

	<b>Body: CT Protocols</b>		
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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: 100ml @ 2.5ml/sec <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 3mm soft tissue kernel Axial 8 x 2 mm MIPS Coronal and sagittal 3 mm reformats with soft tissue kernel
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:
- 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 3mm soft tissue kernel Axial 8 x 2 mm MIPS Coronal and sagittal 3 mm reformats with soft tissue kernel
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
- 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: 100 ml @ 4 mL/sec
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 with coronal & sagittal reformats through entire thorax. 2) 3 mm oblique coronal MIPS reformats through right and left pulmonary arteries. 3) 1mm lung axial, 8 x 2 mm axial MIPS
Filming	B31fkernel (2 mm axials and all coronal MIP's) B70f kernel (1 mm axials, 8x2 MIPS)

#### 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	<ol style="list-style-type: none"><li>1. Axial 1mm lung kernel</li><li>2. Axial 3mm soft tissue kernel</li><li>3. Axial 8 x 2 mm MIPS</li><li>4. Coronal and sagittal 3mm reformats soft tissue kernel</li></ol>
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) Supine expiration <i>contiguous</i> scan (apex to posterior costophrenic angles). MinIP 3) Prone inspiration <i>contiguous</i> scan (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	SUPINE: Axial 1 mm lung kernel Axial 3 mm soft tissue kernel Axial 8 x 2 mm MIPS Coronal and sagittal 3mm reformats with soft tissue kernel  Expiration Supine: Axial 1 mm lung kernel 8mm MinIP axial (if capable)  Prone: Axial 1mm lung kernel
Filming	B70f kernel (1.0 mm axials and 5 mm coronals)

	B30f kernel (5 mm axials).
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Comments:

- Supine expiration images will detect air trapping.
- 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: 100 ml @ 4 mL/sec
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	1) 2 mm axials with coronal & sagittal reformats through entire thorax. 2) Axial 1mm lung kernel, 8 x 2 mm axial MIPS
Filming	B31f kernel (axials, oblique coronal reformats) B70f kernel (axials, 8 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 1 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	Raw data axials Axial 1mm lung kernel Axial 3mm soft tissue kernel Axial 8 X 2 mm MIPS Coronal and sagittal 3 mm reformats with soft tissue kernel
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 3mm 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.

**C10. Chest abdomen and pelvis CT with contrast (Significant trauma protocol)**

**SVH ONLY**

Indications: High impact or penetrating trauma

Contrast parameters	Oral: none  IV: 100 ml @ 2.5 mL/sec
Region of scan	1. <b><i>Clavicles to the end of the last rib</i></b> in arteriogram phase (chest arteriogram portion)  2. Top of diaphragm to femoral necks in portal venous phase (abdomen/pelvis portion)  3. <b><i>Optional</i></b> delayed phase: Top of diaphragm to femoral necks.  Perform automatically if fluid is seen in the abdomen and suspected renal injury.
Scan delay	Oral: none  1. IV: Arterial phase: 25 sec after IV contrast or care bolus at mid aorta; peak + 0 sec  2. Portal venous phase: 70 sec after IV contrast  3. Optional delayed phase: anytime up to 5mins after contrast at technologist discretion if previewed images seem abnormal (abdomen fluid, renal injury etc.)
Detector collimation	16 x 1.5 mm, 64 x 1.2 mm, 32 x 1.2 mm (128 slice)
Slice thickness	1. Chest arteriogram CT  · Axial lung/bone kernel 1mm  · MIPS 8 mm

	<ul style="list-style-type: none"> <li>· Axial/coronal/sagittal soft tissue 2mm</li> <li>· Sagittal lung/bone kernel 1 mm</li> </ul> <p>2. Abdomen/pelvis PV phase CT</p> <ul style="list-style-type: none"> <li>· Axial coronal sagittal soft tissue kernel 3 mm</li> <li>· Sagittal lung/bone kernel 1 mm</li> </ul>
Filming	<p>B30f kernel</p> <p>B70f kernel for lungs and additional spine sagittal reformats.</p>

Comments:

- Notes: usually done with non-con CT head and CT C-spine before giving contrast

## **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: 100 ml at 2.5 ml/sec
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	3 mm axials; 3 mm coronal & sagittal reformats. 1mm axial lung kernel through lungs
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.
- 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: 100 ml @ 2.5 mL/sec
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	3 mm axials; 3 mm coronal & sagittal reformats 1 mm axial lung kernel through the lungs
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: 100 ml @ 2.5 ml/sec
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	3 mm axials; 3 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.



