

1. What is an MRI contrast agent?

MRI contrast agents are chemical substances that contain the metal gadolinium. They are injected through a vein for many magnetic resonance imaging (MRI) scans.

2. What are the benefits of MRI contrast agents?

When injected through a vein into the body, MRI contrast agents improve how internal organs, blood vessels, and other tissues look on the MRI images. This helps detect problems and diagnose medical conditions. For many medical conditions, the use of MRI contrast agents is a necessary part of the MRI.

3. What are the risks from MRI contrast agents?

A. Injection problems. Any injection can cause injury to a nerve, artery, or vein, or result in infection. The contrast agent can also sometimes leak outside of the vein into the soft tissues during injection. This is called extravasation and is uncommon (about 1 in every 1,000 injections). This may be painful, but the pain is generally relieved by cold or warm compresses.

B. Allergic reaction. Some people can be allergic to MRI contrast agents. There can sometimes be a mild reaction to the contrast agent such as itching and hives (about 1 in every 100 injections). Uncommonly, there can be a serious reaction to the contrast agent such as changes in blood pressure, cardiac distress, and respiratory distress (about 1 in every 10,000 injections). Very rarely this can result in death.

For patients who have had a previous mild allergic reaction to an MRI contrast agent and need another MRI with MRI contrast agent, it is generally safe to do so after taking anti-allergy medications. For patients who have had a prior serious allergic reaction to MRI contrast agent, other alternatives to getting MRI contrast agent should first be strongly considered.

C. Nephrogenic systemic fibrosis. A rare disease called nephrogenic systemic fibrosis (NSF) has been linked to MRI contrast agents. NSF is a disease of the skin and internal organs that has no treatment and in very rare cases can result in death. Almost all cases of NSF have happened in patients with moderate to severe kidney disease who received particular (older generation) MRI contrast agents. There have been no new documented cases of NSF since 2006.

Some MRI contrast agents have no known cases of NSF, even when used in patients with severe kidney disease and on kidney dialysis. The risk of NSF from these MRI contrast agents is therefore extremely low but there may still be some risk of NSF if you have moderate to severe kidney disease. If you are on dialysis and require an MRI contrast agent, then dialysis should take place within 24 hours of your MRI scan.

D. Gadolinium deposition. Tiny amounts of gadolinium from MRI contrast agents can stay in the brain and other parts of the body for months to years. This can happen even in patients with normal kidney function. Some MRI contrast agents stay in the body more than others. There are no known health problems currently linked to this. It is possible that in the future there may be health problems from gadolinium staying in the body that we currently do not know about.

E. **Risk to the fetus.** MRI contrast agents have not shown any problems to the developing fetus in humans, but studies in animals suggest they may cause problems. Except in very rare cases we do not give MRI contrast agents to patients who are pregnant.

F. **Risk in breastfeeding.** An extremely small amount (0.04%) of MRI contrast agent given to a lactating woman reaches her breast milk. About 1% of the MRI contrast agent within the breast milk gets absorbed by the baby's gastrointestinal tract. While it is safe to continue breastfeeding after your MRI scan, if you have any concerns it is reasonable to pump and discard breast milk for 24 hours following your MRI scan.

4. What are the alternatives to using an MRI contrast agent?

A. In some cases your MRI can be performed without using an MRI contrast agent. In other cases, not using a MRI contrast agent can make your MRI no longer useful for your medical care.

B. Other imaging tests such as x-ray computed tomography (CT) may be an option for you. CT uses ionizing radiation to make images. CT also usually requires a different type of contrast agent to be used. CT contrast agents have their own risks including the risk of allergic reaction.

C. Your medical provider may know of other ways to help diagnose or monitor your medical problem.

5. Are there different types of MRI contrast agents?

There are two major types of MRI contrast agents, linear and macrocyclic:

A. Macrocyclic MRI contrast agents include **Dotarem** (gadoterate meglumine), **Gadavist** (gadobutrol), and **ProHance** (gadoteridol). These have not been linked to NSF. These also deposit far less in the brain and other parts of the body than linear agents do.

B. Linear MRI contrast agents include **MultiHance** (gadobenate dimeglumine) and **Eovist** (gadoxetate disodium). These have not been linked to NSF. These deposit more in the brain and other parts of the body than macrocyclic agents do.

Older generation linear MRI contrast agents include **Omniscan** (gadodiamide), **OptiMARK** (gadoversetamide), and **Magnevist** (gadopentetate dimeglumine). These have been linked to NSF and deposit more in the brain and other parts of the body than macrocyclic agents do. These MRI contrast agents are not in current use intravenously at EHC sites.

6. Which type of MRI contrast agent will I be getting?

The type of MRI contrast agent given may depend on the reason for your MRI. The vast majority of patients will be administered **ProHance**. Other agents (such as **Eovist** or **MultiHance**) may be used if you have an allergy to **ProHance** or there is specific information that is best obtained with other agents.

If you have concerns about particular MRI contrast agents, in many cases a different one can be used that you are more comfortable with.