TRA Medical Imaging
P.O. Box 1535, Tacoma, WA 98401 | MAIN (253) 761-4200 | TOLL FREE (866) 761-4200 | www.tranow.com

CTA Coronary with Calcium Score / CTA Angiography Heart

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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.

Indication: Chest pain, concern for coronary artery disease in low and intermediate risk patients, anomalous coronary artery, equivocal stress test, etc.

Prep:
A negative troponin is required for ED patients prior to scanning, unless exam has been ordered by Cardiologist; if result is not available, call radiologist
** Pre-Medication**:** The CCTA radiologist should ALWAYS be called prior to ANY medication administration (this includes metoprolol, nitro, and IV fluids).

Beta blockers = Metoprolol

GE Scanner (FHS) and Non-FLASH Siemens (MHS)

RADIOLOGIST MUST BE NOTIFIED PRIOR TO MEDICATION ADMINISTRATION

- If heartrate is > 75 bpm and systolic blood pressure > 95mmHg, 100mg of Metoprolol by mouth
    - Scan 45-60 minutes after dose administered
- If heartrate is > 75 bpm and systolic blood pressure < 95mmHg, call Radiologist due to risk of hypotension
- If heartrate < 75 bpm, no Metoprolol is needed

Siemens Scanner, FLASH (MHS)

- If heartrate is > 90 bpm and systolic blood pressure > 95mmHg, 100mg of Metoprolol by mouth
    - Scan 45-60 minutes after dose administered

- If heartrate is > 90 bpm and systolic blood pressure < 95mmHg, call Radiologist due to risk of hypotension

- If heartrate < 90 bpm, no Metoprolol is needed

Sublingual Nitroglycerin

- *Contraindications* (do not give nitro and call radiologist)
    - Ingestion of erectile dysfunction medication (Viagra, Cialis, etc.) in last 24 hours
    - History of severe aortic stenosis or hypertrophic cardiomyopathy
    - Currently taking medications for glaucoma

- If without contraindications, then:
    - If systolic blood pressure is >95mmHg, give sublingual nitroglycerin two tablets or sprays (0.8 mg total dose)
    - If systolic blood pressure is <95mmHg, call Radiologist due to risk of hypotension
    - **CTA should be done 4-7 minutes after NTG is given.**

Patient Position:

1. Supine: Cardiac breathing (Hyperventilation), Feet down with arms above head
2. Female patients: Attempt breast displacement by moving breasts laterally and superiorly which may be secured in some cases with the CT binder strap.

Scan Range (CC Z-AXIS): Carina through base of heart, center on both frontal (for superior border) and lateral (for inferior border) scouts/topograms

- If patient has had bypass (CABG) or aortic evaluation also needed, call CCTA radiologist and plan to extend coverage to top of lungs (*and scan caudocranial*)

IV Contrast:

- Exam requires IV to be antecubital or more central in location (no forearm, wrist, hand IVs)
- Ideally, IV should be in right antecubital (AC) fossa; left AC is 2nd choice
- IV **must** be rated for 5cc/sec or higher; default rate is 6cc/sec

Acquisitions:

TWO acquisitions total typically = Non-contrast and IV contrast enhanced CTA

NOTES:

- If pt is < 40 yo and **not** from ER, call Radiologist to see if non-contrast necessary
- Rarely, delayed phase may be necessary in cases of aneurysm, cardiac mass, etc and will be decided on by CCTA radiologist.

Breathing Instructions: *MUST be followed to decrease motion artifact.*

- Perform a practice run with the patient to ensure understanding
    - To be done while patient is lying on the CT table after hooking up EKG leads PRIOR to acquiring images
    - Choose cardiac package breathing instructions ("breath in, breath out, breathe in again and hold your breath")

1. ***Non-contrast***
    - GE:
        - No ASIR
        - DFOV: 25 cm
        - kV: 120
        - mA settings:
            - BMI table
    - Siemens:
        - care kV OFF
        - kV: 120
        - mA settings:
            - Care dose
    - Toshiba:
        - No AIDR
        - DFOV: 25 cm
        - kV: 120
        - mA settings:
            - small patient (<120 lbs): 300 mA
            - average patient: 340 mA
            - large patient (BMI > 40): 450 mA
2. ***CTA Coronary with IV contrast***
    - **kV and mA:**
        - Siemens**:** Care kV and Care dose
        - GE scanner – BMI table
        - Contrast bolus:
            - Trigger delay with HU threshold of 100HU in the ascending aorta
            - Test Bolus: 15 cc contrast w/ 15cc flush; ROI in ascending aorta + 5 sec to peak
        - ECG Gating:
            - **Siemens 128 (Flash) ONLY:**
                - Heartrate <75 bpm: prospective ECG gating
                - Heartrate >75 retrospective ECG gating
            - **All other scanners:** Retrospective (dose-modulated)
                - 0-90% R-R interval with pulse modulation
                - Tube on full dose for 65-85% and low dose (20% dose) remaining time

Series and Reformats:

****If your scanner cannot reconstruct the exact axial thickness specified, reconstruct the closest axial thickness but not thicker than requested dimensions below****

-example: Axial 2mm requested and scanner can only recon 2.5mm or

1.25mm→ choose the 1.25mm thickness

1. **Non-contrast: (same for all scanners and sites)**
   - Axial 2.5 mm ST kernel (22-25 cm FOV around heart)
   - *NOTE: Please calculate calcium scores on every coronary CTA, EXCEPT if there has been prior coronary artery bypass grafting and/or stents*

2. **CTA Coronary with IV contrast: (differs by scanner, see below)**
   - **Siemens:**
     - CTA: *Axial* 0.6 mm slice thickness "Best systole" (I31 or I41 kernel; FOV around heart)
     - Multiphase: *Axial* 0.6 mm slice thickness multiphase coronary CTA; (FOV around heart) 200 -440ms increments of 20ms
     - Function: *Axial* 2mm slice thickness (FOV around heart) – Increments of 10%
     - Chest / Full FOV (soft tissue/standard kernel, full FOV)
       1. *Axial* 2 mm slice thickness (I30 kernel)
       2. *Coronal*: 2x2mm slice thickness
       3. *Sagittal*: 2x2mm slice thickness
       4. *Axial* 10 x 2 MIPS (soft tissue/standard kernel, full FOV)
   - **GE:**
     - CTA: *Axial* 0.625 mm slice thickness @ 75% (soft tissue/standard kernel, 25 cm FOV around heart)
     - Multiphase: *Axial* 0.625 mm slice thickness multiphase coronary CTA 65-85% in 5% increments (soft tissue/standard kernel, 25 cm FOV around heart)
     - Function: *Axial* 2mm slice thickness (soft tissue/standard kernel, 25 cm FOV around heart) 0-90% with increment of 10%
     - Chest / Full FOV: (soft tissue/standard kernel, full FOV)
       1. *Axial* 2 mm slice thickness
       2. *Coronal*: 2x2mm slice thickness
       3. *Sagittal*: 2x2mm slice thickness
       4. *Axial* 10 x 2 MIPS (soft tissue/standard kernel, full FOV)
   - **Toshiba:**
     - CTA: *Axial* 0.625 mm slice thickness @ 75% (soft tissue/standard kernel, 25 cm FOV around heart)
     - Multiphase: *Axial* 0.625 mm slice thickness multiphase coronary CTA 65-85% in 5% increments (soft tissue/standard kernel, 25 cm FOV around heart)

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