

Clinical Practice Management Guidelines

Imaging of Trauma Patients Adults

I. Purpose

To provide guidelines on adult CT scanning technique.

II. Guideline

Appropriate CT scan and technique is crucial to obtaining usable information and preventing repeat scanning due to inadequate or poor quality images.

III. CT Head – Without Contrast (Non-contrast Study)

A. Protocol Selection

1. Without contrast.
2. Scan helical.

B. Scout

1. Patient position: Head first, supine with arms by sides.
2. Scan from tip of chin through top of head.
3. If scanning head and C-spine, use the same scout for both scans and be sure to scan from nipple line through top of head.

C. CT Imaging Non-contrast

1. Tilt gantry according to angle of base of skull.
2. Start at base of skull and scan through top of head.

D. Post-Processing/Recons

1. 5mm axial – brain, blood, and bone

IV. CT C-Spine – Without Contrast (Non-contrast Study)

A. Protocol Selection

1. Without contrast
2. Scan helical

B. Scout

1. Patient position: Head first, supine with arms by sides.
2. Scan from nipple line through frontal sinus.
3. If scanning head and C-spine, use the same scout for both scans and be sure to scan from nipple line through top of head.

C. CT Imaging Non-contrast

1. Include frontal sinus through T-1.
2. Cone down the display field of view to the C-spine, but leave the scan field of view open to include entire face.
3. If the ordering physician requests a maxillofacial CT, recon from the C-spine raw data.

D. Post-Processing/Recons

1. 2mm axial – soft tissue and bone
2. 2mm coronal – bone
3. 2mm sagittal – bone

V. CT Chest/Abdomen/Pelvis – With Contrast (Contrast Study)

A. Protocol Selection

1. Scan helical

B. Scout

1. Patient position: Head first, supine with arms above head.
2. Chest: Scan chin through adrenals.
3. Abdomen/pelvis: Scan above diaphragms through ischial tuberosity.
4. Chest/abdomen/pelvis: Scan chin through ischial tuberosity.

C. CT Imaging Contrast

1. IV contrast only.
2. Administer 100ml Omnipaque 300 through 20g peripheral IV or larger and at 4 mls/second injection rate.
3. If Foley is present, clamp prior to scanning.
4. If possible, hold breath before starting the scan.
5. Time scan to where contrast is seen in the aorta or about 18-20 seconds after contrast has been started.
6. Chest: Scan lung apices through adrenals.
7. Abdomen/pelvis: Scan above diaphragm through greater trochanter.
8. Chest/abdomen/pelvis: Scan lung apices through greater trochanter.

9. If kidney or bladder injury is suspected, scan 5-10 minute delays of kidneys through bladder.
10. If ordering physician requests T/L spine, it should be ordered with contrast and reconstructed from the C/A/P in raw data. **Do not scan the patient twice.**

D. Post-Processing/Recons

1. 3mm axial – soft tissue, lung (if chest scanned), and bone
2. 2mm coronal – soft tissue
3. 2mm sagittal – soft tissue

VI. CT and Transfers

- A. If transfer is planned to a higher level of care, do not delay transfer to obtain CT scans.
- B. Do not obtain CT chest/abdomen/pelvis without IV contrast. If you are concerned about the renal function of the patient and feel the patient needs further imaging, consult the accepting hospital for further guidance.
 1. eGFR >45 use regular contrast
 2. eGFR 30-45 use visipaque
 3. eGFR <30 contact physician
- C. If CT scans are obtained and the patient is being transferred, upload all images to the Trauma Image Repository (TIR).

Reference: University of Arkansas for Medical Sciences Department of Radiology and Trauma Council

Imaging of Trauma Patients Pediatrics

I. Purpose

To provide guidelines on pediatric CT scanning technique.

II. Guideline

Appropriate CT scan and technique is crucial to obtaining usable information and preventing repeat scanning due to inadequate or poor quality images.

III. CT Head – Without Contrast (Non-contrast Study)

A. Shielding

1. Shield breast and gonads with lead apron.

B. Protocol Selection

1. Without contrast.
2. Try to fit in volume scan if possible.
3. Scan helical if does not fit in volume scan.

C. Scout

1. Patient position: Supine with arms by sides.
2. Scan from tip of chin through top of head.
3. If scanning head and C-spine, use the same scout for both scans and be sure to scan from nipple line through top of head.

D. CT Imaging Non-contrast

1. Tilt gantry according to angle of base of skull.
2. Start at base of skull and scan through top of head.

E. Post-Processing/Recons

1. 4mm axial – brain, blood, and bone

IV. CT C-Spine – Without Contrast (Non-contrast Study)

A. Shielding

1. Shield breast and gonads with lead apron.

B. Protocol Selection

1. Without contrast
2. Try to fit in volume scan if possible.
3. Scan helical if does not fit in volume scan.

B. Scout

1. Patient position: Supine with arms by sides.
2. Scan from nipple line through frontal sinus.
3. If scanning head and C-spine, use the same scout for both scans and be sure to scan from nipple line through top of head.

C. CT Imaging Non-contrast

1. Include frontal sinus through T-1.
2. Cone down the display field of view to the C-spine, but leave the scan field of view open to include entire face.
3. If the ordering physician requests a maxillofacial CT, recon from the C-spine raw data.

D. Post-Processing/Recons

1. 1mm axial – soft tissue and bone
2. 1mm coronal – bone
3. 1mm sagittal – bone

V. CT Chest/Abdomen/Pelvis

A. Shielding

1. Bismuth shield breast after Scout.

B. Protocol Selection

1. Scan helical.

C. Scout

1. Patient position: Supine with arms above head by sides.
2. Chest: Scan chin through adrenals.
3. Abdomen/pelvis: Scan above diaphragms through pubic symphysis.
4. Chest/abdomen/pelvis: Scan chin through pubic symphysis.

D. CT Imaging Contrast

1. IV contrast only.
2. Administer 2ml/kg Omnipaque
 - a. <4 years, 0.5ml/second injection rate
 - b. 4-12 years, 1ml/second injection rate
 - c. >12 years, 1.5-2mls/second injection rate
3. If Foley is present, clamp prior to scanning.
4. Chest: Scan lung apices through adrenals.
7. Abdomen/pelvis: Scan above diaphragm through pubic symphysis.
8. Chest/abdomen/pelvis: Scan lung apices through pubic symphysis.
9. If kidney or bladder injury is suspected, scan 8-10 minute delays of kidneys through bladder.
10. If ordering physician requests T/L spine, it should be ordered with contrast and reconstructed from the C/A/P in raw data. **Do not scan the patient twice.**

D. Post-Processing/Recons

1. 3mm axial – soft tissue, lung (if chest scanned), and bone
2. 2mm coronal – soft tissue
3. 2mm sagittal – soft tissue

VI. CT and Transfers

- A. If transfer is planned to a higher level of care, do not delay transfer to obtain CT scans.
- B. Do not obtain CT chest/abdomen/pelvis without IV contrast. If you are concerned about the renal function of the patient and feel the patient needs further imaging, consult the accepting hospital for further guidance.
- C. If CT scans are obtained and the patient is being transferred, upload all images to the Trauma Image Repository (TIR).

Reference: Arkansas Children's Hospital Department of Radiology and Trauma Council