

 <small>INCORPORATED PROFESSIONAL SERVICES</small>	Body: CT Protocols		
	Reviewed:	Date: 1/05/2023	D. Chaudry
	Revised:	Date: 12/30/2022	Dr. Call

C 1: Chest CT with contrast

C 2: Chest CT without contrast

C 3: Chest CT angiogram (pulmonary embolism protocol)

C 4: Chest CT without contrast (lung nodule follow-up, lung CA screening)

C 5: High-resolution chest CT

C 6: Chest CT angiogram (pulmonary vein mapping protocol)

C 7: Post Procedural Pneumo Scan

C 8: Veran Chest Without (inspiration, expiration)

C 9: CT Coronary Artery Calcium Scoring

A 1: Abdomen and pelvis CT with contrast

A 1A: Abdomen CT with contrast

A 1P: Pelvis CT with contrast

A 2: Abdomen and pelvis CT with contrast (trauma protocol)

A 3: Abdomen and pelvis CT without intravenous contrast

A 3A: Abdomen CT without intravenous contrast

A 3P: Pelvis CT without intravenous contrast

A 4: Abdomen and pelvis CT without contrast (hematoma protocol)

A 5: Pre- and post-contrast abdomen CT (liver protocol)

A 6: Pre- and post-contrast abdomen CT (pancreas protocol)

A 7: Abdomen and pelvis CT with contrast (enterography protocol)

A 8: Renal Ablation CT

A 9: Abdomen and pelvis CT angiogram(GI bleed protocol)

GU 1: Abdomen and pelvis CT without contrast (CT-KUB)

GU 2: Pre- and post-contrast abdomen and pelvis CT (CT-IVP)

GU 3: Pre- and post-contrast abdomen CT (adrenal protocol)

GU 4: Pelvis CT with contrast (CT cystogram)

GU 5: Pre- and post-contrast abdomen CT (renal protocol)

Combo 1: Chest, abdomen, and pelvis CT with contrast

Combo 2: Chest and abdomen CT with contrast

C 1: Chest CT with contrast

Indications: mediastinal and pleural pathology.

Contrast parameters	IV: 125ml@ 2.5ml/sec, OR 100ml @ 2.5ml/sec, with 30ml saline flush <i>Venogram option:</i> 140 ml at 4ml/sec, 10% contrast solution (100ml total) at 3ml/sec.
Region of scan	Lung apex to posterior costophrenic angles
Scan delay	50 seconds <i>Venogram option:</i> 60-90 seconds
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	Axial 1mm lung kernel Axial 5mm soft tissue kernel Axial 8 x 2 mm MIPS Coronal and sagittal 5 mm reformats with soft tissue kernel 10.2019 REV
Filming	B30f kernel (axials) B70f kernel (axials, axial MIP)

Comments:

- Optional CT venogram protocol for SVC syndrome or thrombus; best used with double-barreled power injector.
- Pediatric patients under 10 years of age: reconstructions at 3 mm axials instead; keep 8 x2 mm axial MIP.
- Optional CT navigational bronchoscopy images: 1 mm x 0.8 mm axial slices, B31F kernel, mediastinal window.

C 2: Chest CT without contrast

Indications: pulmonary nodules, airspace disease.

Contrast parameters	NA
Region of scan	Lung apex to posterior costophrenic angles
Scan delay	NA
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	Axial 1mm lung kernel Axial 5mm soft tissue kernel Axial 8 x 2 mm MIPS Coronal and sagittal 5 mm reformats with soft tissue kernel 10.2019 REV
Filming	B30f kernel (axials) B70f kernel (axials, axial MIP)

Comments:

- Pulmonary nodule workup: optional 1.5 mm thick sections through nodules of interest at radiologist's discretion.
- Pediatric patients under 10 years of age: reconstructions at 3 mm axials instead; keep 8 x 2 mm axial MIP.
- Optional CT navigational bronchoscopy images: 1 mm x 0.8 mm axial slices, B31F kernel, mediastinal window.

C 3: Chest CT angiogram (pulmonary embolism protocol)

Indications: suspected pulmonary embolism.

