UAB MEDICINE

Location(s) of protocol or standing order use:
Location(s) of protocol or standing order use:
UAB Hospital - North Pavilion, UAB Hospital -TKC, UAB Hospital - Highlands, UAB Hospital - Acton Road, UAB Hospital – Leeds, UAB Hospital-Gardendale, UAB Hospital-Hoover

Contrast Media Protocol

Implementation Criteria: The referring physician order for the exam/procedure serves as the order to initiate.

Locations of Protocol Use: UAB Medicine and Clinical Facilities administering contrast media in the Department of Radiology

Personnel Authorized to Implement: Radiologic Technologists and all Registered Nurses.

Prior to the Start of the Procedure:

1. Check the patient's allergies. If an allergy to any contrast or medication required in the procedure is noted, notify the radiologist to determine if the procedure should be performed.
2. If the procedure requires intravenous (IV) access and the patient does not have IV access, place an IV access.
3. If the patient is of child bearing age (12-50) and there is a possibility of pregnancy, a urine pregnancy test should be obtained for exams requiring/assessing pregnancy status and consent.
4. Ambulatory Locations:
   - If no lab value is available upon arrival to the Radiology department, a serum creatinine and eGFR will be performed in the department with the use of I-stat equipment provided by UAB Bedside Testing. The referring physician order for the exam/procedure serves as the order to initiate necessary labs to perform the requested exam/procedure.
5. *CT:
   - Estimated glomerular filtration rate (eGFR)
     - If the patient's eGFR is <30 mL/minute or if there is an increase in serum creatinine of 0.2 mg/dL or greater with the previous 48 hours, notify the radiologist. The radiologist will determine how to proceed.

   - Review the patient's medication history to determine if they are currently taking metformin.
     - In patients with no evidence of AKI (acute kidney injury) and with eGFR ≥30 mL / min/1.73m2, there is no need to discontinue metformin either prior to or following the intravenous administration of iodinated contrast media, nor is there an obligatory need to reassess the patient's renal function following the test or procedure.
     - In patients taking metformin who are known to have acute kidney injury or severe chronic kidney disease (stage IV or stage V; i.e., eGFR< 30), or are undergoing arterial catheter studies that might result in emboli (atheromatous or other) to the renal arteries, metformin should be temporarily discontinued at the time of or prior to the procedure, and withheld for 48 hours subsequent to the procedure and reinstituted only after renal function has been re-evaluated and found to be normal.
     - If multiple CT exams with different doses are performed with a single IV contrast dose the higher approved contrast dose will be given.

*Anything outside the above parameters, contact a radiologist for guidelines.

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Procedure: CT Arthrogram

- Shoulder or Hip
  Mix 5 mL of Iohexol (Omnipaque®) 240, 10 mL of 0.9% sodium chloride, and 5 mL of lidocaine 1% (preservative-free) in a 20 mL syringe. Inject intra-articularly into the joint being imaged.

- Wrist or Ankle
  Mix 5 mL of Iohexol (Omnipaque®) 240, 10 mL of 0.9% sodium chloride, and 5 mL of lidocaine 1% (preservative-free) in 20 mL syringe. Inject intra-articularly into the joint being imaged.

- Knee
  Mix 5 mL of Iohexol (Omnipaque®) 240, 10 mL of 0.9% sodium chloride, and 5 mL of lidocaine 1% (preservative-free) in 20 mL syringe. Inject intra-articularly into the joint being imaged.

Procedure: CT Cystogram

- Dilute 10 mL Iohexol (Omnipaque®) 350 or Iopamidol (Isovue) 370 in 500 mL of 0.9% sodium chloride and infuse via foley catheter prior to imaging.

Procedure: CT Neuro Exams

- All CT Neuro Exams *unless noted below for specific exams
- Administer 100 mL Iohexol (Omnipaque®) 350 or Iopamidol (Isovue) 370 prior to imaging as an IV bolus using a mechanical injector. .

