



# CLINICAL GUIDELINES

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## Abdomen Imaging Policy

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eviCore healthcare Clinical Decision Support Tool Diagnostic Strategies: This tool addresses common symptoms and symptom complexes. Imaging requests for individuals with atypical symptoms or clinical presentations that are not specifically addressed will require physician review. Consultation with the referring physician, specialist and/or individual's Primary Care Physician (PCP) may provide additional insight.

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## Abdomen Imaging Guidelines

<b>Abbreviations for Abdomen Imaging Guidelines</b>	<b>4</b>
<b>AB-1: General Guidelines</b>	<b>6</b>
<b>AB-2: Abdominal Pain</b>	<b>11</b>
<b>AB-3: Abdominal Sepsis (Suspected Abdominal Abscess)</b>	<b>18</b>
<b>AB-4: Flank Pain, Rule Out or Known Renal/Ureteral Stone</b>	<b>20</b>
<b>AB-5: Gastroenteritis</b>	<b>24</b>
<b>AB-6: Mesenteric/Colonic Ischemia</b>	<b>26</b>
<b>AB-7: Post-Operative Pain with-in 60 Days Following Abdominal Surgery – Abdominal Procedure</b>	<b>29</b>
<b>AB-8: Abdominal Lymphadenopathy</b>	<b>31</b>
<b>AB-9: Bariatric Surgery</b>	<b>34</b>
<b>AB-10: Blunt Abdominal Trauma</b>	<b>36</b>
<b>AB-11: Gaucher’s Disease and Hemochromatosis</b>	<b>38</b>
<b>AB-12: Hernias</b>	<b>41</b>
<b>AB-13: Abdominal Mass</b>	<b>44</b>
<b>AB-14: Lower Extremity Edema</b>	<b>46</b>
<b>AB-15: Zollinger-Ellison Syndrome (ZES)</b>	<b>47</b>
<b>AB-16: Adrenal Cortical Lesions</b>	<b>49</b>
<b>AB-17: Abdominal Aortic Aneurysm (AAA), Iliac Artery Aneurysm (IAA), and Visceral Artery Aneurysms Follow-Up of Known Aneurysms and Pre-Op Evaluation</b>	<b>56</b>
<b>AB-18: Abdominal Aortic Aneurysm (AAA) and Iliac Artery Aneurysm (IAA)-Post Endovascular or Open Aortic Repair</b>	<b>59</b>
<b>AB-19: Aortic Dissection and Imaging for Other Aortic Conditions</b>	<b>61</b>
<b>AB-20: Bowel Obstruction and Gastroparesis</b>	<b>63</b>
<b>AB-21: Diarrhea, Constipation, and Irritable Bowel</b>	<b>66</b>
<b>AB-22: GI Bleeding</b>	<b>70</b>
<b>AB-23: Inflammatory Bowel Disease Rule Out Crohn’s Disease or Ulcerative Colitis</b>	<b>73</b>
<b>AB-24: Celiac Disease (SPRUE)</b>	<b>76</b>
<b>AB-25: CT Colonography (CTC)</b>	<b>78</b>
<b>AB-26: Cirrhosis and Liver Screening for Hepatocellular Carcinoma (HCC); Ascites and Portal Hypertension</b>	<b>80</b>
<b>AB-27: MR Cholangiopancreatography (MRCP)</b>	<b>84</b>
<b>AB-28: Biliary Tract Disease Jaundice</b>	<b>87</b>
<b>AB-29: Liver Lesion Characterization</b>	<b>90</b>
<b>AB-30: Elevated Liver Function (LFT) Levels</b>	<b>95</b>