Contrast parameters	IV: 125 ml@ 4 ml/sec, OR 100 ml @ 4 mL/sec, with 30 ml saline flush
Region of scan	1) Lung apex to adrenal glands a) Scan caudo-cranial (re-orient images to scroll from top to bottom) 2) Iliac crests to popliteal fossae (optional)
Scan delay	1) CARE bolus: ROI on main pulmonary artery. Delay of peak + 4 sec. 2) 4 minutes (optional)
Detector collimation	1) 16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm 2) Non-helical 5 mm at 4 cm intervals (optional)
Slice thickness	1) 2 mm axials and 5 mm axials. 7 mm straight coronal & sagittal reformats through entire thorax. 3 mm oblique coronal MIPS reformats through right and left pulmonary arteries. 8 x 2 mm axial MIPS 2) 5 mm axials at 4 cm intervals (optional)
Filming	B31fkernel (2 mm axials and all coronal MIP's) B70f kernel (5 mm axials)

Comments:

- Siemens Embolism042s settings.
- CT venography is optional and is done only when specifically requested by the referring clinician.
- Optional CT navigational bronchoscopy images: 1 mm x 0.8 mm axial slices, B31F kernel, mediastinal window.
- Scan caudo-cranial – reduces streak artifact

C 4: Chest CT without contrast (lung nodule follow-up, lung CA screening)

Indications: pulmonary nodule follow-up, minimizing radiation exposure.

Contrast parameters	NA
Region of scan	Lung apex to posterior costophrenic angles
Scan delay	NA
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	1.0 or 1.25 mm axials (lung), 5 mm axials (soft tissue), 8 x mm coronal & sagittal MIP reformats.
Filming	B30f kernel (axials) B70f kernel (axials, coronal MIP)

Comments:

- Siemens Lung Low Dose settings.
- Utilize when confirming stability of indeterminate nodules over a 2-year period.
- For lung screening CT: patients would need initial requisition from referring provider.
- Optional CT navigational bronchoscopy images: 1 mm x 0.8 mm axial slices, B31F kernel, mediastinal window

C 5: High-resolution chest CT

Indications: diffuse lung pathology, inhalational exposure, asbestosis.

Contrast parameters	NA
Region of scan	1) Supine inspiration <i>contiguous</i> scan (apex to posterior costophrenic angles) 2) Dynamic supine expiration (see comments) 3) Prone inspiration <i>contiguous</i> scan (carina to posterior costophrenic angles)
Scan delay	NA
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	1) 1.0 mm and 5 mm axials; 7 mm coronal & sagittal MIP reformats. 2) 1.0 mm axials. 3) 1.0 mm axials.
Filming	B70f kernel (1.0 mm axials and 7 mm coronals) B30f kernel (5 mm axials).

Comments:

- Supine expiration images will detect air trapping. Perform a total of 3 scan series (upper, mid, and lower lungs), with each scan series encompassing 4-5 slices while the patient is actively breathing out.
- Prone inspiration series will differentiate early fibrosis from posterior dependent atelectasis.
- Optional CT navigational bronchoscopy images: 1 mm x 0.8 mm axial slices, B31F kernel, mediastinal window.

C 6: Chest CT angiogram (pulmonary vein ablation protocol)

Indications: pre-procedural mapping for pulmonary vein ablation treatment of atrial fibrillation.

Contrast parameters	IV: 125 ml @ 4 mL/sec, OR 100 ml @ 4 mL/sec, with 30 ml saline flush
Region of scan	Lung apex to posterior costophrenic angles (scan from bottom to top)
Scan delay	30 sec
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	3 mm axials; 3 mm MIP oblique coronal reformats parallel to right and left pulmonary veins; 7 mm MIP straight coronal & sagittal reformats.
Filming	B31f kernel (axials, oblique coronal reformats) B70f kernel (axials, 7 mm MIP reformats).

Comments:

- Siemens Embolism042s settings.
- Optional CT navigational bronchoscopy images: 1 mm x 0.8 mm axial slices, B31F kernel, mediastinal window.

C 7: Post Procedural Pneumo Scan

Indications: Dr. Desai protocol: post lung bx scan

Contrast parameters	none
Region of scan	Lung apex to posterior costophrenic angle. FOV affected lung only
Scan delay	none
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	1.0 mm axials Coronal and sagittal 5 mm reformats with soft tissue kernel
Filming	B70f kernel – very sharp (1 mm axials - lung)

Comments:

C 8: Veran Chest Without (inspiration, expiration)

Indications: Navigational Bronchoscopy

Contrast parameters	none
Region of scan	Hyoid bone to costophrenic angles. FOV: Need lateral skin margins
Scan delay	none
Detector collimation	16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	0.75 mm x 0.5 mm axial, 5 mm axial; 7 mm coronal and sagittal MIP reformat
Filming	B35f kernel – Heart View Medium – mediastinum (0.75 x 0.5 & 5 mm axial – soft tissue) B70f kernel – very sharp (5mm axial & 8 x 2 mm coronal & sagittal MIP – lung)

Comments:

CTDI for Medium 7.6 mGy

CTDI for Large 11.4 mGy

Breathing Instructions:

1. Inspiration: Have patient take a breath in and blow it out. Take another breath in and blow it out. Take another breath in and hold it.
2. Expiration: Have patient take a breath in and blow it out and hold it.

