

Use of Contrast Agents in MRI



by Dr N.Wambeek,
Radiologist



Introduction

Gadolinium is the only commonly used MRI contrast agent and generally has an excellent safety profile. Other types of MRI contrast such as liver specific agents are used much less frequently. In general the aim of contrast agent use in MRI is similar to that in CT, ie to improve the detection of pathology.

Gadolinium is a paramagnetic agent which has the effect of modifying the magnetic relaxation times of tissue, which helps highlight pathological processes.

Gadolinium is most commonly administered intravenously or injected in to joints to outline intra articular structures.

Indications

Whilst contrast agents are used much less frequently in MRI than in CT scanning due to the higher intrinsic contrast resolution of MRI, their indications are similar

Common indications:

1. Neoplasia detection and staging.
2. Infection, including abscess detection.
3. Inflammatory tissue eg synovitis or pannus.
4. Post operative lumbar spine evaluation.
5. MR Angiography and Venography.
6. Investigation of intra articular disorders particularly labral tears in the hip and shoulder, and intrinsic wrist ligaments.

Side Effects

Gadolinium is a very safe drug for most patients.

Patients occasionally experience mild side effects including coldness at the injection site, nausea, headache dizziness and itching.

Allergic reactions are rare (0.004 – 0.7%).

Fatal reactions are extremely rare.

Contra-indications

- Previous reaction to Gadolinium.
- Advanced renal failure – see Gadolinium in Renal Failure below.
- Patients with a history of reaction to iodinated contrast may undergo contrast enhanced MRI safely (although they have a slightly increased risk of reaction, as do patients with asthma or history of other allergies).

Gadolinium in Renal Failure

Gadolinium has minimal nephrotoxic effects at standard MRI dosage, however it is now widely accepted that Gadolinium should be avoided where possible in all patients on dialysis or with severe impairment of renal function (Stage 4&5, Cr clearance <30 and 15 ml/min, respectively), due to the risk of developing Nephrogenic Systemic Fibrosis. This is a debilitating irreversible “scleroderma like” condition that may be fatal in some cases.

Pregnancy and Breast Feeding

Whilst there are no known long term effects on the foetus, of Gadolinium use in pregnancy, it is usual practice to avoid administration unless there is a strong clinical indication, and the study can not be safely delayed until after delivery.

It is safe to administer Gadolinium to breast feeding mothers, although they may prefer to express milk and stop breast feeding for 24hr.

Key Practice Points

- The principals and indications for contrast use in MRI are similar to those for CT, although required less frequently.
- Gadolinium based contrast agents used in MRI are generally safe and well tolerated, but caution should be exercised in patients with renal impairment.
- If a patient with known or significant risk factors for renal impairment is likely to require Gadolinium, renal function should be checked prior to the procedure.

Case 2. 25 yo female with recurrent instability following shoulder dislocation. Axial T1 Weighted Image after injection of Gadolinium into the shoulder joint shows tear of the anterior labrum (Figure 3, arrow).

Case 1. 38 yo female with headaches. Coronal T1 weighted images of the brain showing enhancing metastases (arrows) a. Pre contrast (image 1) and b. Post contrast (image 2).

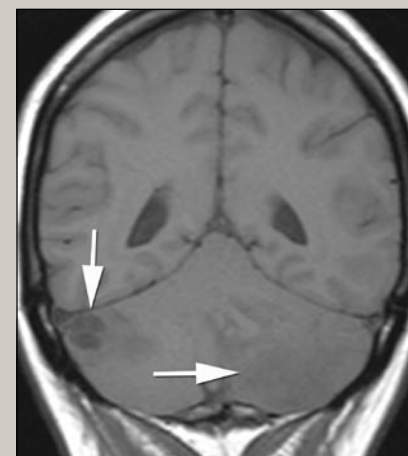


Image 1

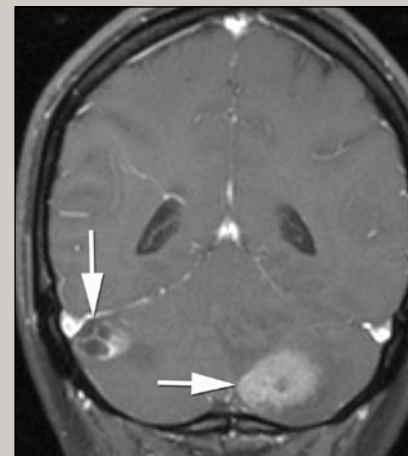


Image 2

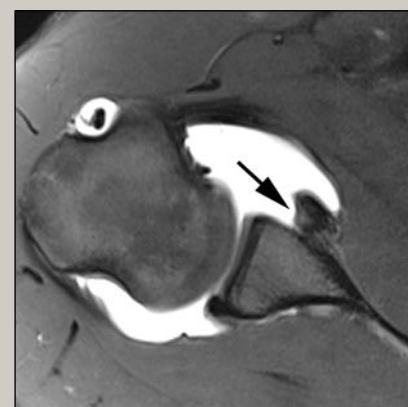


Figure 3