***CTA of Head & Neck or CTA Neck ONLY**

- Administer 100 mL Iohexol (Omnipaque®) 350 or Iopamidol (Isovue) 370 prior to imaging as an IV bolus using a mechanical injector. Injection into IV in right arm if possible.

CT Perfusion

- Administer 40 mL Iohexol (Omnipaque®) 350 or Iopamidol (Isovue) 370 prior to imagining as IV

Note: If a soft tissue neck is performed in addition to another IV contrast exam, add 25ml to the IV Iohexal (Omnipaque®) 350 or Iopamidol (Isovue) 370 dose

Positive Enteric Contrast:

- **Indications:**
  1. Abdominal or pelvic surgery or CT in the last 2 weeks. Abscess Drain or Wound Vac
  2. Suspected or known enterocutaneous fistula, bowel perforation/leak, abdominal abscess, abdominal fluid collection or free air, biloma, pancreatic pseudocyst, or pancreatic walled off necrosis, esophageal perforation
  3. Pelvic mass in females, gynecologic cancer (cervical, endometrial, uterine, ovarian, or fallopian tube), and any peritoneal cancer or tumor (desmoid tumor, peritoneal carcinomatosis, peritoneal nodule, pseudomyxoma peritonei, omental caking, or primary peritoneal cancer). Enterovaginal Fistula

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4. CT Abdomen and/or Pelvis without IV contrast (not stone or adrenal protocol).

- Pre-mixed 500 mL (i.e., 16.9 oz.) bottle of Omnipaque (iohexol) oral solution (9 mg iodine/mL

Route	Indication	Dosage
Oral	Routine	Administer 250 mL 60 min prior to scan and 250 mL 30 min prior to scan.
G-tube	Routine	Administer 500 mL 60 min prior to scan.
J-tube	Routine	Administer 250 mL 60 min prior to scan.
Oral	Bariatric Post-op	Administer 150 mL on the table, immediately prior to scan.
G-tube	Check placement	Administer 150 mL on the table, immediately prior to scan.
Oral	Esophageal leak	Administer 100 mL on the table, immediately prior to scan*****.

(A) For fluid collection in the upper abdomen (e.g., pancreatic pseudocyst) 250 mL 15 min prior and 250 mL on the table.

(B) If possible, the last sip should be swallowed at the time of the scan.

****Note:** NO positive oral contrast agent is to be given for CTA studies (Pre or Post stent), renal studies, liver imaging, pancreatic imaging, acute flank pain, acute trauma patients, CT Urograms, CT Cystograms or GI bleeding studies. Water or Breeza can be used if requested. The CT Imaging exam should be performed 1 hour after the patient starts drinking, even if they cannot finish the bottle. Do NOT delay inpatient or ED scans.

Rectal Contrast

- **Indications:**
  1. Evaluating for perforation or for anastomotic leak after anorectal or colonic surgical intervention.
  2. Suspected or known rectal or colonic fistula.
  3. Re-evaluation of a pelvic abscess or fluid collection, if requested by ordering provider.
  4. Follow up of complicated diverticulitis, if requested by ordering provider.

- Mix 100 mL Omnipaque® 350 or Iopamidol (Isovue) 370 in one gallon of water. Shake well and pour 1500-1800 mL into enema bag (discard any leftover), then administer the mixture rectally per patient tolerance.

- **Note: Oral contrast is preferred over rectal contrast due to patient comfort, although, both are likely equally diagnostic if post-administration duration is long enough to allow for passage into the rectum (2 hours is a safe estimate assuming normal bowel mobility)**

Procedure: Routine Body CT Protocols (Refer to ***Table 1*** for weight-based dosing**)**

Routine Abdomen, Pelvis or Abdomen + Pelvis:

- Administer Iohexol (Omnipaque) IV or Iopamidol (Isovue) 370 by mechanical or hand injector.
- Administer one bottle (16.9 oz i.e., 500mL) of the pre-mixed oral solution orally and wait 1 hourprior to scanning. ***Refer to Enteric contrast policy***

