TRA MEDICAL IMAGING

253-761-4200
PO Box 1535
Tacoma WA 98401
tranow.com

CT (Pulmonary Embolism) & CTA Abdomen / Pelvis
CTA Chest (PE) & CTA A/P

Reviewed By: Dan Verdini, MD
Last Reviewed: August 2024
Contact: (866) 761-4200, Option 1

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-MINW 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-MINW 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

OTHER:

- Please call radiologist for **OUTPATIENT rule out PE** before patient leaves department
  - Mark these studies STAT

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CTA Chest & CTA Abdomen + Pelvis

Indication: Evaluate for pulmonary embolism, chest pain, shortness of breath, etc + abdominal pain, nausea/vomiting, sepsis, etc.
-can be used for any combination of CTA of the Chest Abdomen pelvis (CT PE + CTA A/P or CTA chest + CTA A/P or CTA thoracic aorta and CTA A/P)

Patient Position: Supine, feet down with arms above head

Oral Contrast:
**For specific volume + dilution based on examination type, see separate Oral Contrast protocol document and/or hospital policy for below indicated agents

- TRA-MINW offices: Dilute Isovue 370
- Hospital sites:
  - ED: Water, if possible (500 mL 15-20 min before examination)
  - Inpatient:
    - Prefer: Dilute Isovue 370
    - If above unavailable: Gastrografin
    - *Avoid Barium (Readi-Cat)*
  - FHS/MHS Outpatient: Gastrografin and/or Barium (Readi-Cat), per hospital/site policy

IV Contrast Dose, Flush, Rate, and Delay:

- Dose & Rate: (modify volume if using something other than Isovue 370; 20-gauge or larger IV, at least 4 inches above wrist or pressure injectable line)
  - < 200 lbs 100 mL Isovue 370, 4cc/sec
  - > 200 lbs 125 mL Isovue 370, 5cc/sec
- Flush: 50 mL saline

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Acquisitions: 2 (arterial, delay)

NOTES:

- Breathing (all phases): End inspiration
- Coverage: Arterial: Top of lung apices through lesser trochanters,
  Delay (A/P): 1cm above diaphragm to lesser trochanter

- **Arterial phase**
  - Trigger bolus off ascending aorta, threshold 100 HU. If trigger bolus not possible, use delay of 30sec.
  - Acquisition helical thickness (slice) 0.6 mm -1 mm
- **Delayed (Late Venous) phase**
  - Acquisition helical thickness (slice) 1 - 1.25 mm
  - Delay of 75 seconds

Series + Reformats:

- **Arterial (Full Chest / Abdomen / Pelvis)**
  - Axial 0.625 – 1 mm vascular or soft tissue kernel
  - Axial 2 - 2.5 mm vascular or soft tissue kernel
  - Coronal 2 x 2 mm soft tissue kernel
  - Sagittal 2 x 2 mm soft tissue kernel
  - Coronal MIP 5 x 2 mm soft tissue kernel (“MIP”)

- **Venous (Abdomen / Pelvis)**
  - Axial 2 - 2.5 mm soft tissue kernel (“VenAx”)
  - Coronal 2 x 2 mm soft tissue kernel (“VenCor”)
  - Sagittal 2 x 2 mm soft tissue kernel (“VenSag”)

*****Machine specific protocols are included below for reference**

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*THIN, AXIAL ARTERIAL PHASE - machine-specific thickness (axial):

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

*NOT THIN AXIAL ARTERIAL PHASE - machine-specific thickness (axial):

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

*AXIAL VENOUS PHASE - machine-specific thickness (axial):

- GE = 2.5 mm
- Siemens = 2 mm
- Toshiba = 2 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^2) **NOT** on dialysis
  - Reference hospital protocol

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Contrast Allergy Protocol

- Per hospital protocol
- Discuss with radiologist as necessary

Hydration Protocol

- For eGFR **30-45 mL/min** per 1.73 m^2: 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

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  - 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