<b>AB-31: Pancreatic Lesion</b>	<b>98</b>
<b>AB-32: Pancreatic Pseudocysts</b>	<b>101</b>
<b>AB-33: Pancreatitis</b>	<b>103</b>
<b>AB-34: Spleen</b>	<b>106</b>
<b>AB-35: Indeterminate Renal Lesion</b>	<b>109</b>
<b>AB-36: Renal Failure</b>	<b>113</b>
<b>AB-37: Renovascular Hypertension</b>	<b>115</b>
<b>AB-38: Polycystic Kidney Disease</b>	<b>118</b>
<b>AB-39: Hematuria and Hydronephrosis</b>	<b>120</b>
<b>AB-40: Urinary Tract Infection (UTI)</b>	<b>122</b>
<b>AB-41: Patent Urachus</b>	<b>124</b>
<b>AB-42: Transplant</b>	<b>126</b>
<b>AB-43: Hepatic and Abdominal Arteries</b>	<b>130</b>
<b>AB-44: Suspected Neuroendocrine Tumors Of The Abdomen</b>	<b>133</b>
<b>AB-45: Liver Elastography</b>	<b>134</b>

## Abbreviations for Abdomen Imaging Guidelines

<b>AAA</b>	abdominal aortic aneurysm
<b>ACE</b>	angiotensin-converting enzyme
<b>ACTH</b>	adrenocorticotrophic hormone
<b>AFP</b>	alpha-fetoprotein
<b>ALT</b>	alanine aminotransferase
<b>AST</b>	aspartate aminotransferase
<b>BEIR</b>	Biological Effects of Ionizing Radiation
<b>BUN</b>	blood urea nitrogen
<b>CNS</b>	central nervous system
<b>CT</b>	computed tomography
<b>CTA</b>	computed tomography angiography
<b>CTC</b>	computed tomography colonography (aka: virtual colonoscopy)
<b>DVT</b>	deep vein thrombosis
<b>ERCP</b>	endoscopic retrograde cholangiopancreatography
<b>FNH</b>	focal nodular hyperplasia
<b>GFR</b>	glomerular filtration rate
<b>GGT</b>	gamma glutamyltransferase
<b>GI</b>	gastrointestinal
<b>HCC</b>	hepatocellular carcinoma
<b>HCPCS</b>	Healthcare Common Procedural Coding System (commonly pronounced: "hix pix")
<b>HU</b>	Hounsfield units
<b>IAA</b>	iliac artery aneurysm
<b>IV</b>	intravenous
<b>KUB</b>	kidneys, ureters, bladder (plain frontal supine abdominal radiograph)
<b>LFT</b>	liver function tests
<b>MRCP</b>	magnetic resonance cholangiopancreatography
<b>MRA</b>	magnetic resonance angiography
<b>MRI</b>	magnetic resonance imaging

<b>mSv</b>	millisievert
<b>NAFLD</b>	nonalcoholic fatty liver disease
<b>PA</b>	posteroanterior projection
<b>PET</b>	positron emission tomography
<b>RAS</b>	renal artery stenosis
<b>RBC</b>	red blood cell
<b>SBFT</b>	small bowel follow through
<b>SPECT</b>	single photon emission computed tomography
<b>VC</b>	virtual colonoscopy (CT colonography)
<b>PFT</b>	pulmonary function tests
<b>WBC</b>	white blood cell
<b>ZES</b>	Zollinger-Ellison Syndrome

## AB-1: General Guidelines

<b>AB-1.1: Overview</b>	<b>7</b>
<b>AB-1.2: CT Imaging</b>	<b>7</b>
<b>AB-1.3: MR Imaging</b>	<b>8</b>
<b>AB-1.4: MR Enterography Coding Notes</b>	<b>8</b>
<b>AB-1.5: Ultrasound</b>	<b>8</b>
<b>AB-1.6: Abdominal Ultrasound</b>	<b>9</b>
<b>AB-1.7: Retroperitoneal Ultrasound</b>	<b>9</b>
<b>AB-1.8: CT-, MR-, Ultrasound-Guided Procedures</b>	<b>10</b>
<b>AB-1.9: Special Considerations</b>	<b>10</b>

