

The background of the top half of the page is a photograph of a medical professional in blue scrubs adjusting a patient on a CT scanner. The patient is lying on a white table, partially covered by a blue drape. The scanner's gantry is visible in the background. The Materialise logo is in the top right corner, consisting of a blue triangle above the word 'materialise' in a bold, sans-serif font, with the tagline 'innovators you can count on' below it.

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SCAN PROTOCOL HEARTPRINT

These general HeartPrint® imaging guidelines can help you reach the optimal image quality to create a HeartPrint® model. Should you have any questions or require further clarification, please don't hesitate to contact us via HeartPrint@materialise.com. We are happy to help you as well on more specific imaging guidelines for pediatric patients.

COMPUTED TOMOGRAPHY (CT)

Heart Structures

(Examples: aortic and pulmonary valves, coronaries, LAA ...)

General rule: standard ECG-triggered diastolic protocol with good contrast, more specifically:

- 100-120kV, 550-700mAs
- Slice distance: 0.3-0.7mm (0.5mm most common)
- Slices are incremental or (at least) equal to slice distance
- CT scanner with 64 or more slices to avoid motion and misalignment artifacts
- Medium contrast on the left or right side of the heart for diagnostic imaging
- Heartbeat below 65
- For the access route (if required): see vessel structure details below
- Ideally, with the patient holding their breath

Vessel Structures

(Examples: TAA, AAA, coarctation ...)

General rule: standard vascular protocol with good contrast, more specifically:

- 100-120kV, 550-700mAs
- Slice distance: 0.7-1mm
- Slices are incremental or (at least) equal to slice distance
- CT scanner with 16 or more slices to avoid long scans
- No ECG triggering required
- Medium contrast on the left or right side of the heart for diagnostic imaging

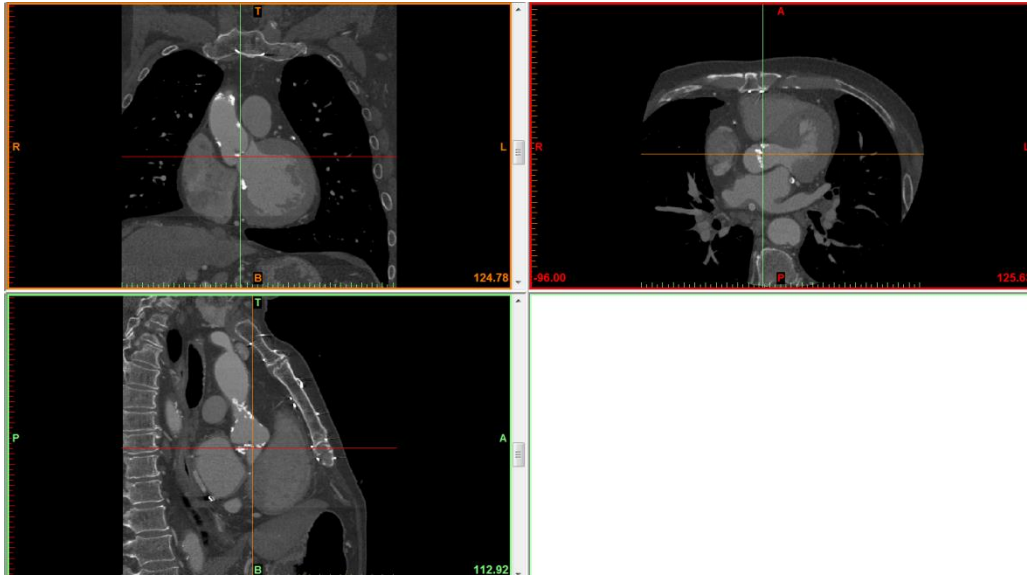


Figure 1. Example of an approved CT heart scan – good scan with clear contrast, slice increment and slice distance 0.625mm, no misalignments

MAGNETIC RESONANCE IMAGING (MRI)

Heart Structures

(Examples: aortic and pulmonary valves, coronaries, LAA ...)

General rule: standard diastolic protocol with good contrast, more specifically:

- Slice distance: 0.3-0.7mm (0.5mm most common)
- Slices are incremental or (at least) equal to slice distance
- The higher the spatial resolution the better (as long as the signal-to-noise ratio permits)
- Ideally, with the patient holding their breath
- Contrast medium (e.g. Ablavar®) on the left or right side of the heart for diagnostic imaging
- For full heart: it is preferable to obtain 3D volume data (at least) three times and merge it into one file so that all cardiovascular structures contain contrast medium
- **Important rule:** nearly isotropic voxels (not standard)

Vessel Structures

(Examples: TAA, AAA, coarctation ...)

