

## **CTA Chest Abdomen and Pelvis = CTA Entire Aorta (ER / In-patient)**

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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.

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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

## **CTA Chest, Abdomen, and Pelvis = CTA Entire Aorta** **(ER / In-patient)**

**Indication:** Chest pain, aortic dissection, back pain, aortic aneurysm, etc

**\*NOTES\*:**

- **Non-Contrast Chest:** Default acquisition for all ER / In-patients
- **Delayed phases:** Only needed if prior vascular surgery or stent / graft (TEVAR, EVAR, aneurysm repair, etc).
- **Tera Recon / Via:** Arterial axial recons (thin and thick) should 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      80 mL Isovue 370
  - > 200 lbs      100 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)
- Breathing: End inspiration

**Acquisitions: 2 or 3**

- Default: Non contrast of chest followed by Arterial Chest / Ab / Pel
- For patients w/ prior vascular surgery / endograft, please acquire non contrast and delayed acquisitions to cover region of prior surgery / graft
- **Non contrast phase**  
Coverage:
  - Default: Scan from lung apices through diaphragm
  - If there is prior vascular surgery / stent graft in abdomen / pelvis, then include A/P in the non-contrast acquisitionAcquisition helical thickness (slice) 1 - 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 -1 mm

- **Delay phase (if performed)**

- Coverage:
  - Chest and/or Ab/Pelvis depending on where vascular surgery / stent / graft is (can review scout or non contrast images to confirm)
- Delay of 75 seconds (or 30 seconds after arterial finishes)
- Acquisition helical thickness (slice) 1-1.25mm

**Series + Reformats:**

- **Non-contrast** (if performed)
  - Axial 1.2-1.5 mm soft tissue kernel (“Noncon”)
- **Arterial**
  - Thin Axial 0.625-1 mm (thin) vascular or soft tissue kernel (\***VIA / TERA RECON\***)  
“AxThin”
  - Axial (not thin) 2-2.5 mm soft tissue kernel (\***VIA / TERA RECON\***)
  - Axial 10 x 2 mm MIP (include Chest only)
  - Coronal Chest 2 x 2 mm
  - Sagittal Chest 2 x 2 mm
  - Coronal Abdomen-Pelvis 2 x 2 mm
  - Sagittal Abdomen-Pelvis 2 x 2 mm
  - Sagittal MIP 5 x 2 mm, Full CAP FOV (“MIP SAG”)
  - Coronal MIP 5 x 2 mm, Full CAP FOV (“MIP COR”)
- **Delay** (if performed)
  - Axial 1.0 -1.5 mm soft tissue kernel (“Delay”)

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 – 1.5mm
- Toshiba = 2 mm

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

- GE = 0.625 mm
- Siemens = 0.75 – 0.8 mm
- Toshiba = 1 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 – 1.5mm
- Toshiba = 1 mm

## 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 m<sup>2</sup>) **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 m<sup>2</sup>: 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
- 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