## **AB-1.1: Overview**

- A current clinical evaluation (within 60 days) is required before advanced imaging can be considered. The clinical evaluation may include a relevant history and physical examination, appropriate laboratory studies, and non-advanced imaging modalities such as plain X-ray or ultrasound. Other meaningful contact (telephone call, electronic mail or messaging) by an established individual can substitute for a face-to-face clinical evaluation.
- GI Specialist evaluations can be helpful, particularly in determining mesenteric/colonic ischemia, diarrhea/constipation, irritable bowel syndrome (IBS), or need for MRCP.
- Conservative treatment for abdominal pain can include (list is not exhaustive):
  - ◆ Anti-secretory or H. Pylori medications
  - ◆ Non-steroidal or opiate analgesia
  - ◆ Plain abdominal radiography
  - ◆ Diet modification
  - ◆ Pro- or anti-motility agents
- Abdominal imaging begins at the diaphragm and extends to the umbilicus or iliac crest.
- Pelvic imaging begins at the iliac crest and extends to the pubis.
- Clinical concerns at the dividing line can be providers' choice (abdomen and pelvis; abdomen or pelvis).

## **AB-1.2: CT Imaging**

- CT imaging is a more generalized modality. Abdominal CT is usually performed with contrast (CPT® 74160):
  - ◆ Oral contrast has no relation to the IV contrast administered.
  - ◆ Exceptions are noted in these guidelines, and include:
    - Abdominal CT with contrast (CPT® 74160) or without and with contrast (CPT® 74170) with suspicion of a solid organ lesion (liver, kidney, pancreas, spleen).
    - Abdominal CT without contrast (CPT® 74150) or Abdomen and Pelvis CT (CPT® 74176) if there is renal insufficiency/failure, or a documented allergy to contrast. It can also be considered for diabetics or the very elderly.
  - ◆ Abdomen with Pelvis CT, usually with contrast (CPT® 74177), should be considered when signs or symptoms are generalized, or lower quadrant abdomen or pelvic.
  - ◆ CT Enterography (CPT® 74177) combines CT imaging with large volumes of ingested neutral bowel contrast material to allow visualization of the small bowel.
    - Usually, only 2D reformatting is used (coronal reformatted images);
    - If the 3D rendering codes are requested (CPT® 76376 or CPT® 76377), then the final radiology report should be obtained first to verify that true 3D rendering was performed.
    - See also: **AB-23: Inflammatory Bowel Disease Rule Out Crohn's Disease or Ulcerative Colitis**

- ◆ CT Enteroclysis
  - A tube is placed through the nose or mouth and advanced into the duodenum or jejunum. Bowel contrast material is infused through the tube and CT imaging is performed either with or without intravenous contrast.
  - CT enteroclysis is used to allow visualization of the small bowel wall and lumen. CT enteroclysis may allow better or more consistent distention of the small bowel than CT enterography.
  - Report by assigning: CPT® 74176 or CPT® 74177
  - Usually, only 2D reformatting is used (coronal reformatted images).
  - The final radiology report should be obtained first to verify that true 3D rendering was performed when 3D rendering codes are requested (CPT® 76376 or CPT® 76377).

See also: **AB-23: Inflammatory Bowel Disease Rule Out Crohn's Disease or Ulcerative Colitis**

### **AB-1.3: MR Imaging**

- MRI may be preferred as a more targeted study in cases of renal failure in individuals allergic to intravenous CT contrast, and as noted in these guidelines.
  - ◆ MRI of the abdomen with contrast only is essentially never performed. If contrast is indicated, MRI Abdomen without and with contrast (CPT® 74183) should be performed.
  - ◆ For pregnant women ultrasound or MRI without contrast should be used to avoid radiation exposure. The use of gadolinium contrast agents is contraindicated during pregnancy, as gadolinium contrast agents cross the placenta and enter the amniotic fluid with unknown long term effects on the fetus.

