Liver 4 Phase
CT Abdomen WO W - NC.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.

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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Indication:
- New indeterminate liver lesion with history of hepatocellular dysfunction or cirrhosis
- New possible HCC
- Baseline cirrhosis
- Follow-up HCC status post TACE or ablation
- Follow-up metastatic disease post ablation

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 track or 40s), Venous 70s, Delayed 5-minute (or 10-minute)

Acquisitions: 4 (1 non-contrast +3 post-contrast)
- Non-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. **Non-contrast**
   - Axial 2-2.5 mm ST kernel

2. **Late Arterial Phase**
   - Axial 2-2.5 mm ST kernel
   - Coronal 2 mm ST kernel
   - Sagittal 2 mm ST kernel

3. **Venous Phase**
   - Axial 2-2.5 mm ST kernel
   - Coronal 2 mm ST kernel
   - Sagittal 2 mm ST kernel

4. **5-Minute Delay Phase** (or 10-minute if cholangiocarcinoma)
   - Axial 2-2.5 mm ST kernel
   - Coronal 2 mm ST kernel
   - 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
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

- **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
        - Gastrograin OK if Isovue unavailable
        - Avoid Barium (Readi-Cat)
      - FHS/MHS Outpatient: Gastrograin 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