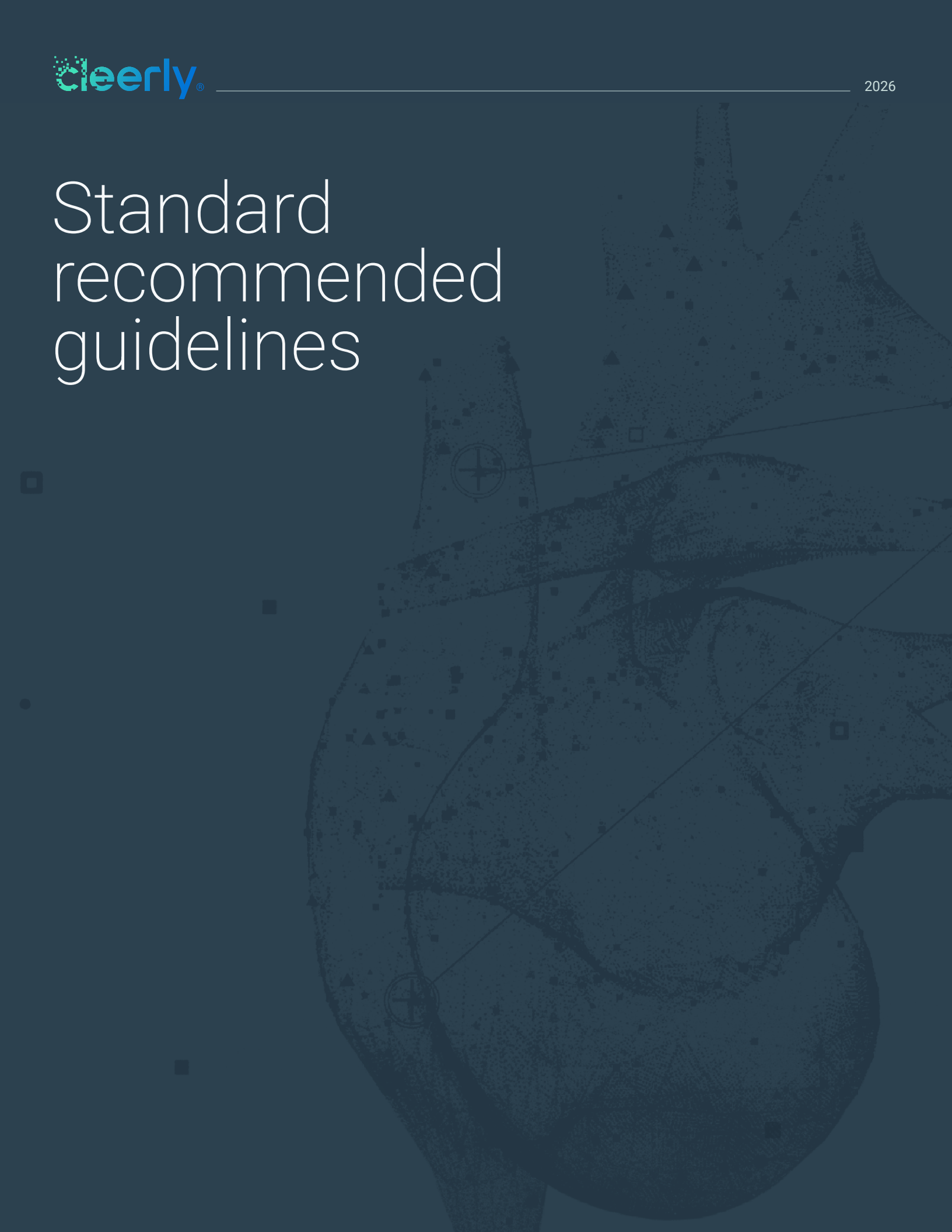
Cleerly®

2026

Standard recommended guidelines



CCTA

Conventional CT image acquisition, reconstruction, & uploading

This protocol aligns with the 2016 SCCT Guidelines for the performance and acquisition of coronary computed tomographic angiography.[1] Detailed scanning protocols may be obtained from the CT manufacturer vendor through the clinical applications department. These recommendations have been found to provide optimal results for plaque characterization.

