Computed Tomography: Adult Chest

Image quality in the multicenter setting can be greatly influenced by variances in acquisition protocols. These variances may be related not only to equipment manufacturer and model, but also technique.

The study may permit imaging per institutional standard-of-care. However, aligning image acquisition to established standards is essential for robust quality data.

The table, below, is provided as a guideline and overview for routine head CT exams. Please refer to your site's specific CT manufacturer's imaging protocols and physicist recommendations for the optimal scanning protocol.

The Chest CT examination should contain, at a minimum, the following series:

1. Localization scans
2. Axial acquisition contiguous 5mm
    a. Sagittal and coronal reconstructions in both standard and lung algorithms

Exam and Patient Preparation

Scan Type	Helical / Spiral	
SFOV	Body / Large or as appropriate to body habitus	Approximately 380 mm (adjusted to patient)
DFOV	To include entire chest, skin to skin	
Patient Position	• Supine, feet-first into the gantry with the knees bent utilizing radiolucent CT knee wedge support whenever possible • Arms raised above shoulders whenever possible	Lateral iso-centering is critical for proper Automatic Exposure Control
IV Contrast Injection	• Dose and rate per institutional standard • Dual head power injector recommended • 35-60 seconds fixed scan delay from start of injection is typical • Saline flush recommended	Insert an intravenous catheter per institutional guidelines prior to the start of imaging.
Oral Contrast	None*	*Unless specifically indicated by supervising radiologist

Image Acquisition

Localization Scan	• AP or PA depending on scanner manufacturer for optimal AEC • Lateral	Apex of lungs to adrenals
Scan Direction	Craniocaudal	
Scan Range	Spinus process of C-7 to base of vertebrochondral ribs	Apex of lungs to adrenals
Technical \ Scanning Parameters	• Automatic Exposure Control (AEC) should be used whenever possible • Iterative reconstruction and similar noise reduction techniques should be utilized if available • Adjust kVp and mAs per slice or range (minimum and maximum mAs for multidetector CT) per body habitus and manufacturer recommendations Slice thickness = 5 mm contiguous	Please refer to manufacturer recommendations.
Reformats	Not required	Sagittal, coronal, and MIP reformats recommended from thin slice reconstructed images.
Radiation Dose	Per ALARA	
Respiration	Single breath-hold on inspiration	If patient is unable to achieve single breath-hold, they should be instructed to take slow shallow breaths to limit respiratory motion

References

1. ACR–SCBT-MR–SPR Practice Parameter for the Performance of Thoracic Computed Tomography (CT), Res. 7 – 2018. https://www.acr.org/-/media/ACR/Files/Practice-Parameters/CT-Thoracic.pdf, accessed June 10, 2021.
2. Adult Routine Chest CT Protocols Version 2.1, 5/4/2016. https://www.aapm.org/pubs/CTProtocols/documents/AdultRoutineChestCT.pdf, accessed February 19, 2021.
3. Kalra, MK. "Chest CT Protocols", presented at the 3rd CT Dose Summit, Phoenix, AZ, March 2013. https://www.aapm.org/meetings/2013CTS/documents/FRI_12Kalra_Codyprotocolchest.pdf, accessed February 19, 2021.
4. García-Garrigós E, Arenas-Jiménez JJ, Sánchez-Payá J. Best Protocol for Combined Contrast-Enhanced Thoracic and Abdominal CT for Lung Cancer: A Single-Institution Randomized Crossover Clinical Trial. AJR Am J Roentgenol. 2018 Jun;210(6):1226-1234.