

Uniform Guidelines for Use of Iodinated Contrast Media Covalent Radiology

Objective: Provide consistent guidelines for administration of iodinated contrast media (CM) while maintaining balance between high quality diagnostic studies and reducing patient risk. It is important to note that this document contains guidelines only – they are not strict protocols. Physicians are encouraged to assess each patient in light of the clinical situation and apply these guidelines or employ alternative methods as deemed appropriate by the monitoring/treating physician according to his/her clinical judgment. Special considerations for breast feeding, pregnant women and pediatric patients are included at the end of this document.

Facility and Staff: Staff should be prepared to identify and respond to contrast reactions and understand the facility processes for requesting additional help and/or emergency personnel. A radiologist or designated physician should be present in the building when contrast is administered. Emergency medications and equipment should be available in the department.

Contrast agents: Low-osmolar contrast media (LOCM) are used at all imaging centers and hospital locations. Some hospitals may choose to stock high osmolar agents, but these are not to be used for intravascular administration. Iso-osmolar agents (eg., Visipaque) may also be used, but there is no clear evidence that these agents are safer than LOCM for prevention of contrast induced nephropathy (CIN). Iso-osmolar (IOCM) agents may be used for extremity arteriography to decrease pain associated with injection. In facilities that require a physician order specifying the type of contrast media and dose to be administered, the technologist will administer contrast in accordance with that order. In facilities where a direct physician order is not required, contrast will be administered according to the radiology protocol specified for the requested examination. Type and dosage of CM used must be documented by technologist on each case.

Patient selection and screening: Patients scheduled to receive contrast are screened mainly to prevent allergic type reactions and CIN. Therefore, a patient history should be obtained prior to contrast administration. Screening questions should include:

- Allergic reaction to iodinated contrast. History of contrast allergy requires pretreatment as outlined below. History of asthma and allergies to shellfish, topical iodine or gadolinium do not require premedication for iodinated CM.

Screening to reduce risk of contrast induced nephropathy. A YES to any of the following questions requires assessment of renal function within the past 30 days:

- Patient age > 60 years
- Renal failure, kidney disease, kidney cancer, kidney surgery, dialysis, renal transplant, single kidney
- Hypertension requiring medical therapy

- Use of Metformin or metformin containing drugs – see section on Metformin
- Diabetes mellitus
- Clinical history of possible AKI. Acute kidney injury is an abrupt reduction in kidney function often with decreased urine output (increase of serum creatinine by >0.3 mg/dL within 48 hours OR an increase in serum creatinine by 50%. Within 7 days). Among many causes are dehydration, NSAID and other nephrotoxic medications, heart failure, sepsis, hypotension and urinary obstruction.

Creatinine screening: If the answer to ALL of the above questions is no, then there is no need to draw a serum Cr. If the answer to any of the above questions is yes, then serum Cr is obtained and eGFR is calculated based on serum Cr value. In stable patients, Cr value within the past 30 days is adequate. Point of care (POC) testing devices may be used if they are subject to appropriate quality control monitoring and results are recorded.

Threshold values:

- eGFR \geq 30: Ok to proceed with iodinated contrast media administration unless there are signs of Acute Kidney Injury (defined above).
- eGFR <30: Do not inject iodinated contrast media. Consider non contrast examination, other imaging modality or discuss possible hydration to improve renal function.

Strategies to Prevent CIN:

- **Confirm that contrast is necessary** for the study and clinical problem
- **Hydration:** Outpatients should be encouraged to drink fluids and stay hydrated. If needed, IV hydration with Normal Saline beginning 6-12 hours prior to contrast administration, continuing 4-6 hours after. Sodium Bicarbonate can also be used (154mEq in 846ml of D5W or sterile water), but studies as to its superiority over normal saline are conflicting.

Metformin patients:

- eGFR \geq 30: No action is needed. This should be the vast majority of patients who actually get iodinated contrast.
- eGFR <30 or with diagnosis of AKI: Metformin should be suspended for at least 48 hours from the time of the procedure and the patient should be advised not to resume the medication until renal function has been re-assessed and confirmed to be at baseline.

Strategies to Prevent Contrast Reactions:

Confirm that contrast is necessary for the study and clinical problem

- If the prior contrast agent is known then **switch to another agent**
- **Steroids:** Medrol (methylprednisolone) 32mg po 12 hours and 2 hours before

procedure or Prednisone 50mg po 13hrs, 7hrs and 1 hour before procedure. For patients who cannot take oral steroids, 200mg hydrocortisone IV may be given. There is no value to giving first dose of steroids within 3 hours of procedure.

- **Antihistamines:** Benadryl 50mg IV or PO 1 hour prior to procedure (must be combined with steroids above).
- **Accelerated IV Premedication** (only for emergent examinations): Methylprednisolone sodium succinate (e.g., Solu-Medrol®) 40 mg IV or hydrocortisone sodium succinate (e.g., Solu-Cortef®) 200 mg IV immediately, and then every 4 hours until contrast medium administration, plus diphenhydramine 50 mg IV 1 hour before contrast medium administration. Minimum pretreatment duration is 5 hours.

