CENTRAL ZONE

NSHA DIAGNOSTIC IMAGING PROGRAM CLINICAL GUIDELINES
IODINATED CONTRAST MEDIA BEST PRACTICES
JANUARY 2020

(BASED ON ACR CONTRAST MEDIA MANUAL 2018, CAR CIN PRACTICE GUIDELINE 2011)

THE FOLLOWING PROVINCIAL GUIDELINE IS INTENDED TO AID IN A CONSISTENT APPROACH TO IODINATED CONTRAST MEDIA ADMINISTRATION. IT CANNOT MANDATE PROCEDURE, NOR REPLACE CLINICAL JUDGEMENT ON A CASE BY CASE BASIS. IT REFERS TO STABLE PATIENT EXAMINATION. LIFE THREATENING OR UNSTABLE MEDICAL SITUATIONS ALWAYS REQUIRE MEDICAL ASSESSMENT AND INDIVIDUALIZED MANAGEMENT DECISIONS

This document is based largely on the ACR Contrast Media Manual 2018, CAR CIN Practice Guideline 2011, and contributions by experts within Nova Scotia. It has been approved by DI Executive Committee and CT Advisory Modality Committee in Fall of 2019. It is open to continual comment and input and will be revised when appropriate.

1. Contrast media vastly improves diagnostic accuracy in many CT exams and is absolutely necessary in others. Risks of contrast media, which are usually small, are usually outweighed by the benefits of enhancement except in a small subset of patients. Administration to those considered at higher than average risk for renal injury is an individual medical decision. In those who are not of increased risk, no individualized medical decision is required.
2. Contrast media should not be administered in cases where it offers no diagnostic benefit.
3. Risks of iodinated contrast media with respect to acute renal injury appear to be less than originally thought.
4. Relative contraindications include risk of adverse reaction , contrast induced renal failure and metformin related lactic acidosis

Adverse Reaction

1. Risk of adverse reaction to low osmolar contrast agents is low, but is INCREASED in patients with previous history of serious adverse reaction to contrast media. Past history of allergy to other agents is a less important predictor of serious adverse reaction.
2. Despite history of previous adverse reaction to contrast media, administration may be necessary. When risk is considered high on the basis of past reaction, consider pre treatment regime. 50 mg oral prednisone at 13, 7 and 1 hour pre injection, and 50 mg Benadryl by any route one hour before exam. (An accelerated IV regime for urgent exams works just as well: IV hydrocortisone 200mg at 5 hours, and 1 hour Merak et al ***Radiology:*** Volume 285: Number 2—November 2017)

Contrast Induced Nephropathy (CIN)

The main risk factor for CIN is baseline severe renal failure, particularly worse in diabetes.

1. An eGFR should be calculated on any patient considered at higher risk of CIN:
   - Age > 60
   - History of renal disease, including:
     - Kidney transplant
     - Single kidney
     - Renal cancer
     - Renal surgery
   - History of hypertension requiring medical therapy
   - History of diabetes mellitus
   - Acute renal failure

   A serum creatinine done within the last 6 months is adequate for stable outpatients (CAR Guideline 2011) unless the patient is stated to be in acute renal failure or shock. In patients and ER patients should have a serum creatinine within last 48h

2. While the proof is not conclusive, any patient with an eGFR <30 ml/min should be considered at some risk for CIN, and decision to inject based on a balance between need and this risk.
3. Any patient in the above group may be at increased risk if dehydrated. The literature is mixed on the value of volume expansion before contrast administration.
4. Currently, there is no convincing evidence of any protective effect from acetylcysteine or any other agent, and premedication is therefore currently not recommended.

Metformin

There is a risk of diabetic ketoacidosis in patients taking metformin but is almost nil if patients are properly selected and managed.

1. In patients with eGFR>30 there is no need to stop metformin or recheck kidney function
2. In patients with eGFR<30, metformin should be stopped at the time of the exam, held for 48 hours, and not reinstituted until renal function has been checked. The decision to reinstate metformin therapy should be left to the primary care provider, as it may be inappropriate to restart if the renal function remains low, even if unchanged.
3. Metformin should be stopped as in (2) for ALL patients undergoing intrarterial catheter injections when the catheter could cause embolization into the renal arteries. This is *regardless* of calculated creatinine clearance.

PROCEDURE

Only patients at risk for renal impairment need be investigated for risk of CIN. (This EXCLUDES patients who are being imaged urgently for an acute condition, in which case kidney function is seldom an important consideration. Discussion with requesting medical staff or attending radiologist may be required) The attending technologist will have each patient answer the relevant questions to determine the risk levels. The answer to these questions will be documented on the patient record. For those at risk (table above), an eGFR will be made available by the laboratory, automatically in the RIS. This will be done through both the Millenium and Meditech systems. (*(It is not possible to calculate the eGFR on the latest creatinine in Meditech in all instances. When this is not possible, no calculation will be provided, and a manual or semi automatic calculation of the eGFR will need be done with the latest creatinine. No calculation or routine creatinine will be done on Inpatients or ER patients, and serum creatinine and manual calculation must be arranged as a routine at each institution for those at risk having a contrast media exam. The recommended method/formula is CKD-EPI formula, already in use at many sites. It is available on line* https://qxmd.com/calculate/calculator_251/egfr-using-ckd-epi
Any patient who has an eGFR of >30 can be safely injected if other contraindications are not present. Any patient with an eGFR <30 will be evaluated by the attending radiologist who will make a decision regarding appropriateness of injection, and the withholding of metformin.

Patients on dialysis and no residual renal function to preserve are at no risk for CIN, and contrast can be administered. Patients on dialysis may have residual renal function with the goal of being taken off dialysis; in this scenario, there should be a discussion between the radiologist and referring physician to weigh the pros and cons of administering contrast.

BREAST FEEDING

Contrast media and breastfeeding is an area of imaging safety that has been investigated for both iodinated and gadolinium-based contrast agents. The current guidelines do not support the cessation of breastfeeding or any special precautions after intravenous administration of these contrast media.

Iodinated and Gadolinium – Based contrast media

- Both agents have a plasma half-life of two hours and almost 100% excreted within 24hours (with normal renal function)
- Less than 1% of the administered dose is excreted into breast milk
- Less than 1% of that contrast in breast milk is absorbed in the infants gastrointestinal tract

There is a theoretical risk of allergic reaction to contrast from breast milk, but this has never been reported:

- current guidelines do not support the cessation of breastfeeding after contrast administration
- a conservative approach, only if the mother remains concerned about any potential effects, may wait 12-24 hours, expressing and discarding milk over that period, but there is no benefit to waiting >24 hours

Breast feeding mothers should be informed of the low risk and if there are any additional questions, have a radiologist speak to them if you are not able to answer her questions. An informed decision to temporarily stop breast-feeding should be left up to the mother.

REFERENCE:

Tremblay E, Thérasse E, Thomassin-Naggara I et-al. Quality initiatives: guidelines for use of medical imaging during pregnancy and lactation. Radiographics. 2012;32 (3): 897-911.