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

Indications: blunt abdomen injury.

Contrast parameters	Oral: none IV: 100 ml @ 2.5 mL/sec
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	3 mm axials; 3 mm coronal & sagittal reformats. 1mm axial through the lungs
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.

### **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	3 mm axials; 3 mm coronal & sagittal reformats 1 mm axial through the lungs
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.

### **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	3 mm axials; 3 mm coronal & sagittal reformats 1 mm axial through the lungs
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens Abdomen Vol settings.

### **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	3 mm axials; 3 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.

#### **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	3 mm axials; 3 mm coronal & sagittal reformats 1mm axials through the lungs
Filming	B30f kernel B70f kernel for lung bases

Comments:

- Siemens Abdomen Vol settings.

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

Indications: liver lesion characterization; HCC screening in cirrhosis.

Contrast parameters	Oral: none IV: 100 mL @ 4 mL/sec
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	3 mm axials 3 mm coronal & sagittal reformats (portal venous phase only) 1mm axial through the lungs
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: 100 mL @ 4 mL/sec
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 (portal venous phase only) 1mm axial through the lungs
Filming	B30f kernel B70f kernel for lung bases

Reference: Society of Abdominal Radiology and American Pancreatic Association Gastroenterology [January 2014](#) 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 or Breeza (see comments) IV: 100 ml @ 2.5 mL/sec
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) 1mm axial lung
Filming	B30f kernel B70f kernel for lung bases

### Comments:

- Siemens Abdomen Vol settings.
- Volumen/Breeza 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 3mm axials)
- 2) Diaphragm to iliac crests (angio 2mm axial, coronal, sagittal)
- 3) Diaphragm to iliac crests (Urographic phase 10 min 3mm axial, 2mm cor, sag)

## **A 9: Abdomen and pelvis CT angiogram (GI bleed/ mesenteric ischemia)**

Indications: Gastrointestinal bleeding- Looking for active extravasation

Contrast parameters	Oral: None. IV: 100 ml @ 4 mL/sec
Region of scan	Diaphragm to symphysis
Scan delay	1) Non-Contrast 2) IV: Arterial phase: 25 sec after IV contrast or care bolus at mid aorta; peak + 0 sec 3) 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	2 mm axials 2 mm coronal & sagittal reformats ( arterial and portal venous phase) 1mm axial through lungs 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	3 mm axials; 3 mm coronal & sagittal reformats 1mm axial through the lungs
Filming	B30f kernel B70f kernel for lung bases

### Comments:

- Siemens Abdomen Vol settings
- Obtain plain film KUB either before or after CT scan.
- **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 90 seconds
Region of scan	1) Diaphragm to symphysis pubis (optional) 2) Diaphragm to symphysis pubis
Scan delay	1) Non-contrast (CT-KUB): (mandatory, not - optional) 2) Split Bolus 10 min Delay; second bolus should be given 90s prior to scan
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) Non Contrast: 3mm axial, coronal 2) Split Bolus: 3mm axial, 3mm coronal MPR, 3mm thick sagittal reformats. 3) 1mm axial through the lungs
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: 100 ml @ 2.5 mL/sec
Region of scan	1) Diaphragm to iliac crests 2) Diaphragm to iliac crests 3) Adrenals and kidneys
Scan delay	1) Non-contrast: 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	Non Contrast: 3mm axials Venous: 2mm axials; 3mm coronals and sagittals Delay: 3mm axials  1mm axial through the lungs
Filming	B30f kernel  B70f kernel for lung bases

Comments: .

- 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) 3 mm axials 2) 3 mm axials; 3 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.

## 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: 100mL @ 2.5mL/sec.
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: 90 seconds.
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	Non Contrast: 3 mm axials Arterial: 3 mm axials; 3 mm thick coronal and sagittal Nephrographic: 3 mm coronal & sagittal reformats. 1mm axial through the lungs
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: 100 ml @ 2.5 ml/sec
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	3 mm axials; 3 mm coronal & sagittal reformats 1mm axial through the lungs 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.
- 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: OR 100 ml @ 2.5 ml/sec
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 3mm soft tissue kernel Axial 8 x 2 mm MIPS Coronal and sagittal 3 mm reformats with soft tissue kernel
Filming	B30f kernel B70f kernel for lungs (including MIP reformats).

Comments:

- Siemens AbdomenVol settings.
- 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.