DEPARTMENT OF RADIOLOGY
POLICY ON THE ADMINISTRATION OF IV CONTRAST MEDIA

Policy

Intravenous contrast material is to be administered by a qualified physician or trained radiologic nurse. A radiologist or radiology resident/fellow will administer all other parenteral contrast material.

The supervising physician will prescribe the nature, dose and rate of contrast administration. The patient's risk status will be assessed prior to contrast administration, so as to determine the type, quantity and dose of contrast to be administered. Standard recommendations for these injections will be available in the area where these procedures are performed. During and following the injection, the administering individual will remain with the patient to observe for possible reactions. Emergency equipment and emergency pharmaceuticals must be available. All individuals administering contrast must be trained in the emergency protocols as per Departmental Policy.

A radiological technologist may prepare the contrast media and prepare the delivery unit (syringe, power injector, etc.).

Consent

Informed consent will be obtained by the requesting physician or the radiologist in the department. Prior to contrast administration the patient or guardian is required to sign an informed consent explicitly stating that the risks, benefits, and alternative choices have been thoroughly explained to, and understood by the patient or appropriate guardian. Consents are obtained by the designated physician in the department or by medical or surgical House staff. Registered nurses and Radiologic Technologists are permitted to witness consents. All personnel administering contrast are required to confirm the presence of a consent prior to injection

Classifications

Two choices are available:

1. Conventional contrast media
2. Low osmolality media (LOCM)

Complications

Iodinated intravenous contrast agents, used for radiologic procedures, possess a small risk of reactions, which can range in severity from minor to fatal. Complications can be significantly reduced when we properly assess the patient's health status, obtain the medical history, and review previous contrast reactions.

Numerous societies have published guidelines and standards for IV contrast selection and administration. The NYU/Bellevue Department of Radiology uses the guidelines approved by the American College of Radiology and the Technology Assessment arm of the University Health Consortium

Non-ionic contrast media should be used in the following circumstances:

1. Active asthma requiring the use of an inhaler
2. Insulin dependent diabetes
3. Severe cardiac disease
4. History of mild or moderate reaction to contrast
5. History of allergy to various iodine containing substances (shellfish, iodine, and or previous contrast reactions
6. Inability to communicate allergy history

Note that non-ionic is now used almost exclusively.

**Mild reaction* - Nausea, vomiting, diaphoresis, c/o a warm sensation, c/o altered taste, itching, hives, rash, headache, pallor, nasal stuffiness, dizziness, chills, swelling around eyes and face, anxiety
***Moderate reaction* - Tachycardia, hypertension, hypotension, dyspnea, wheezng, laryngospasm, bronchospasm
****Severe reaction* - Anaphylaxis, convulsions, cardiopulmonary arrest

CT examinations on patients with a history of severe allergy- e.g. anaphylaxis, throat swelling, difficulty breathing related to prior contrast exposure should never be performed with contrast. If the patient requires a special procedure examination, the referring physician must be consulted. If the procedure is required then proper pre-medication and anesthesia assistance is necessary. See below for appropriate pre-medication.

Risk of ARF

Risk of contrast related ARF is similar for LOCM and HOCM in normal patients. Normal patients are classified as those patients with Cr < 1.4 mg/dl; well hydrated patients who are moderately impaired (Cr < 2 mg/dl) with or without diabetes may be injected. Patients undergoing hemodialysis should be scheduled for dialysis within 6 hours of the contrast injection. Diabetics who are on glucophage (Metformin) should be instructed to hold the medication for 48 hours *following* the CT, pending lab work. It is recommended that metformin be withheld for 24 hours *before* the test, however, recent data has shown that this is not a contraindication to IV contrast in emergency situations. **IV contrast is contraindicated in patients with a history of myeloma or monoclonal gammopathy.**

Cardiac Disease

Patients with severe cardiac disease, for example CHF, patients on digitalis or other inotropic agents, patients with chronic refractory arrhythmias, and/or mitral and/or aortic valve disease (preoperative), should be given LOCM. Patients with coronary artery disease (CAD), previous CABG, or history of myocardial infarction without complications may receive HOCM.

Steroid Preparation

Role of Steroid Preparation

Steroid preparation along with LOCM is indicated for patients with a history of a prior moderate or severe reaction to contrast media or a significant asthma history. It is the responsibility of the referring physician to prescribe the medication for the steroid preparation. The preparation is as follows:

Prednisone 50 mg PO x 3 doses
The first dose should be administered 24 hours prior to the study. The second dose 12 hours prior to the study and the last dose one hour prior to the study.

Diphenhydramine 50 mg PO x 1 dose. Should be administered one hour prior to the study.

Outpatients who have driven to the hospital for the procedure should be advised that they will require assistance to drive them home, because of drowsiness induced by the antihistamine.

Recommendation: Steroid prep + LOCM in patients with a history of prior contrast reaction

Risk Factor Assessment:

Information regarding patient risk can be obtained from the following sources:

1. The patient's referring physician
2. The patient's chart
3. The physician obtaining informed consent
4. The clinician interviewing the patient prior to the injection of the contrast media. All risk factors should be discussed with the patient prior to initiating the injection.
5. Nursing interview/documentation sheet

Management of Contrast Reactions

The following treatment guidelines are based on 1998 published ACR guidelines for treatment of contrast reaction. Emergency equipment is readily available at all times.