CT Enterography-Suspected GI Bleed

- Administer Iohexol (Omnipaque) IV or Iopamidol (Isovue) 370 by mechanical or hand injector.
- Administer Three bottles of Breeza (each contains 500 ML) separated by 20 min a

piece i.e., 1 bottle at 60, 40, and 20 minutes prior the scan, and 8 oz. (240 mL i.e., a cup) of water on the exam table. ***Refer to Enteric contrast policy***

Suspected GI Ischemia

- Administer Iohexol (Omnipaque) or Iopamidol (Isovue) 370 IV by mechanical or hand injector.

Multiphase Exam for Cancer Follow-up

- Administer Iohexol (Omnipaque®) IV by mechanical or hand injector.

Runoff Lower and Upper Extremity CT Angiography

- Administer Iohexol (Omnipaque®) or Iopamidol (Isovue) 370 IV by mechanical or hand injector.

Adrenal Mass and Runoff CTA

- Administer Iohexol (Omnipaque®) or Iopamidol (Isovue) 370 IV by mechanical or hand injector.

2 & 3 Phase CT Liver

- Administer Iohexol (Omnipaque®) or Iopamidol (Isovue) 370 IV by mechanical injector

Renal 3 Phase

- Administer Iohexol (Omnipaque®) or Iopamidol (Isovue) 370 IV by mechanical injector.

CT Urography

- Administer Iohexol (Omnipaque®) IV or Iopamidol (Isovue) 370 by mechanical injector.
- Administer 200 ml of 0.9% sodium chloride IV

Renal Donor

- Administer Iohexol (Omnipaque®) IV or Iopamidol (Isovue) 370 by mechanical injector.

Table 1:

<36 kg (<80 lbs)	1 mL per lb of body weight
36-60 kg (81 -130 lbs)	80 mL
61-115 kg (131 – 251 lbs)	100 mL
> 116 kg (252 lbs)	150 mL

Procedure: Enhanced Body CT Protocols (Refer to ***Table 2*** for weight-based dosing**)**

4 Phase CT Liver

- Administer Iohexol (Omnipaque®) IV or Iopamidol (Isovue) 370 by mechanical injector.

Pancreas Multiphase

- Administer Iohexol (Omnipaque®) or Iopamidol (Isovue) 370 IV over by mechanical injector.

CTA A/P DIEP/FIX Protocol

- Administer Iohexol (Omnipaque®) or Iopamidol (Isovue) 370 IV over by mechanical injector.

Table 2:

Patient Weight	Dose
<36 kg (<80 lbs)	1 mL per lb of body weight
36-60 kg (81 -130 lbs)	100 mL
61-90 kg (131 – 200 lbs)	140 mL
>91kg (201 lbs)	180 mL

Procedure: Routine CTA (Refer to **Table 3** weight-based dosing**)**

- Administer Iohexol (Omnipaque®) or Iopamidol (Isovue) 370 IV by mechanical injector

Renal Artery CT Angiography

- Administer Iohexol (Omnipaque®) or Iopamidol (Isovue) 370 IV by mechanical injector

Aorta-iliac CT Angiography

- Administer Iohexol (Omnipaque®) or Iopamidol (Isovue) 370 IV by mechanical injector

Table 3:

Patient Weight	Dose
≤110 kg (<240lbs)	80 mL
≥111 (≥241 lbs)	100 mL

Procedure: Routine Chest CT Protocols (Refer to **Table 4** weight-based dosing)

- Administer Iohexol (Omnipaque®) Iopamidol (Isovue) 370 IV by mechanical or hand injector.