C 9: CT Coronary Artery Calcium Scoring

Indications: Coronary artery calcium scoring.

Contrast parameters	IV: None
Region of scan	Heart
Scan delay	N/A
Detector collimation	128 x 0.6 mm
Slice thickness	Axial 1mm lung kernel Axial 3 mm soft tissue kernel with 1.5 mm increments Axial 8 x 2 mm MIPS Coronal and sagittal 5 mm reformats with soft tissue kernel
Filming	B35f kernel heart view (axials) B70f kernel (axials, axial MIP)

Comments:

- Spiral protocol for patients with heart rate greater than 60 bpm.
- Sequential scan for patient with heart rate less than 60 bpm.

A 1: Abdomen and pelvis CT with contrast

Indications: abdominal pain, tumor staging, acute abdomen, penetrating abdomen trauma.

Contrast parameters	Oral: 900 ml (approx. 100 ml just before scan) IV: 125 ml at 2.5 ml/sec, OR 100 ml at 2.5 ml/sec, with 30 ml saline flush
Region of scan	Diaphragm to symphysis
Scan delay	Oral: 45-90 minutes from initial ingestion; 120 min for patients 10 years and younger IV: 60 seconds
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 5 mm coronal & sagittal reformats.
Filming	B30f kernel B70f kernel for lung bases.

Comments:

- Siemens Abdomen Vol settings.
- Use 5% Gastrografin solution when there is possible bowel perforation, impending surgery, or suspected bowel obstruction.
- Oral contrast delay can be shortened to 45-60 minutes if using Omnipaque.
- Pediatric patients under 10 years of age: 3 mm axials and 3 mm coronals instead.
- Inguinal/ventral hernia evaluation: patients should perform Valsalva maneuver at end-inspiration to accentuate any hernias.

A 1A: Abdomen CT with contrast

Indications: upper abdominal pain, tumor staging.

Contrast parameters	Oral: 450ml (approx 100 ml just before scan) IV: 125 ml@ 2.5 ml/sec, OR 100 ml @ 2.5 mL/sec, with 30 ml saline flush
Region of scan	Diaphragm to iliac crests
Scan delay	Oral: 45-60 minutes from initial ingestion IV: 60 seconds
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 5 mm coronal & sagittal reformats
Filming	B30f kernel B70f kernel for lung bases.

Comments:

- Siemens Abdomen Vol settings.
- Use 5% Gastrografin solution when there is possible bowel perforation, impending surgery, or suspected bowel obstruction.
- Pediatric patients under 10 years of age: 3 mm axials and 3 mm coronals instead.

A 1P: Pelvis CT with contrast

Indications: lower abdominal pain, inguinal hernias.

Contrast parameters	Oral: 900 ml IV: 125 ml at 2.5 mL/sec, OR 100 ml @ 2.5 ml/sec, with 30 ml saline flush
Region of scan	Iliac crests to symphysis
Scan delay	Oral: 45-90 minutes from initial ingestion; 120 minutes for patients 10 years and younger IV: 60 seconds
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 5 mm coronal & sagittal reformats
Filming	B30f kernel

Comments:

- Siemens Abdomen Vol settings.
- Use 5% Gastrografin solution when there is possible bowel perforation, impending surgery, or suspected bowel obstruction.
- Oral contrast delay can be shortened to 45-60 minutes if using Omnipaque.
- Pediatric patients under 10 years of age: 3 mm axials and 3 mm coronals instead.

A 2: Abdomen and pelvis CT with contrast (trauma protocol)

Indications: blunt abdomen injury.

Contrast parameters	Oral: none IV: 125 ml at 2.5 mL/sec, OR 100 ml @ 2.5 mL/sec, with 30 ml saline flush
Region of scan	1) Diaphragm to symphysis 2) Optional: kidneys to symphysis after 10-minute delay
Scan delay	Oral: NA IV: 60 seconds, optional 10-minute delay
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 5 mm coronal & sagittal reformats.
Filming	B30f kernel B70f kernel for lung bases and sagittal reformats.

