

Diversified Radiology of Colorado Guidelines for the administration of IV iodinated contrast media.

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Background

Diversified Radiology Guidelines represent a tool to assist radiologists in providing appropriate care for patients. These guidelines are not inflexible rules or requirements of practice and are not intended, nor should they be used to establish a legal standard of care. Diversified Radiology cautions against the use of this document in litigation in which the clinical decisions of a practitioner are called into question.

The ultimate judgment regarding the propriety of any specific procedure or course of action must be made by the practitioner in light of all the circumstances presented. Thus, an approach that differs from the guidance in this document, standing alone, does not necessarily imply that the approach was below the standard of care. To the contrary, a conscientious practitioner may responsibly adopt a course of action different from that set forth in this document when, in the reasonable judgment of the practitioner, such course of action is indicated by the condition of the patient, limitations of available resources, or advances in knowledge or technology subsequent to publication of this document.

The practice of medicine involves not only the science, but also the art of dealing with the prevention, diagnosis, alleviation, and treatment of disease. The variety and complexity of human conditions make it impossible to always reach the most appropriate diagnosis or to predict with certainty a particular response to treatment. Therefore, it should be recognized that adherence to the guidance in this document will not assure an accurate diagnosis or a successful outcome. All that should be expected is that the practitioner will follow a reasonable course of action based on current knowledge, available resources, and the needs of the patient to deliver effective and safe medical care. The sole purpose of this document is to assist practitioners in achieving this objective.

The decision to administer contrast in patients undergoing CT should always be a matter of clinical judgment, based on the individual circumstances of the patient. Patients with chronic kidney disease (CKD) are at risk of contrast-induced nephropathy (CIN), an uncommon but potentially serious form of acute kidney injury. The most important risk factor for CIN is renal insufficiency.

Screening patients for chronic kidney disease

Diversified Radiology recommends routinely screening patients undergoing CT examinations to identify those individuals with CKD and thus at potential risk of CIN. Patients should be screened by asking these four questions:

1. What is your current age?
 2. Do you have diabetes?
 3. Do you have hypertension requiring medication?
 4. Do you have ANY problems with your kidneys (such as transplant, single kidney, kidney cancer, kidney surgery, dialysis)?
- *If patient is less than 60 years of age and answers NO to questions 2-4, IV contrast will be administered.*
 - *If a patient is older than 60 years of age and/or answers YES to any of these questions, an assessment of renal function should be performed as detailed below, before administering IV contrast.*

Assessment of Renal Function in patients with CKD and/or CIN risk factors

A baseline serum creatinine (with or without eGFR) should be available or obtained before the injection of contrast medium in all patients considered at risk for CIN (as defined by above screening questions). The serum creatinine measurement should preferably be within the last 30 days for outpatients and more recent for inpatients, preferably within the last 7 days, unless there is acutely decreasing renal function in which case the serum creatinine level should be from the day of the exam.

Contrast administration with GFR <40

Avoidance of iodinated contrast: Concern for the development of CIN is a relative but not absolute contraindication to the administration of intravascular iodinated contrast medium in at-risk patients. The risk of clinically relevant renal dysfunction is very low. **There is no agreed-upon threshold of serum creatinine elevation or eGFR declination beyond which the risk of CIN is considered so great that intravascular iodinated contrast medium should never be administered.** In fact, since each contrast medium administration always implies a risk-benefit analysis for the patient, contrast medium administration for all patients should always be taken in the clinical context, considering all risks, benefits and alternatives.

eGFR <40: The technologist should ideally speak directly with a radiologist prior to administering any IV contrast unless the situation is deemed emergent by the ordering physician. (One exception to this rule is patients with end stage renal disease on **permanent** renal dialysis.*)

eGFR <30: is a relative contraindication to intravenous iodinated contrast administration; but not an absolute contraindication. Iodinated contrast should not be administered unless considered diagnostically imperative and the benefits of contrast outweigh the risk of CIN. In this scenario we recommend the referring attending physician and radiologist discuss risk vs. benefit and that the attending physician document this conversation and need for contrast in the patient's medical record. (An exception to this rule is patients with end stage renal disease on **permanent** renal dialysis.*)

CIN prevention

The major preventive action to mitigate the risk of CIN is to provide intravenous volume expansion prior to contrast medium administration. The ideal infusion rate and volume is unknown, but isotonic fluids are preferred (Lactated Ringer's or 0.9% normal saline).

Possible hydration options (for patients without contraindication) include:

Oral hydration: Consider at least 500 ml (i.e. 2 cups) before contrast administration. After the procedure, the patient should drink at least 1 cup of water per hour for 8 hours

or

IV Hydration: Consider normal saline (NS) 250 cc prior to the CT examination and 250 cc following the examination.

Special Circumstances:

***Renal dialysis patients**

Patients with anuric end-stage chronic kidney disease who do not have a functioning transplant can receive intravascular iodinated contrast medium without risk of further renal damage because their kidneys are no longer functioning. However, there is a theoretical risk of converting an oliguric patient on dialysis to an anuric patient on dialysis by exposing him or her to intravascular iodinated contrast medium

***Multiple doses of iodinated contrast in single day**

There is insufficient evidence to specifically endorse the decision to withhold a repeat contrast medium injection until more than 24 hours have passed since the prior injection, nor to recommend a specific threshold of contrast medium volume beyond which additional contrast media should not be given within a 24-hour period. Further, obtaining a serum creatinine measurement between two closely spaced iodinated contrast medium-enhanced studies is unlikely to be of any benefit given the slow nature of change of serum creatinine in patients with AKI.

Therefore, the decision to administer closely spaced contrast-enhanced studies is clinical and subjective, with high-risk patients (e.g., Stage IV and Stage V chronic kidney disease, AKI) treated with greater caution than the general population.

Summary of DRC contrast guidelines

- **There is no absolute threshold eGFR or Creatinine at which iodinated contrast will be withheld if considered medically imperative and the risks and benefits have been weighed and determined by ordering physician and radiologist.**
- **All patients will be screened with 4 Questions:**
 1. What is your current age?
 2. Do you have diabetes?
 3. Do you have hypertension requiring medication?
 4. Do you have ANY problems with your kidneys (such as transplant, single kidney, kidney cancer, kidney surgery, dialysis)?
 - If patient is less than 60 years of age and answers NO to questions 2-4, IV contrast will be administered.
 - If a patient is older than 60 years of age and/or answers YES to any of these questions, an assessment of renal function should be performed before administering IV contrast.
- **eGFR <40 - technologist should contact radiologist to discuss.**
- **eGFR <30 - relative contraindication. if ordering clinician and radiologist have discussed and it is deemed clinically imperative to administer iodinated contrast, then recommend proceeding after documentation has been made in patient medical record.**