Table 4:

Patient Weight	Dose
<45 kg (<100 lbs)	50 mL
45 – 90 kg (101– 200 lbs)	60 mL
91 – 158 kg (201 – 350 lbs)	80 mL
>159 kg (>351lbs)	100 mL

Procedure: CTA Chest Only PE, Aortic Dissection, CTA Chest Only PE vs. Dissection, CTA Routine Chest (Refer to **Table 5** weight-based dosing)

- Administer Iohexol (Omnipaque ®) or Iopamidol (Isovue) 370 IV by mechanical injection followed by 0.9 % sodium chloride flush.

Table 5:

Patient Weight	Dose	0.9% Sodium Chloride
<45 kg (<100 lbs)	50 mL	50 mL
45 – 90 kg (101 – 200 lbs)	60 mL	50 mL
91 – 158 kg (201 – 350 lbs)	80 mL	50 mL
>159kg (>351lbs)	100 mL	50 mL

Procedure: Cardiac CTA (Coronary) - Retrospective or Prospective Gated Tracked (Refer to **Table 6** for weight-based dosing**)**

- Administer Iohexol (Omnipaque®) 350 or Iopamidol (Isovue) 370 IV dose IV followed by a 0.9% sodium chloride flush.

Table 6:

Patient Weight	Dose	0.9% Sodium Chloride
<45 kg (<100 lbs)	60 mL	50 mL
45 – 90 kg (101– 200 lbs)	70 mL	60 mL
91 – 158 kg (201 – 350 lbs)	80 mL	70 mL
>159 kg (>351lbs)	100 mL	70 mL

Procedure: Cardiac CTA (TAVR) (Refer to **Table 7** for weight-based dosing**)**

Cardiac CTA (TAVR)

• Administer Iohexol (Omnipaque®) 350 or Iopamidol (Isovue) 370 IV dose IV followed by a 0.9% sodium chloride flush.

• If a CTA Neck is performed in addition to Cardiac CTA (TAVR), add 20mL to the IV Iohexol (Omnipaque®) 350 or Iopamidol (Isovue) 370 IV dose.

Table 7:

Patient Weight	Dose	0.9% Sodium Chloride
<45 kg (<100 lbs)	60 mL	50 mL
45 – 90 kg (101 – 200 lbs)	70 mL	60 mL
91 – 158 kg (201 – 350 lbs)	80 mL	70 mL
>159 kg (>351 lbs)	100 mL	70 mL

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256 Slice Scanner

If GFR < 40 mL/minute notify the radiologist. The radiologist will determine how to proceed.

• Administer 40 mL Iohexol (Omnipaque®) 350 or Iopamidol (Isovue) 370 IV bolus followed by 50 mL of 0.9% sodium chloride flush.

Procedure: CT MSK

All indications

□ Administer 100 mL or Iohexol (Omnipaque®) 350 or Iopamidol (Isovue) 370 IV

Pediatric Patients

Age 16 and under	Dose
< 62 kg (<137 lbs)	1 mL per pound of Iohexhol (Omnipaque®) 300
> 63 kg (>138 lbs)	1 mL per pound of Iohexhol (Omnipaque®) 350
Age 17 and older	**Reference the Adult Dosing Guidelines**

Breast Imaging

Procedure: Breast Imaging – Mammogram with Contrast

- Administer 1.5 mL/kg of Iohexol (Omnipaque®) 350. Maximum dose of 150 mL

ALL MR Procedures done on 1.5 Tesla Magnet unless noted specifically in separate section.

- Patients < 90 kg (200 lb): Administer gadolinium IV. To derive the patient's dose, round the patient weight in pounds to the nearest ten, then divide by 10 and subtract 1.
- Example 78 kg (173lb patient). Round to 170, divide by 10 (170/10) =17, 17 subtract 1 (17-1) =16 mL of gadolinium.

Consult the attending radiologist if procedures are ordered in which the gadolinium dose would exceed 20 mL in 24 hours.

- For pediatric patients (12-15 years of age), use the formula based on weight for dosing all MR procedures.
- Example 45kg (100lbs) 15 year old, 100/10-1=9 mL of gadolinium.