Mild Reactions-

1. Discontinue injection if not completed, except with N/V (see #5 below)
2. No treatment needed in most cases. Patient reassurance.
3. Diphenhydramine 25 mg-50 mg PO/IV
4. Maintain IV
5. *For nausea and vomiting*: stop or slow injection, reassure patient, may give Compazine 10 mg IM
6. *For uticaria* give diphenhyramine 25-50 mg PO/IM/IV or Hydroxine (Vistaril) PO/IV/IM 25-50 mg
7. Notify house staff if inpatient or Radiologist House staff for outpatient.
8. Document reaction in patient care notes and on occurance form.

Moderate Reactions-

1. Always maintain IV if possible. If patient does not have an IV infusing prepare NS or D5W at KVO.
2. Notify radiology house staff and referring house staff. If reaction progresses acutely, the RN or MD should administer SC epinephrine 1:1,000, as discussed below, while waiting on the physician. This is to avoid further complications.
3. For all reactions initiate O2 6-10L/min via face mask and obtain vital signs.
4. *For severe uticaria* epinephrine 1:1,000 SC 0.1-0.3mg can be given. Contraindicated in severe cardiac disease.
5. *For facial/laryngeal edema* give epinephrine 1:1,000 0.1- 0.2mg. s.c. If there is evidence of hypotension give epinephrine (1:10,000) .1mg or 1cc slowly IV. IV epinephrine should be administered by the MD, unless the RN is certified in ACLS. Repeat PRN up to a maximum of 1.0 mg.
6. **If patient is not responding to therapy or obvious laryngeal edema (acute), notify anesthesia or call the airway team at x 4111.**
7. *For bronchospasm* administer beta agonist inhalers such as metaproteranol (Alupent), terbutaline (Brethaire) or albuterol (Proventil). For mild bronchospasm give 0.1- 0.3mg epinephrine SC. If bronchospasm advances acutely administer epinephrine (1:10,000) slowly IV. Once again if the patient is not responding to the treatment stat page anesthesia
8. Transfer patient to the appropriate unit. If patient is an outpatient notify nursing leadership.
9. Document reaction in patient care notes and on occurrence form.

Severe Reactions/Anaphylaxis

1. **For severe reactions call the Airway team immediately.**
2. Notify house staff and monitor vital signs, including EKG.
3. For all patients maintain IV and provide fluid replacement of LR or NS.
4. For all patients initiate O2 at 6-10 L/min via face mask.
5. *For hypotension with bradycardia (possible vagal reaction)* elevate legs up to 60 degrees or more (preferred) or trendelenberg position.
6. Prepare .6 -1.0 mg atropine for IV administration. Repeat atropine up to a dose of 2 mg (for adults).

7. *For pheochromocytoma* phentolamine 5 mg (1.0 mg in children) should be given.
8. *For seizures/convulsions* consider diazepam IV (valium) or midazolam IV (versed) 2.5 mg. Protect the patient and monitor vital signs.
9. *For anaphylaxis* give 1.0 ml of epinephrine 1:10,000 IV slowly over 1 minute, give IV fluids, and administer steroids solu-cortef 1gram or its equivalent.
10. Transfer patient to appropriate unit. If patient is an outpatient notify nursing leadership.

Discharge of patients following contrast reactions

1. Minor/mild reactions
   - Nurse to discharge patient. Instruct patient about his/her sensitivity to contrast for future reference
   - Log pertinent information on contrast reaction form
2. Moderate/severe reactions
   - The patient’s attending physician should discharge patient from the hospital when appropriate.

RISK ASSESSMENT FORM FOR CONTRAST INJECTION

Procedure: ____________________
Date: ____________________

To assist in selecting the appropriate contrast media, the questions below should be used as a guideline in every interview and/or chart review.

Patient Risk Assessment:
Risk Factors:

1. Previous severe reaction: __Yes __No
2. Previous mild contrast reaction (except nausea/vomiting, heat/flushing/pain) __Yes __No
3. Pretreatment for current study. __Yes __No
4. History of asthma and no pretreatment for current study: __Yes __No
5. History of systemic, allergic reactions to multiple agents and no pretreatment for current exam. __Yes __No
6. Significant cardiac dysfunction; e.g.
   - -w/unstable angina (angina at rest or upon mild exertion): __Yes __No
   - -w/severe congestive failure (dyspnea at rest or upon mild exertion): __Yes __No
   - -w/severe, uncontrolled arrhythmias: __Yes __No
   - -recent (within 1 week) myocardial infarction: __Yes __No
   - -with shock (BP< 100 mm Hg, pallor, tachycardia): __Yes __No
   - -w/pulmonary hypertension: __Yes __No
7. Severe renal dysfunction (creatinine > 2.5 mg/dl): __Yes __No
8. Diabetes and serum creatinine > 1.4 mg/dl: __Yes __No
9. Diabetes and on Glucophage: __Yes __No

**Glucophage must be held for 48 hours following the CT exam*

10. Sickle cell disease: __Yes __No
11. Are you pregnant or nursing an infant? __Yes __No
12. Have you eaten or drank in the last 4 hours? __Yes __No
13. Have you had a barium study in the last week? __Yes __No