Comments:

- Siemens Abdomen Vol settings.
- Perform optional 10-minute delayed imaging through the GU system if gross hematuria or if renal trauma is seen.
- For *stable* patients with penetrating abdomen injuries, protocol A1 is preferred. Unstable patients should not be imaged.
- Pediatric patients under 10 years of age: 3 mm axials and 3 mm coronals instead.

A 3: Abdomen and pelvis CT without intravenous contrast

Indications: abdominal pain; estimated GFR too low for IV contrast.

Contrast parameters	Oral: 900 ml (approx 100 ml just before scan) IV: none
Region of scan	Diaphragm to symphysis
Scan delay	Oral: 45-90 minutes; 120 minutes for patients 10 years old or younger
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 5 mm coronal & sagittal reformats
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens Abdomen Vol settings.
- Oral contrast delay can be shortened to 45-60 minutes if using Omnipaque.
- Pediatric patients under 10 years of age: 3 mm axials and 3 mm coronals instead.

A 3A: Abdomen CT without intravenous contrast

Indications: upper abdomen pain; estimated GFR too low for IV contrast.

Contrast parameters	Oral: 450 ml (approx 100 ml just before scan) IV: none
Region of scan	Diaphragm to iliac crests
Scan delay	Oral: 45-60 minutes
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 5 mm coronal & sagittal reformats
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens Abdomen Vol settings.
- Pediatric patients under 10 years of age: 3 mm axials and 3 mm coronals instead.

A 3P: Pelvis CT without intravenous contrast

Indications: lower abdomen pain; estimated GFR too low for IV contrast.

Contrast parameters	Oral: 900 ml (approx 100 ml just before scan) IV: none
Region of scan	Iliac crests to symphysis
Scan delay	Oral: 45-90 minutes; 120 minutes for patients 10 years old or younger
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 5 mm coronal & sagittal reformats
Filming	B30f kernel

Comments:

- Siemens Abdomen Vol settings.
- Oral contrast delay can be shortened to 45-60 minutes if using Omnipaque.
- Pediatric patients under 10 years of age: 3 mm axials and 3 mm coronals instead.

A 4: Abdomen and pelvis CT without contrast (hematoma protocol)

Indications: ruptured AAA, post-catheterization groin hematomas.

Contrast parameters	Oral: none IV: none
Region of scan	Diaphragm to symphysis
Scan delay	NA
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 5 mm coronal & sagittal reformats
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens Abdomen Vol settings.
- Pediatric patients under 10 years of age: 3 mm axials and 3 mm coronals instead.

A 5: Pre- and post-contrast abdomen CT (liver protocol)

Indications: liver lesion characterization; HCC screening in cirrhosis.

Contrast parameters	Oral: none IV: 125 ml at 4cc/sec, OR 100 mL @ 4 mL/sec, with 30 ml saline flush
Region of scan	Diaphragm to iliac crests
Scan delay	1) Non-contrast 2) Arterial phase: 25 sec after IV contrast 3) Portal venous phase: 70 sec after IV contrast 4) Delayed phase: 5 min after IV contrast
Detector collimation	1) 16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice) 2) 16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm 3) 16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice) 4) 16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 5 mm coronal & sagittal reformats (portal venous phase only)
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens Abd Multi Phase settings.

A 6: Pre- and post-contrast abdomen CT (pancreas protocol)

Indications: pancreatic mass; NOT for initial pancreatitis workup.

Contrast parameters	Oral: Neutral contrast or water IV: 125 ml at 4cc/sec, OR 100 mL @ 4 mL/sec, with 30 ml saline flush
Region of scan	Diaphragm to iliac crests
Scan delay	1) Non-contrast 2) Pancreatic Parenchymal phase at 40-50 sec 3) Portal Venous phase at 65-70 sec
Detector collimation	1) 16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice) 2) 16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm 3) 16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	3 mm axials; 3 mm coronal & sagittal reformats
Filming	B30f kernel B70f kernel for lung bases

Reference: Society of Abdominal Radiology and American Pancreatic Association Gastroenterology [January 2014](https://www.gastrojournal.org/article/S0016-5085(13)01588-6/fulltext#sec3.1) Volume 146, Issue 1, Pages 291–304.e1 ([https://www.gastrojournal.org/article/S0016-5085\(13\)01588-6/fulltext#sec3.1](https://www.gastrojournal.org/article/S0016-5085(13)01588-6/fulltext#sec3.1))

Comments:

- Siemens Abd Multi Phase settings.
- For pancreatitis, perform protocol A1 instead.

