Gadolinium Contrast Administration
Radiology of Indiana Recommendations

Overview

1. Gadolinium-based contrast agents (GBCAs) should only be administered when deemed necessary by the radiologist.
2. Routine screening and laboratory testing for renal failure is no longer required prior to the administration of group II agents.
3. If a patient presents with known renal failure, the necessity of a group II agent should be confirmed by the radiologist.
4. If a group II agent is used in the setting of dialysis, hemodialysis should be performed as soon as possible after contrast administration.
5. Group I agents are contraindicated in patients on dialysis, and are no longer used at UCSF.
6. Group III agents (Eovist®) require informed consent when eGFR < 30

Update:

In accordance with the ACR Manual on Contrast Media 2021, the following changes to the MR contrast administration algorithm are submitted.

- When Gadovist (or other Group II agents) is administered, assessment of renal function with laboratory testing (including eGFR) does not need to be performed.

    - "Based on the most recent scientific and clinical evidence [30-37] the ACR Committee on Drugs and Contrast Media considers the risk of NSF among patients exposed to standard or lower than standard doses of group II GBCAs is sufficiently low or possibly nonexistent such that assessment of renal function with a questionnaire or laboratory testing is optional prior to intravenous administration. As in all instances, group II GBCAs should only be administered if they are deemed necessary by the supervising radiologist, and the lowest dose needed for diagnosis should be used as deemed necessary by the supervising radiologist."

- For patients on renal dialysis, dialysis should be performed as soon as possible after the administration of Gadovist (or group II agent) as possible. The MR Technologists shall help ensure that this has been planned PRIOR to injection by reviewing the patient's medical record and/ or contacting the ordering physician.

- For Eovist (and Group I and III agents). The practice of screening for renal dysfunction should continue as before. Administration of these agents in patients with an eGFR of <30mL/min/1.73m2 is contraindicated*.

https://www.acr.org/Quality-Safety/Resources/Contrast-Manual

*Please see "Background Information" section below for additional information.

Agents:

Based on current information, macrocyclic Gd agents appear to be have a superior safety profile to linear Gd agents. Therefore, Radiology of Indiana requests that Gadovist or other Group 2 macrocyclic agents be used as the primary agent for MRI contrast. Eovist may be used for certain abdominal imaging indications.

- Group I: Agents associated with the greatest number of NSF cases:
  - Gadodiamide (Omniscan® – GE Healthcare)
  - Gadopentetate dimeglumine (Magnevist® – Bayer HealthCare Pharmaceuticals)
  - Gadoversetamide (OptiMARK® – Guerbet)

- Group II: Agents associated with few, if any, unconfounded cases of NSF:
  - Gadobutrol (Gadavist® – Bayer HealthCare Pharmaceuticals; Gadovist in many countries)
  - Gadobenate dimeglumine (MultiHance® – Bracco Diagnostics)
  - Gadoterate acid (Dotarem® – Guerbet)
  - Gadoteridol (ProHance® – Bracco Diagnostics)

- Group III: Agents for which data remains limited regarding NSF risk, but for which few, if any unconfounded cases of NSF have been reported.

- Gadoxetate disodium
  - Eovist – Bayer HealthCare Pharmaceuticals; Primovist in many countries

Background Information

Approach to intravenous gadolinium in patients with impaired kidney function

The relative risk to benefit of Group 1 and 3 intravenous gadolinium agents in patients with severely impaired kidney function should be carefully considered by the referring physician and radiologist with input from a nephrologist if necessary. Particular caution should be considered in patients with acute renal failure. *No patient should be denied any imaging investigation that is critical to clinical management*, which takes precedent over any other cautionary measures.

Patients in whom have had screening and GFR is above 30 do not need repeat lab work (renal testing: GFR) if renal testing has already been done within the past 30 days prior to the test and patient has not received new (since prior renal tests) potentially nephrotoxic medications (such as chemotherapy), or has known newly diagnosed renal disease that has been diagnosed since the prior renal tests.

Key point: *Group 2 agents are preferred.*

Group 1 and 3 Gadolinium agents should only be given to a patient who is on dialysis or has a GFR ≤ 30 if the imaging study is considered critical to clinical management, study has been approved by a radiologist, the patient cannot receive Group 2 agents and informed consent has been obtained.

Group 2 agents may be given to patients who are on dialysis. However, dialysis should be performed as soon as possible following administration of these agents. The MR Technologists shall help ensure that this has been planned PRIOR to injection by reviewing the patient's medical record and/ or contacting the ordering physician.

Role of dialysis after gadolinium administration in patients with renal impairment

Dialysis does not protect patients from developing NSF[1]. Studies have shown that the serum concentration of gadolinium is significantly decreased after hemodialysis, however, there is no information regarding residual tissue amounts[2]. Theoretically, the sooner the dialysis session is performed the less amount of contrast agent is deposited in the tissues. Therefore, all patients already receiving dialysis treatment should be scheduled for dialysis as soon as practical following the gadolinium-enhanced MRI and preferably within 24 hours. This should be arranged by the requesting physician in consultation with the patient's outpatient nephrologist and dialysis unit. It is suggested that routine MRI studies should be scheduled in the morning and dialysis scheduled in the afternoon following the study. Administration of hemodialysis promptly after gadolinium may require altering the patient's regular outpatient dialysis schedule and advance communication several days in advance with the nephrologist and dialysis unit. There is consensus that a patient with chronic kidney disease who is not already dialysis dependent should not be started on dialysis after administration of gadolinium for precautionary purposes only, since there is no data to support the benefits of this intervention.

Key point: *Dialysis should preferably be performed within 24 hours of gadolinium administration in patients already on dialysis.*

1. Broome DR, Cottrell AC, Kanal E. Response to "Will dialysis prevent the development of nephrogenic systemic fibrosis after gadolinium-based contrast administration?" AJR Am J Roentgenol 2007;189: W234-235.
2. Joffe P, Thomsen HS, Meusel M. Pharmacokinetics of gadodiamide injection in patients with severe renal insufficiency and patients undergoing hemodialysis or continuous ambulatory peritoneal dialysis. Acad Radiol 1998; 5: 491-502.