

TRA-MINW

CTA Chest Abdomen and Pelvis = CTA Entire Aorta

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In accordance with the ALARA principle, TRA policies and protocols promote the utilization of radiation dose reduction techniques for all CT examinations. For scanner/protocol combinations that allow for the use of automated exposure control and/or iterative reconstruction algorithms while maintaining diagnostic image quality, those techniques can be employed when appropriate. For examinations that require manual or fixed mA/kV settings as a result of individual patient or scanner/protocol specific factors, technologists are empowered and encouraged to adjust mA, kV or other scan parameters based on patient size (including such variables as height, weight, body mass index and/or lateral width) with the goals of reducing radiation dose and maintaining diagnostic image quality.

If any patient at a TRA outpatient facility requires CT re-imaging, obtain radiologist advice prior to proceeding with the exam.

The following document is an updated CT protocol for all of the sites at which TRA is responsible for the administration, quality, and interpretation of CT examinations.

Include for ALL exams

- **Scout:** Send all scouts for all cases
- **Reformats:** Made from *thinnest source* acquisition
 - Scroll Display
 - Axial recons - Cranial to caudal
 - Coronal recons - Anterior to posterior
 - Sagittal recons - Right to left
 - Chest reformats should be in separate series from Abdomen/Pelvis reformats, where applicable
- **kVp**
 - 100 @ <140lbs
 - 120 @ >140lbs
- **mAs**
 - Prefer: Quality reference mAs for specific exam, scanner and patient size
 - Auto mAs, as necessary

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Indication: Aortic aneurysm, aortic dissection, TEVAR (thoracic aortic endovascular repair), EVAR (endovascular repair), etc

***NOTES*:**

- **Non-Contrast:** Rad should be contacted in patients < 40 yo to discuss if necessary.
- **Delayed phase:** needed if there is history of vascular surgery or stent / graft (i.e., TEVAR, EVAR).
- **Tera Recon:** Arterial axial recons (0.6 and 2mm) need to be auto-routed

Patient Position: Supine, feet down with arms above head

Scan Range (CC z-axis): Lung apices through less trochanter

IV Contrast Dose, Flush, Rate, and Delay:

- Dose: (modify volume if using something other than Isovue 370)
 - < 200 lbs 100 mL Isovue 370
 - > 200 lbs 125 mL Isovue 370
- Flush: 50 mL saline
- Rate: 3-4cc/sec (20-gauge or larger IV, at least 4 inches above wrist or pressure injectable line)
- Delay: Bolus trigger off of ascending aorta (threshold 100HU)

Acquisitions: 1 - 3 (non-contrast, arterial, delay)

NOTES:

- Noncontrast may not be necessary in patients < 40yo (contact Rad to discuss). Noncontrast needs to include Abdomen / Pelvis if patient has abdominal aortic graft / stent.
- Delayed phase if endograft or vascular stent is present (check scout images and non-contrast scan, as history may not include graft / stent)
- Breathing: End inspiration
- **Non contrast phase**
 - Coverage:
 - Stent in Chest on scout/localizer: Scan from lung apices through diaphragm to include entire stent
 - Stent in Abdomen on scout/localizer: Scan from diaphragm through lesser trochanter to include entire stent
 - Stent crosses from Chest into Abdomen: Scan from lung apices through lesser trochanter to include entire stent

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- Acquisition helical thickness (slice) 1.25 mm
- **Arterial phase**
 - Coverage: Lung apices to lesser trochanter
 - Trigger bolus off ascending aorta, threshold 100 HU
 - NOTE: Use care in setting of dissection due to false lumen, may require manual trigger
 - Acquisition helical thickness (slice) 0.6 or 0.625 mm
- **Delay phase**
 - Coverage:
 - Stent in Chest: Scan range from lung apices through diaphragm (include entire stent)
 - Stent in Abdomen: Scan range from diaphragm through lesser trochanter (include entire stent)
 - Stent crosses from Chest into Abdomen: Scan range from lung apices through lesser trochanter (include entire stent)
 - Delay of 60 seconds (or 20 seconds after arterial finishes)
 - Acquisition helical thickness (slice) 1.2-1.5mm

Series + Reformats:

- **Non-contrast** (if performed)
 - Axial 1.2-1.5 mm soft tissue kernel
- **Arterial**
 - Thin Axial 0.6-0.625 mm (thinnest axial recon possible) vascular or soft tissue kernel (***TERA RECON***)
 - Axial (not thin) 2-2.5 mm soft tissue kernel (***TERA RECON***)
 - Axial 10 x 2 mm MIP (include Chest only) soft tissue kernel
 - Coronal Chest 2 x 2 mm soft tissue kernel
 - Sagittal Chest 2 x 2 mm soft tissue kernel
 - Coronal Abdomen-Pelvis 2 x 2 mm soft tissue kernel
 - Sagittal Abdomen-Pelvis 2 x 2 mm soft tissue kernel
 - Sagittal MIP 5 x 2 mm soft tissue kernel, Full chest-abdomen-pelvis FOV
 - Coronal MIP 5 x 2 mm soft tissue kernel, Full chest-abdomen-pelvis FOV
- **Delay** (if performed)
 - Axial 1.2-1.5 mm soft tissue kernel

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Machine specific recons (axial ranges given above for machine variability):

* NON-CONTRAST PHASE - Soft tissue (ST) Kernel, machine-specific thickness (axial):

- GE = 1.25 mm
- Siemens = 1.2 mm (or 1.5 mm on older generation)
- Toshiba = 2 mm

*THIN, AXIAL ARTERIAL PHASE - Soft tissue (ST) Kernel, machine-specific thickness (axial):

- GE = 0.625 mm
- Siemens = 0.6 mm
- Toshiba = 0.625 mm

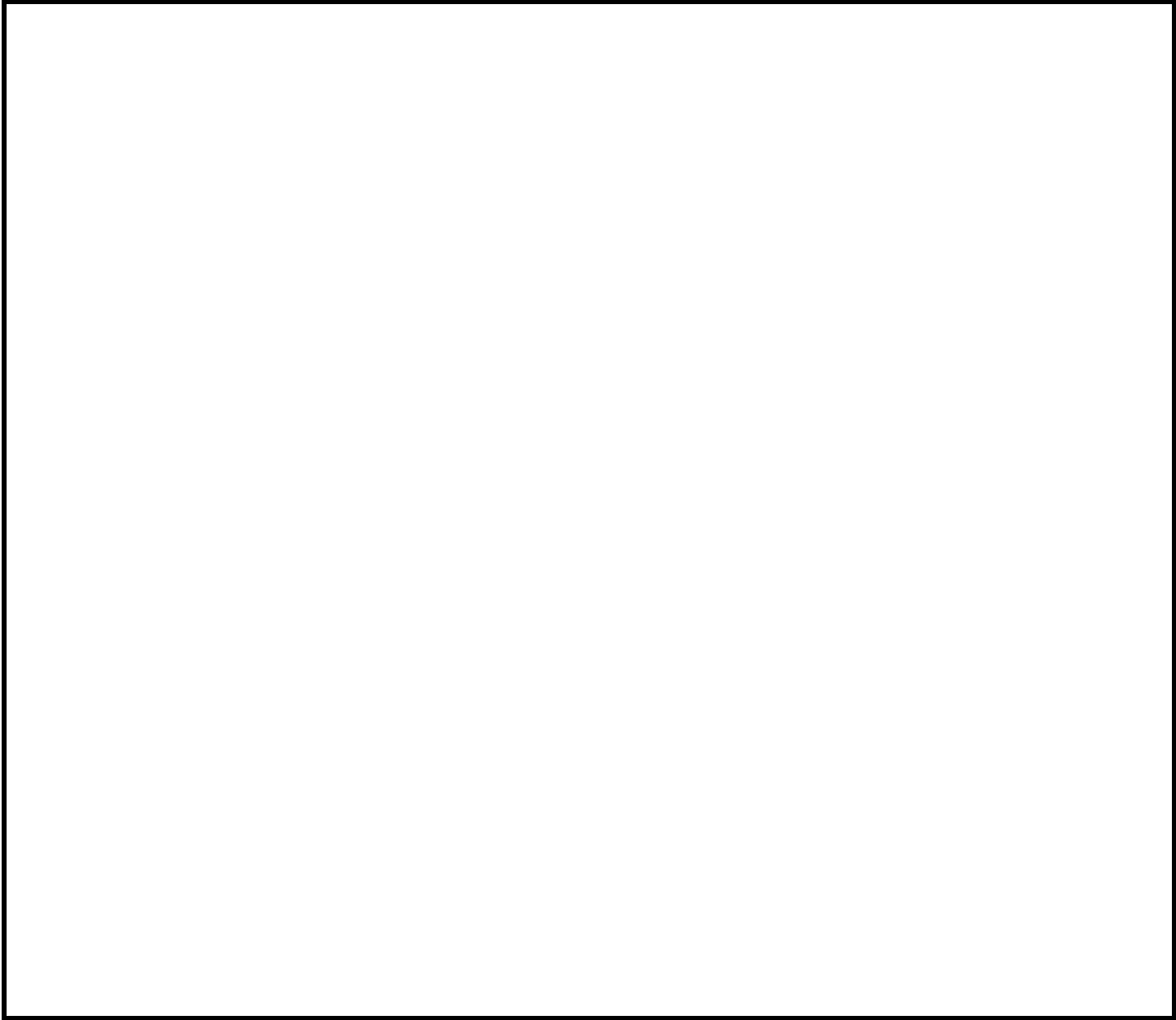
*AXIAL ARTERIAL PHASE (not thin) - Soft tissue (ST) Kernel, machine-specific thickness (axial):

