion complexes or super paramagnetic (iron oxide) magnetite particles.

MRI contrast agents can be classified as follows:

- Chemical composition
- Route of administration
- Magnetic properties
- Bio distribution and use.

MRI contrast agents or gadolinium contrast agents, sometimes referred to as "dye", are chemicals used in magnetic resonance imaging scans. Injecting a gadolinium contrast into the body improves the quality of the MRI image or image. The classification of contrast agents includes X-ray contrast agents. X-ray contrast agents are divided into positive and negative contrast agents. Positive contrast agents have a higher atomic number, either barium sulphate or iodine, and appear more radio permeable than the surrounding tissue. Negative contrast agents are low-density gases (air, oxygen, carbon dioxide) that appear to be radiation permeable. Positive contrast agents attenuate X-rays more than the soft tissues of the body and can be divided into water-soluble iodine tablets and water-insoluble barium agents. MRI with contrast media is excellent for measuring and evaluating tumors. Contrast helps identify even the smallest tumors and provides the surgeon with clearer information about the location and size of the tumor and other associated tissue. Contrast MRI images are sharper and higher quality than non-contrast images. The two main types of iodine-based contrast agents are ionic and nonionic. Most contrast media used in MRI scans contain a metal called gadolinium. Physicians often use gadolinium as opposed to MRI scans because of the way they diffuse in the magnetic field. Contrast color is a solution used to emphasize specific structures when displaying body images. Contrast media are substances used in studies such as x-rays, fluoroscopy, and Computed Tomography (CT) scans. It is different from the contrast agent used in X-ray or CT scans. MRI contrast agents do not contain iodine and rarely cause allergic reactions or other problems.

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