Breastfeeding: Only 0.01% of mother's contrast dose is likely to be absorbed by the gut of a breastfeeding infant (1/100th of an mL for a 100mL dose) and no toxic effects have been demonstrated. In instances where the mother is concerned about this very small dose, she may elect to withhold breastfeeding for 24 hours. Nearly 100% of the administered dose will be cleared by 24 hours. The radiology staff should provide the patient with information to help her make an informed decision.

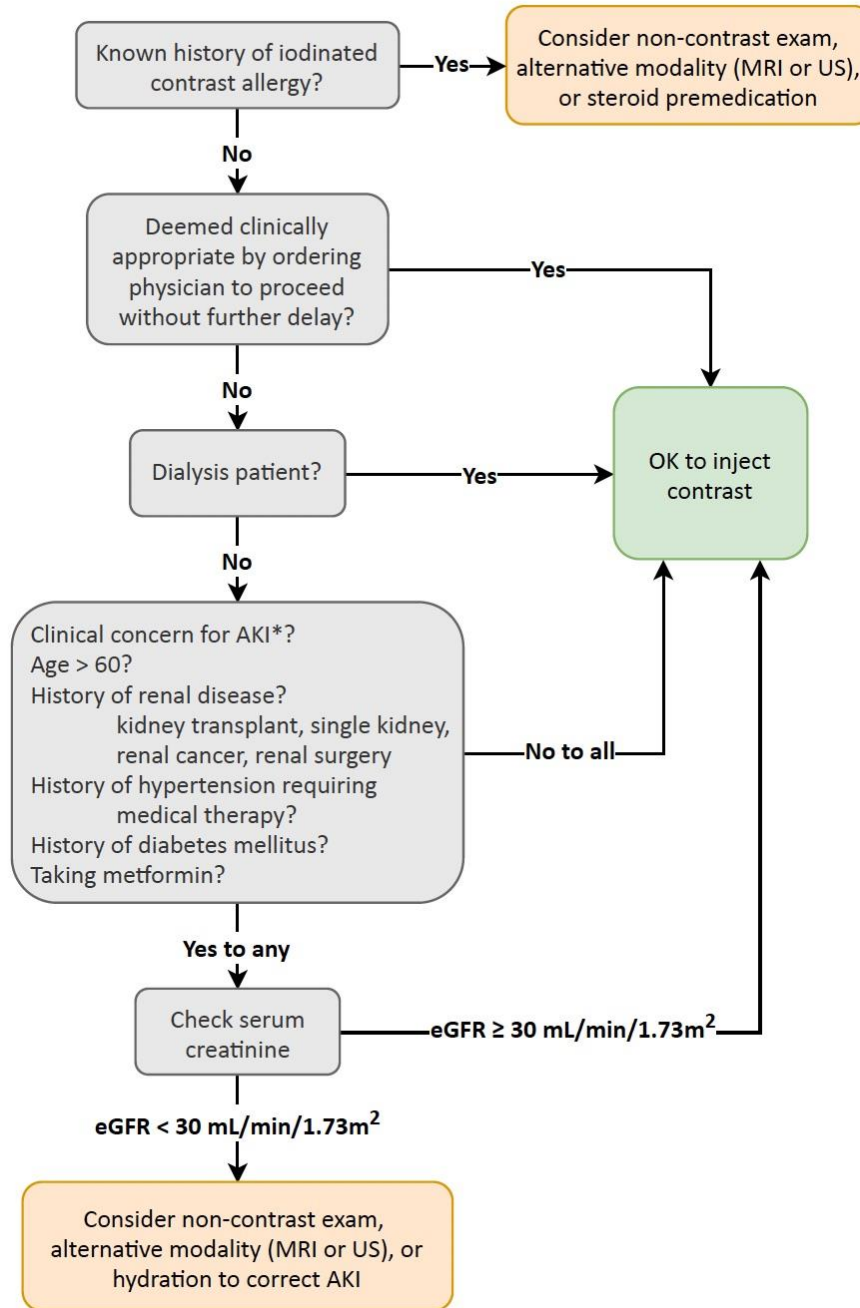
Pregnant patients: Given that there are no available data to suggest potential harm to the fetus from exposure to iodinated contrast medium via maternal IV or intra-arterial injection, we do not recommend routine screening for pregnancy prior to iodinated contrast media use. Iodinated contrast is FDA category B (Animal reproductive studies have failed to demonstrate a risk to the fetus, and there are no adequate well-controlled studies in pregnant women).

Pediatric patients:

- Recommended contrast dose: 2ml/kg or 1ml/lb.
- IV hydration should only be ordered by the referring pediatrician
- Strongly consider alternative imaging methods in the rare case of children with contrast or iodine allergy. Any steroid pre-treatment must be ordered by a pediatrician. Contrast should only be given to pediatric patients with contrast allergies when a PALS certified pediatric anesthesiologist or emergency physician is on site and available.

Reference: ACR Manual on Contrast Media, Version 10.3, 2018.

Iodinated Contrast Guidelines



*Acute kidney injury is an abrupt reduction in kidney function often with decreased urine output. Among many causes are dehydration, NSAID and other nephrotoxic medications, heart failure, sepsis, hypotension, and urinary obstruction.