- For pediatric patients less than 12 years of age for all MR studies, consult attending radiologist.
- For patients less than 18 years of age having a MRA of renal arteries, aorta and lower extremities, consult attending radiologist.

Procedure on 3 Tesla Magnet
ALL MR Procedures done on 3 Tesla Magnet unless noted specifically in separate section.

- Patients < 90 kg (200lbs): Administer gadolinium IV. To derive the patient's dose, calculate the Tesla dose for the 1.5 Tesla Magnet (above) and half the dose.
  - Example78 kg (173lb patient. 1.5 Tesla Magnet dose is 16 mL then divide by 2 for 3Tesla Magnet dose (16/2=8 mL)
- Patients ≥ 90 kg (200lbs): Administer gadolinium 10 mL IV
- The maximum dose of gadolinium contrast a patient may receive in a 24-hour period is 20 mL. Consult an attending radiologist if procedures are ordered in which the gadolinium dose would exceed 20 mL in 24 hours.
- For pediatric patients (12-15 years of age), use the formula based on weight for dosing all MR procedures.
  - Example: 45kg (100 lb 15 year old, 100/10-1=9 mL of gadolinium contrast.
- For pediatric patients less than 12 years of age for all MR studies, consult attending radiologist.
- For patients less than 18 years of age having a MRA of renal arteries, aorta and lower extremities, consult attending

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radiologist.

Procedure: Arthrograms

- Prior to start of procedure, add 4 mL of gadoteridol (Prohance®), to 250 mL bag sterile 0.9% sodium chloride, mix well. This bag is not for administration to the patient. It is to be utilized for further dilution (see below)

- Shoulder or Hip Arthrogram
  Mix 5 mL of gadoteridol (Prohance®) mixture, 10 mL of Iohexol (Omnipaque®) 240 and 5 mL of lidocaine 1% (preservative-free) in 20 mL syringe. Inject intra-articularly into the joint being imaged.

- Wrist or Ankle Arthrogram
  Mix 2.5 mL of gadoteridol (Prohance®) mixture, 5 mL of Iohexol (Omnipaque®)) 240 and 2.5 mL of lidocaine 1% (preservative-free) in 10 mL syringe. Inject intra-articularly into the joint being imaged.

- Knee Arthrogram
  Mix 5 mL of gadoteridol (Prohance®) mixture, 10 mL of Iohexol (Omnipaque®) 240 and 5 mL of lidocaine 1% (preservative-free) in 20 mL syringe. Make two syringes. Inject intra-articularly into the joint being imaged.

Procedure Magnetic Resonance Angiogram (MRA) Studies for Adult Patients ≥ 18 years old.

- For imaging of the carotid arteries, renal arteries, aorta, lower extremities, dynamic studies of the abdominal organs: Gadolinium 20 mL IV

  The maximum dose of gadolinium contrast a patient may receive in a 24-hour period is 20 mL. Consult an attending radiologist if procedures are ordered in which the gadolinium dose would exceed 20 mL in 24 hours.

Procedure: Liver Imaging Studies

- For MR procedures requiring a hepatobiliary phase use gadoxetate disodium (Eovist) check GFR per GFR guidelines below.
  - If ≥30 mL/min, administer 10 mL of gadoxetate disodium (Eovist)
  - If <30 mL/min, consult a radiologist

Guidelines for checking GFR for gadoxetate disodium (Eovist):

A. For Outpatients/ED

1. With no prior eGFR at the time of MR exam, utilize panel of questions that includes risk factors for compromised renal function. Questions to include:

History of renal disease, including:

Dialysis

Kidney transplant Single kidney

History of known cancer involving the kidney(s) History of hypertension requiring medical therapy History of diabetes mellitus

   a. If NO risk factors, no eGFR required.

   b. WITH risk factors, obtain eGFR.

2. Outpatient/ED with most recent prior eGFR of 45 or above, utilize panel of questions above.

   a. If NO risk factor and eGFR of 60 or above, no new eGFR.

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