Contraindications

Prior to the CCTA exam a physician or provider reviews patient history to assess for any contraindications:

- A known history of severe and/or anaphylactic reaction to iodinated contrast, medications to control heart rate and vasodilators including beta blockers/nitroglycerin.
- Renal impairment
- Pregnancy
- Clinical instability (e.g. acute myocardial infarction, decompensated heart failure, severe hypotension).
- Inability to cooperate with scan acquisition and/or breath-hold instructions.
- In addition to the above contraindications provided by the SCCT guidelines, patients who have undergone a Coronary Artery Bypass Graft (CABG) should not be referred for a Cleerly Analysis. Patients with cardiac stents and pacemakers are eligible and may be referred to Cleerly for analysis.

Prior to the exam (cont.)

- Discontinue caffeine or stimulants 12 hours prior to appointment time.
- Discontinue use of erectile dysfunction medication within:
  - 72 hours prior to the exam, (24 hours for sildenafil) or within 24 hours following the exam.
- Discontinue solid foods for 4 hours before the scan.
- The patient may continue to take routine medications under the direction of their physician.
- Ensure the patient understands the importance of being well-hydrated prior to the exam.
- The technologist should provide an explanation of what to expect during the scan:
  - Breathing instructions, IV contrast administration, and exam duration.
  - Clear expectations of what to expect before and during the scan are critical to ease anxiety and keep the HR better managed.
  - The patient should receive a thorough explanation of the need for beta blockers and nitroglycerin.

Dose reduction options

- Different CT vendors and scanners have various dose reduction options. Consult the vendor clinical applications department to ensure optimal dose reductions techniques are utilized without negatively affecting image quality and diagnostic performance.
- mA: typically determined by Automatic Exposure Control (AEC). If not, always reduce mA to the point of not reducing image quality.
- Scan technique - Utilize prospective or other dose reduction techniques (e.g. high pitch spiral) when possible, depending on patient parameters, heart rate, and scanner capabilities. Use of retrospective technique may be required in cases of high or variable heart rates. This option is dependent on scanner capabilities.
- Z-axis should be minimized to only include anatomic coverage of the heart.
- Iso-centering to the heart during scan set up, instead of moving the scan field to the heart.
- Half-scan reconstruction should be used by default for all coronary CTA examinations. ■

Image acquisition

CLEERLY REQUIREMENTS

- FOV ≤ 18 cm - Include all heart anatomy and coronary vessels.
- Slice thickness of ≤ 1.0 mm x 0.5 mm increment or less.
  - Slice increment (overlap): @ ½ the selected slice thickness
- Patient name, date of birth, and ordering provider information is required for all exams sent to Cleerly. This data may be auto populated or manually entered on the scanner at the time of the exam.

SCCT GUIDELINES

- Scan type: Cardiac CTA (64+ slice CT scanner with ≤ 350 ms rotation time)
- 100 kVp or 120 kVp (depending on body habitus)
  - BMI Based kVp
    - 100 kVp ≤ 30 BMI
    - 120 kVp > 30 BMI
    - If performing a serial CCTA, utilize the same kVp as the baseline exam.
- Follow your facility's beta-blocker and nitroglycerin protocol guidelines.
- ECG gating must be utilized, along with correct placement of radiolucent leads and patches.
- 18G in the RAC is preferable for IV access. A 20G may be used if necessary.
- Dual contrast injector
  - Biphasic or triphasic injections are recommended for optimal contrast enhancement.

The chart below may be utilized to determine the rate of injection and volume based on iodine contrast concentration, body habitus, and kVp:

kVp	Iodine Concentration (mg/mL)	Volume (mL) @ Standard Injection Rate (mL/s)	Large Habitus Volume (mL) @ Standard Injection Rate (mL/s)	Saline Chaser
100	320	**65–70 mL** @ 5.0–5.5 mL/s		40 mL
	350	**55–60 mL** @ 4.0–4.5 mL/s		40 mL
	370	**55–60 mL** @ 4.0–4.5 mL/s		40 mL
120	320	**78–85 mL** @ 6.0–6.5 mL/s	**90–97 mL** @ 7.0–7.5 mL/s	40 mL
	350	**65–70 mL** @ 5.0–5.5 mL/s	**78–85 mL** @ 6.0–6.5 mL/s	40 mL
	370	**65–70 mL** @ 5.0–5.5 mL/s	**78–85 mL** @ 6.0–6.5 mL/s	40 mL