### **AB-1.4: MR Enterography Coding Notes**

- In the absence of written payer claims/billing guidelines, MRI Enterography is reported in one of two ways:
  - ◆ MRI Abdomen without and with contrast (CPT® 74183), or
  - ◆ MRI Abdomen without and with contrast (CPT® 74183) and MRI Pelvis with and without contrast (CPT® 72197)

### **AB-1.5: Ultrasound**

- Ultrasound, also called sonography, uses high frequency sounds waves to image body structures.
  - ◆ The routine use of 3D and 4D rendering, (post-processing), in conjunction with ultrasound is considered investigational.
  - ◆ All ultrasound studies require permanently recorded images either stored on film or in a Picture Archiving and Communication System (PACS).
  - ◆ The use of a hand-held or any Doppler device that does not create a hard-copy output is considered part of the physical examination and is not separately billable. This exclusion includes devices that produce a record that does not permit analysis of bi-directional vascular flow.



- Duplex scan describes an ultrasonic scanning procedure for characterizing the pattern and direction of blood flow in arteries and veins with the production of real-time images integrating B-mode 2D vascular structures, Doppler spectral analysis, and color flow Doppler imaging.
  - ◆ The minimal use of color Doppler alone, when performed for anatomical structure identification during a standard ultrasound procedure, is not separately reimbursable.

### **AB-1.6: Abdominal Ultrasound**

- Complete abdominal ultrasound (CPT® 76700) includes all of the following required elements:
  - ◆ Liver, gallbladder, common bile duct, pancreas, spleen, kidneys, upper abdominal aorta, and inferior vena cava.
  - ◆ If a particular structure or organ cannot be visualized, the report should document the reason.
- Limited abdominal ultrasound (CPT® 76705) is without all of these required elements and can refer to a specific study of a single organ, a limited area of the abdomen, or a follow-up study.
  - ◆ Further, CPT® 76705 should:
    - Be assigned to report follow-up studies once a complete abdominal ultrasound (CPT® 76700) has been performed; and
    - Be assigned to report ultrasonic evaluation of diaphragmatic motion; and
    - Be reported only once per individual imaging session; and
      - Not be reported with CPT® 76700 for the same individual for the same imaging session.

### **AB-1.7: Retroperitoneal Ultrasound**

- Complete retroperitoneal ultrasound (CPT® 76770) includes all of the following required elements:
  - ◆ Kidneys, lymph nodes, abdominal aorta, common iliac artery origins, inferior vena cava.
  - ◆ For urinary tract indications, a complete study can consist of kidneys and bladder.
- Limited retroperitoneal ultrasound (CPT® 76775) studies are without all of these required elements and can refer to a specific study of a single organ, a limited area of the abdomen, or a follow-up study.
  - ◆ Further, CPT® 76775 should:
    - Be assigned to report follow-up studies once a complete retroperitoneal ultrasound (CPT® 76770) has been performed; and
    - Be reported only once per individual imaging session; and
    - Not be reported with CPT® 76770 for the same individual for the same imaging session.

## **AB-1.8: CT-, MR-, Ultrasound-guided Procedures**

See: **Preface-4.2: CT-, MR-, or Ultrasound-Guided Procedures**

## **AB-1.9: Special Considerations**

- CT of the Abdomen and Pelvis either with or without contrast (CPT® 74177 or CPT® 74176) can be performed prior to endoscopy if requested by the physician who will be performing the endoscopy, especially if there is suspected inflammatory bowel disease.
- Persistent unexplained nausea and vomiting:
  - ◆ One non-contrast brain MRI (CPT® 70551) can be performed in individual with persistent, unexplained nausea and vomiting and a negative GI evaluation.
  - ◆ See: **HD-1.7: Other Imaging Situations** in the Head Imaging Guidelines.
- Fever of unknown origin; unexplained weight loss
  - ◆ In the Oncology Imaging Guidelines, see: **ONC-30: Medical Conditions with Cancer in the Differential Diagnosis**
- Suspected ascites should be initially evaluated by ultrasound.
  - ◆ Ultrasound (CPT® 76700 or CPT® 76705) results can then determine the need for peritoneal fluid analysis or further imaging specific to the findings.<sup>3,4</sup>

### **References**

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**AB-2: Abdominal Pain**

<b>AB-2.1: General Information</b>	<b>12</b>
<b>AB-2.2: Abdominal Pain</b>	<b>13</b>
<b>AB-2.3: Right Upper Quadrant Pain and Gallbladder Disease</b>	<b>15</b>
<b>AB-2.4: Left Upper Quadrant (LUQ) PAIN</b>	<b>16</b>

