

Lesson 12 (A): MRI contrast agents

Aims

- Learning the following topics about MRI contrast agents:
- Classifications
- Positive contrast agents
- Negative contrast agents

MRI contrast

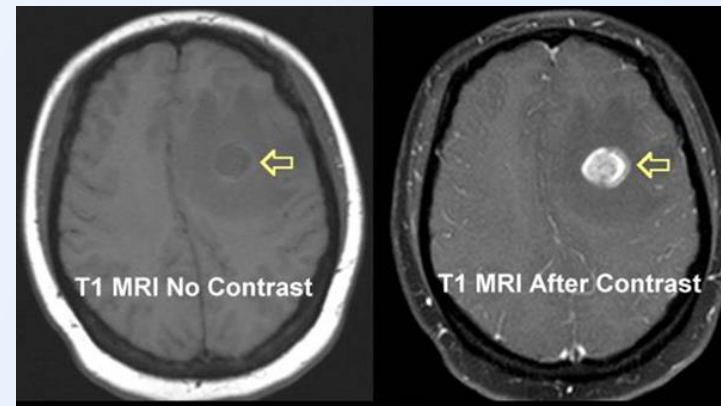
- Inherent MRI contrast depends on:
- Relaxation times (T1 and T2)
- Proton density of the materials or tissues

Classification

- Positive contrast agents
- Negative contrast agents

Positive contrast agents

- T1 agent (T1 enhancement agent)
- Reducing T1 relaxation time more than T2 in small doses →
- Increasing signal intensity on T1- weighted images →
- Appearing bright on MRI
- Gadolinium (Gd)



Negative contrast agents

- T2 agent (T2 enhancement agent)
- Reducing T2 relaxation time more than T1 in large doses →
- Decreasing signal intensity on T2- weighted images →
- Appearing dark on MRI
- Iron oxide nanoparticles

Other classification

- Non-specific extracellular contrast agents
- Organ-specific contrast agents (mostly liver specific contrast agents)
- Gadolinium chelates are the most widely used non-specific extracellular contrast agents.

Organ-specific contrast agents

- Superparamagnetic iron oxide nanoparticles
- Manganese-based agents
- Gadolinium-based agents with a high hepatobiliary excretion

Summary

- Classifications
- Positive contrast agents
- Negative contrast agents