Formula: (scan delay time + acquisition time) x flow rate = contrast volume[1]

To acquire a preferred Hounsfield Unit range for Cleerly's software of between 400–450 HU in the left main coronary artery, Cleerly recommends following the injection parameters listed below. Additionally, utilizing the formula (scan delay time + acquisition time) x flow rate = contrast volume will assist you in delivering the precise amount of contrast on a per patient basis. ■

Image reconstruction

GENERAL GUIDELINES

- Image reconstructions of the CCTA should be reviewed immediately after the completion of the scan.
  - The reconstructions should be reviewed while the patient is still on the scanner table to confirm sufficient quality of data acquisition.
- The reconstructed field of view should be limited to the cardiac structures.
- Iterative reconstruction should be applied on all CCTA exams. IR is a post-processing algorithm that independently reduces noise to preserve resolution and image quality.
- When reconstructions of phases in %'s contain artifacts, reconstructing in ms or -ms may improve the image quality outcome.

CLEERLY RECOMMENDATIONS

Successfully acquired (Slice thickness ≤ 1.0 mm: Slice increment @ ½ the selected slice thickness). If the CCTA was acquired prospectively, submit thin set axial phases (ex. 60%–80%) in 5% intervals. If the CCTA was acquired retrospectively, upload the following thin set axial phases: 30%, 35%, 40%, 50%, 60%, 70%, 75%, 80%. In addition, please upload your automatic phase selection (Best Phase). Let us know if you have any questions.

Canon Specific Scanners:

- Please disable the Enhanced CT (multi-frame DICOM) option per manufacturer instructions. Contact your Canon Service Representative for guidance on this option. Cleerly software is currently unable to analyze any CCTA with this function enabled.
- Reconstruct all cardiac series from the Multi View tab and create axial thin datasets into ≤ 0.5 mm x 0.5 mm increment or less. Reconstructions created on the volume dataset are currently unable to be analyzed by Cleerly software. ■

Uploading series into Cleerly

- All acquired thin-section axial phases should be networked to Cleerly Labs (actual phases uploaded vary by each site's specific radiologist requirements).
- Allow all phases to be reconstructed completely before uploading the exam.

Tips

- Use of patient comfort tools is recommended (arm rest, knee cushions, warm blankets, dimmed lighting).
- Axial images should be reconstructed with a slice thickness of ≤ 1.0 mm x .5 mm increment or less, to include all native coronary arteries.
- A slice increment of 50% of the slice thickness should be used.
- A semi-sharp reconstruction kernel should be used for most patients. For cases that require maximum spatial resolution, a sharp kernel may be used to reduce blooming and increase edge defi nition. For obese patients, a soft or smooth kernel may be used to reduce image noise.
- A sufficient number of phases should be reconstructed in order to find the optimal phase of the cardiac cycle (R-R interval) with the least amount of coronary motion.
- ECG-editing, if available, should be used to correct errors or artifacts occurring during acquisition, and to designate ectopic beats for exclusion or special handling during data reconstruction.

Unanalyzable CT series

- Cleerly only analyzes contrast enhanced, thin axial CCTA reconstructed series.
- Cleerly cannot analyze CTA Chest, Bypass present or calcium score exams, 2D and 3D image reformats, dose reports, wide field of view lung reformats, bolus tracking data or smartprep data. ■

[1]Abbara S, Blanke P, Maroules CD, et al. SCCT guidelines for the performance and acquisition of coronary computed tomographic angiography: A report of the society of Cardiovascular Computed Tomography Guidelines Committee: Endorsed by the North American Society for Cardiovascular Imaging (NASCI). *J Cardiovasc Comput Tomogr*. 2016 Nov-Dec;10(6):435-449.

Cleerly Labs is a web-based software application that is intended to be used by trained medical professionals as an interactive tool for viewing and analyzing cardiac computed tomography (CT) data for determining the presence and extent of coronary plaques (i.e. atherosclerosis) and stenosis in patients who underwent Coronary Computed Tomography Angiography (CCTA) for evaluation of CAD or suspected CAD.

Additional contact info

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Learn more at
cleerly.com