- GE = 2.5 mm
- Siemens = 2 mm
- Toshiba = 2 mm

*AXIAL DELAYED PHASE - Soft tissue (ST) Kernel, machine-specific thickness (axial):

- GE = 1.25 mm
- Siemens = 1.2 mm (or 1.5 mm on older generation)
- Toshiba = 2 mm

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General Comments

NOTE:

Use of IV contrast is preferred for most indications *aside from*: pulmonary nodule follow-up, HRCT, lung cancer screening, and in patients with a contraindication to iodinated contrast (see below).

Contrast *Relative* Contraindications

- **Severe contrast allergy**: anaphylaxis, laryngospasm, severe bronchospasm
 - If there is history of severe contrast allergy to IV contrast, avoid administration of oral contrast
- **Acute kidney injury (AKI)**: Creatinine increase of greater than 30% over baseline
 - Reference hospital protocol (creatinine cut-off may vary)
- **Chronic kidney disease (CKD) stage 4 or 5** (eGFR < 30 mL/min per 1.73 m²) **NOT** on dialysis
 - Reference hospital protocol

Contrast Allergy Protocol

- Per hospital protocol
- Discuss with radiologist as necessary

Hydration Protocol

- For eGFR **30-45 mL/min** per 1.73 m²: Follow approved hydration protocol

IV Contrast (where indicated)

- Isovue 370 is the default intravenous contrast agent
 - See specific protocols for contrast volume and injection rate
- If Isovue 370 is unavailable:
 - Osmolality 350-370 (i.e., Omnipaque 250): Use same volume as Isovue 370
 - Osmolality 380-320 (i.e., Isovue 300, Visipaque): Use indicated volume + **25 mL** (*not to exceed 125 mL total contrast*)

Oral Contrast

- Dilutions to be performed per site/hospital policy (unless otherwise listed)
- Volumes to be given per site/hospital policy (unless otherwise listed)
- TRA-MINW document is available for reference if necessary (see website)

Brief Summary

- Chest only
 - ✓ Chest W, Chest WO
 - ✓ CTPE
 - ✓ HRCT
 - ✓ Low Dose Screening/Nodule
 - None
- Pelvis only
 - ✓ Pelvis W, Pelvis WO
 - Water, full instructions as indicated

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- Routine, excluding chest only and pelvis only
 - ✓ Abd W, Abd WO
 - ✓ Abd/Pel W, Abd/Pel WO
 - ✓ Chest/Abd W, Chest/Abd WO
 - ✓ Chest/Abd/Pel W, Chest/Abd/Pel WO
 - ✓ Neck/Chest/Abd/Pel W, Neck/Chest Abd Pel WO
 - ✓ CTPE + Abd/Pel W
 - TRA-MINW offices: Dilute Isovue-370
 - Hospital sites:
 - ED: Water, if possible
 - Inpatient: prefer Dilute Isovue 370
 - Gastrografin OK if Isovue unavailable
 - Avoid Barium (Readi-Cat)
 - FHS/MHS Outpatient: Gastrografin and/or Barium (Readi-Cat)
- Multiphase abdomen/pelvis
 - ✓ Liver, pancreas
 - Water, full instructions as indicated
 - ✓ Renal, adrenal
 - None
- CTA abdomen/pelvis
 - ✓ Mesenteric ischemia, acute GI bleed, endograft
 - Water, full instructions as indicated
- Enterography
 - Breeza, full instructions as indicated
- Esophogram
 - Dilute Isovue 370, full instructions as indicated
- Cystogram, Urogram
 - None
- Venogram
 - Water, full instructions as indicated