

# TRA-MINW

## CT Liver 3 Phase CT Abdomen W - A.V.D.

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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-MINW 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-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

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## **CT Liver 3 Phase CT Abdomen W - A.V.D.**

### **Indications**

- **New** indeterminate liver lesion (without history of liver dysfunction or cirrhosis), including (but not limited to):
  - Adenoma
  - FNH
  - Hypervascular metastatic disease (includes: carcinoid/neuroendocrine, thyroid, melanoma, choriocarcinoma)
  - Cholangiocarcinoma (with 10-minute delay)
- **Follow-up** for previously characterized liver lesions, including (but not limited to):
  - HCC (*without history of prior TACE or ablation – new HCC or hx TACE/Ablation, use 4-phase [separate protocol]*)
  - Adenoma
  - FNH
  - Known hypervascular metastatic disease (without prior ablation; includes: carcinoid/neuroendocrine, thyroid, melanoma, choriocarcinoma)
  - Cholangiocarcinoma (with 10-minute delay)
- Cirrhosis follow-up (with prior 4-phase available on PACS)

NOTE: MRI is preferred if possible

**Patient Position:** Supine, feet down with arms above head

**Scan Range (CC z-axis):** 1 cm above diaphragm through superior iliac crest

**Prep:** No solids (liquids OK) for 3 hours prior to examination

- Note: Okay to continue examination if prep is incomplete or not done

**Oral Contrast:** 500 mL water 20 minutes before scanning, 250 mL on scanner table immediately pre-scan

### **IV Contrast Dose, Flush, Rate, and Delay:**

- Dose: (modify volume if using something other than Isovue 370)
  - < 200 lbs 75 mL Isovue 370
  - 200-250 lbs 100 mL Isovue 370
  - >250 lbs 125 mL Isovue 370
- Flush: 40 mL saline
- Rate: 4 mL/sec (20-gauge or larger IV)
- Delay: Late arterial (bolus tracking or 40s), Venous 70s, Delayed 5-minute (or 10-minute)

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## **Acquisitions:** 3 (all post-contrast)

- **Late Arterial Phase** - BOLUS TRACKING on descending aorta just above hiatus, start scan 15 seconds after ROI exceeds 150 HU.
  - ONLY IF scanner is NOT able to perform bolus tracking, use 40 second delay
- **Venous Phase** - 70 second delay
- **5-Minute Delay Phase** - 300 second delay; unless concern for cholangiocarcinoma, then 10-minute delay

## **Series + Reformats:**

1. **Late Arterial Phase**
  - a. Axial 2-2.5 mm ST kernel
  - b. Coronal 2 mm ST kernel
  - c. Sagittal 2 mm ST kernel
2. **Venous Phase**
  - a. Axial 2-2.5 mm ST kernel
  - b. Coronal 2 mm ST kernel
  - c. Sagittal 2 mm ST kernel
3. **5-Minute Delay Phase (or 10-minute if cholangiocarcinoma)**
  - a. Axial 2-2.5 mm ST kernel
  - b. Coronal 2 mm ST kernel
  - c. Sagittal 2 mm ST kernel

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

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

### **\*Soft tissue (ST) Kernel, machine-specific thickness (axial):**

- GE = 2.5 mm
- Siemens = 2 mm
- 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 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

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- 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