A 7: Abdomen and pelvis CT with contrast (enterography protocol)

Indications: Crohn's disease, ischemic bowel, small bowel tumors.

Contrast parameters	Oral: 1350 mL Volumen (see comments) IV: 125 ml at 2.5 mL/sec, OR 100 ml @ 2.5 mL/sec, with 30 ml saline flush
Region of scan	Diaphragm to symphysis
Scan delay	Oral: 60 minutes from contrast ingestion IV: 45 seconds
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	3 mm axials; 3 mm coronal & sagittal reformats (at 2 mm intervals)
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens Abdomen Vol settings.
- Volumen timing: drink 450 mL 60 minutes before scan, another 450 mL 40 minutes before scan, 225 mL at 20 minutes before scan, and last 225 mL at 10 minutes before scan.
- Warn patients about watery bowel movements (but not diarrhea) afterwards; Volumen is not absorbed by the intestinal lining.

A 8: Renal Ablation CT

Pre ablation: Angio abdomen-regular-angio only

Post ablation as follows:

- 1) Diaphragm to iliac crests (non con 5mm axials)
- 2) Diaphragm to iliac crests (angio 2mm axial, coronal, sagittal)
- 3) Diaphragm to iliac crests (Urographic phase 10 min 5mm axial, 2mm cor, sag)

A 9: Abdomen and pelvis CT angiogram (GI bleed protocol)

Indications: Gastrointestinal bleeding- Looking for active extravasation

Contrast parameters	Oral: None. IV: 125 ml at 2.5 mL/sec, OR 100 ml @ 2.5 mL/sec, with 30 ml saline flush
Region of scan	Diaphragm to symphysis
Scan delay	IV: Arterial phase: 25 sec after IV contrast or care bolus at mid aorta; peak + 0 sec Optional: Portal venous phase: 70 sec after IV contrast (look for delayed pooling of blood)
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 2 mm coronal & sagittal reformats 1 mm 3-D coronal and sagittal MIP
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens BodyAngioRoutine package
- A kernel of BR59 or lower must be selected when using iMAR metal reduction software

GU 1: Abdomen and pelvis CT without contrast (CT-KUB)

Indications: flank pain and hematuria; suspected renal colic.

Contrast parameters	Oral: none IV: none
Region of scan	Diaphragm to symphysis
Scan delay	NA
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 5 mm coronal & sagittal reformats
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens Abdomen Vol settings
- Obtain plain film KUB either before or after CT scan.
- Pediatric patients under 10 years of age: 3 mm axials and coronals instead.
- **Ultra-Low-dose CT-KUB** option: 120 kV and 30 mAs.
 - **To be used only:** in the setting of known kidney stones detected on a prior study (CT or US), must be ordered specifically as a low-dose study
 - NOT recommended for patients with BMI >25.

GU 2: Pre- and post-contrast abdomen and pelvis CT (CT-IVP)

Indications: painless hematuria, renal mass or transitional cell CA evaluation

Contrast parameters	Oral: 1000 mL water for hydration 15-20 min before. IV: 80 ml at 2.5 ml/sec, wait 8 minutes. 60 ml at 2.5 ml/sec, wait 2 minutes.
Region of scan	1) Diaphragm to symphysis pubis (optional) 2) Diaphragm to symphysis pubis
Scan delay	1) Non-contrast (CT-KUB): (optional) 2) Nephrographic/urographic phase: 10 min after IV contrast
Detector collimation	1) 16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice) 2) 16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	1) 5 mm axials 2) 5 mm axials, 2 mm thick coronal MPR, 5 mm thick sagittal reformats.
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens Abd Multi Phase settings.
- Low-dose CT-KUB option: 120 kV and 30 mAs. Use if pt has already had CT-KUB in last 2 months (but not recommended if patient BMI >25).

GU 3: Pre- and post-contrast abdomen CT (adrenal protocol)

Indications: distinguish between adenoma and metastasis.

Contrast parameters	Oral: none IV: 125 ml at 2.5 mL/sec, OR 100 ml @ 2.5 mL/sec, with 30 ml saline flush
Region of scan	1) Diaphragm to iliac crests 2) Diaphragm to iliac crests 3) Adrenals and kidneys
Scan delay	1) Non-contrast: NA 2) Venous phase: 75 sec after IV contrast 3) Delayed phase: 15 min after IV contrast
Detector collimation	1) 16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice) 2) 16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice) 3) 16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	1) 3 mm axials 2) 3 mm axials; 5 mm coronals and sagittal reformats. 3) 3 mm axials
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens Abd Multi Phase settings.
- Pre-contrast attenuation < 0 HU supersedes the washout profile in adenoma characterization. Non-hemorrhagic, non-calcified masses > 43 HU are suspicious for malignancy. Absolute percentage washout of 52% distinguishes benign from malignant lesions. Radiology 2006; 238: 578-585.