General rule: standard vascular protocol with good contrast, more specifically:

- Slice distance: 0.7-1mm
- Slices are incremental or (at least) equal to slice distance
- The higher the spatial resolution the better (as long as the signal-to-noise ratio permits)
- Contrast medium (e.g. Abalavar®) on left or right side of the heart for diagnostic imaging
- **Important rule:** nearly isotropic voxels (not standard)

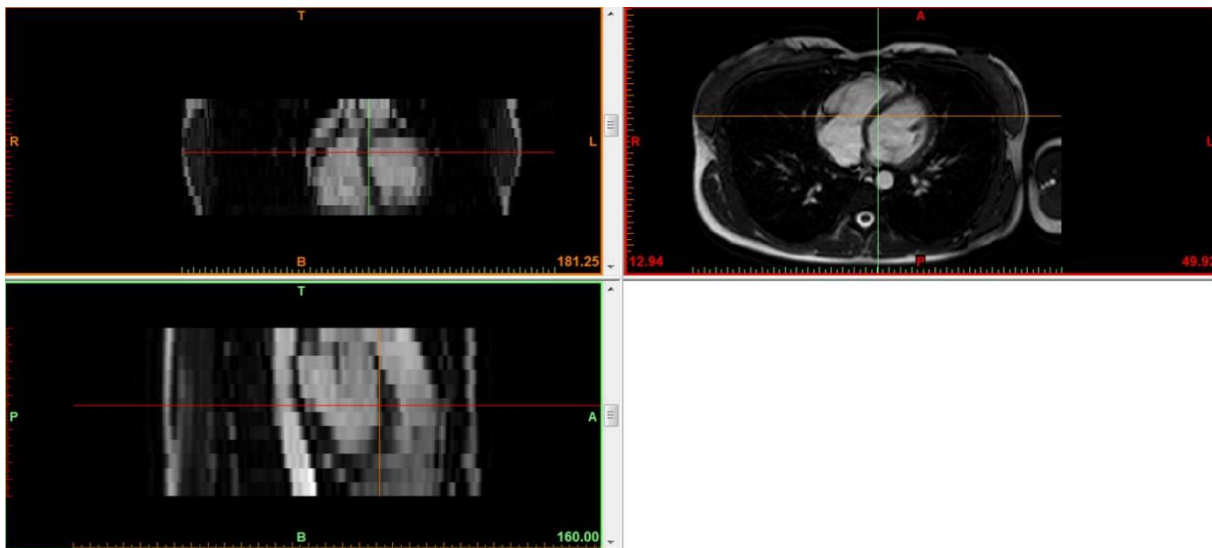


Figure 2. Example of MRI heart unsuitable – very anisotropic voxels (large slice increment)

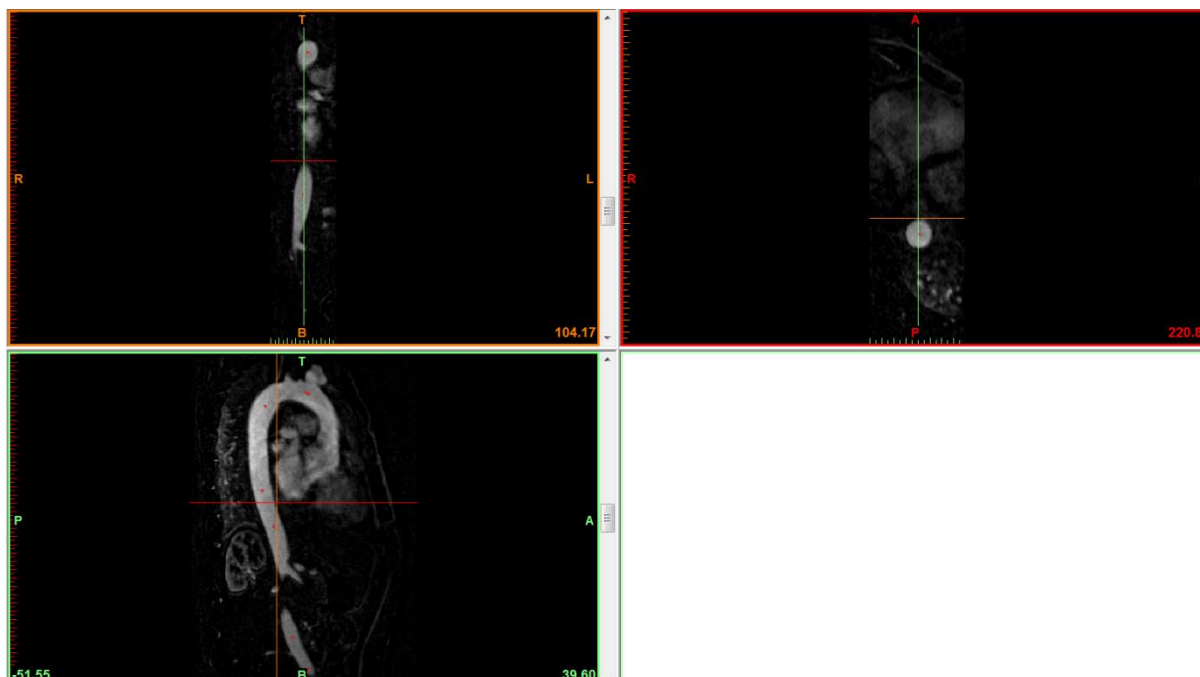


Figure 3. Example of an approved MRI of an aorta: isotropic voxels, 0.9mm slice increment and thickness

Data transfer

Image data must be transferred to Materialise via the SurgiCase platform.

- First time users can contact Materialise Customer Service to obtain a SurgiCase account and instructions (heartprint@materialise.com).
- Ensure necessary rights are obtained for transfer of data to Materialise.
- Instructions for image submission can be found in the SurgiCase Online User Manual for uploading images:
https://mat1euce1oosdoc.s3.amazonaws.com/surgicase/SurgiCase%20Online%20User%20Guide%20for%20Uploading%20Images_L-30442.pdf

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