GU 4: Pelvis CT with contrast (CT cystogram)

Indications: assess for intra- or extraperitoneal bladder rupture.

Contrast parameters	300 ml diluted contrast instilled by gravity through existing Foley catheter (or as much as patient can tolerate)
Region of scan	1) Iliac crests or bladder dome to symphysis 2) Iliac crests or bladder dome to symphysis
Scan delay	1) Non-contrast 2) No delay after instillation of contrast
Detector collimation	1) 16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice) 2) 16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	1) 5 mm axials 2) 5 mm axials; 5 mm coronal & sagittal reformats
Filming	B30f kernel

Comments:

- Siemens Abd Vol settings.
- Foley catheter should be inserted by Emergency Dept or Urology prior to arriving in CT.
- Dilute 50 ml contrast in 500 mL normal saline before instilling.
- Pediatric patients under 10 years of age: 3 mm axials and coronals instead.

GU 5: Pre- and post-contrast abdomen CT (renal protocol)

Indications: renal mass evaluation or follow up.

Contrast parameters	Oral: 1000 ml water for hydration 15-20 min before. IV: 80 ml at 2.5 ml/sec, wait 8 minutes. 60 ml at 2.5 ml/sec, wait 2 minutes.
Region of scan	1) Diaphragm to iliac crests (optional) 2) Diaphragm to iliac crests 3) Diaphragm to iliac crests
Scan delay	1) Non-contrast (may omit for follow-up scans) 2) Arterial phase: 30 seconds 2) Nephrographic/urographic phase: 10 minutes
Detector collimation	1) 16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm 2) 16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm 3) 16 x 0.75 mm, 64 x 0.6 mm, 128 x 0.6 mm
Slice thickness	1) 5 mm axials 2) 5 mm axials; 5 mm thick coronal reformats 3) 2 mm coronal & sagittal reformats.
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens Abd Multi Phase settings.
- Pre-contrast component is optional; omit if scan is done for follow-up of known lesion, OR if urology deems it not necessary.

Combo 1: Chest, abdomen, and pelvis CT with contrast

Indications: tumor staging.

Contrast parameters	Oral: 900 ml (approx 100 ml just before scan) IV: 125 ml at 2.5 mL/sec, OR 100 ml @ 2.5 ml/sec, with 30 ml saline flush
Region of scan	Lung apices to symphysis
Scan delay	Oral: 45-90 minutes from initial ingestion; 120 min for patients 10 years and younger IV: 60 seconds
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	5 mm axials; 5 mm coronal & sagittal reformats 8 x 2 mm coronal MIP through the lungs.
Filming	B30f kernel B70f kernel for lungs (including MIP reformats).

Comments:

- Siemens Abdomen Vol settings.
- For trauma scans: omit oral contrast. Perform sagittal reformats in B70f kernel, to include the anterior chest wall.
- Oral contrast delay can be shortened to 45-60 minutes if using Omnipaque.
- Pediatric patients under 10 years of age: 3 mm axials and coronals instead. Keep 8 x 2 mm axial MIP's.
- Optional CT navigational bronchoscopy images: 1 mm x 0.8 mm axial slices, B31F kernel, mediastinal window.

Combo 2: Chest and abdomen CT with contrast

Indications: tumor staging.

Contrast parameters	Oral: 900 ml (approx 100 ml just before scan) IV: 125 ml at 2.5 ml/sec, OR 100 ml @ 2.5 ml/sec, with 30 ml saline flush
Region of scan	Lung apices to iliac crests
Scan delay	Oral: 45-60 minutes from initial ingestion IV: 60 seconds
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	Axial 1mm lung kernel Axial 5mm soft tissue kernel Axial 8 x 2 mm MIPS Coronal and sagittal 5 mm reformats with soft tissue kernel 10.2019 REV
Filming	B30f kernel B70f kernel for lungs (including MIP reformats).

Comments:

- Siemens AbdomenVol settings.
- Pediatric patients under 10 years of age: 3 mm axials and coronals instead. Keep 8 x 2 mm axial MIP's.
- Optional CT navigational bronchoscopy images: 1 mm x 0.8 mm axial slices, B31F kernel, mediastinal window.