## **AB-2.1: General Information**

The tables in **AB-2.2: Abdominal Pain** provide imaging guidance for generalized and quadrant specific abdominal pain. The column headers are defined as the following:

<b>AB-2.2 Abdominal Pain</b>				
<b>Pain Location</b>	<b>Initial Ultrasound?</b>	<b>Conservative Treatment?</b>	<b>Advanced Imaging Indicated?</b>	<b>Comments</b>
Location/type of abdominal pain	Is an initial US required before advanced imaging?	Is conservative treatment required before advanced imaging?	Advanced imaging indicated for the specific abdominal pain	Additional comments related to indication

## **Red Flag Signs and Symptoms**

- In “red flag” situations, the imaging indications may vary from the usual imaging pathway. A red flag situation is described as the following:
  - ◆ Persistent abdominal pain and at least one of the following:
    - Failure of conservative treatment for 4 weeks
    - Cancer history
    - Fever (101 degrees or greater)
    - Mass
    - GI bleeding
    - Moderate to severe abdominal tenderness
    - Guarding, rebound tenderness, or other peritoneal signs
    - Elevated WBC as per the testing laboratory’s range
- Please note, that when any one red flag is present with abdominal pain, the initial ultrasound is not required. Please proceed to the imaging indications under the “**Advanced Imaging**” column.

## **Pregnant Women**

- For pregnant women, abdominal US (CPT® 76700), and/or pelvic US (if below the umbilicus) (CPT® 76856) and/or TV US (CPT® 76830) should be performed first. If ultrasound is equivocal or red flags are present, proceed to:
  - ◆ MRI abdomen without contrast (CPT® 74181) and/or MRI Pelvis without contrast (CPT® 72195) (if below the umbilicus).

**AB-2.2: Abdominal Pain**

Pain Location	Initial Ultrasound?	Conservative Treatment?	Advanced Imaging Indicated?	Comments
<b>Generalized, men and also women not of childbearing age</b>	Yes  Complete or limited abdomen	No*	*If equivocal ultrasound or if pain is accompanied with: any one red flag <ul style="list-style-type: none"> <li>➤ CT of the Abdomen and Pelvis with contrast</li> </ul>	See red flags in <b><u>AB-2.1</u></b>
<b>Generalized, women of childbearing age, not pregnant,</b>	Yes  Complete abdomen and/or transvaginal and/or complete pelvis	No*	*If equivocal ultrasound or if pain is accompanied with any one red flag: <ul style="list-style-type: none"> <li>➤ CT Abdomen and Pelvis with contrast <i>or</i></li> <li>➤ MRI Abdomen and/or Pelvis without and with contrast</li> </ul>	See red flags in <b><u>AB-2.1</u></b> See imaging for pregnant women in <b><u>AB-2.1</u></b>
<b>Generalized, pregnant</b>	Yes  Complete abdomen and/or transvaginal and/or complete pelvis	No	<ul style="list-style-type: none"> <li>➤ If ultrasound is equivocal with acute pain or any one red flag, MRI Abdomen and/or Pelvis without contrast.</li> <li>➤ In carefully selected patients where CT imaging may be considered life saving for the mother, it can be safely performed with careful attention to radiation protection and technique</li> </ul>	See red flags in <b><u>AB-2.1</u></b> and imaging for pregnant women in <b><u>AB-2.1</u></b>
<b>Left Lower Quadrant, rule out diverticulitis – ALL men and non-pregnant women</b>	No	Yes  (1 week of antibiotics & follow-up)	CT Abdomen and Pelvis with contrast if any red flag is present or ONE of the following: <ul style="list-style-type: none"> <li>➤ Failed antibiotic treatment</li> <li>➤ History of diverticulitis</li> <li>➤ CT Abdomen and Pelvis with contrast prior to endoscopy, if requested by the physician who will be performing the endoscopy.</li> </ul>	See red flags, and imaging for pregnant women in <b><u>AB-2.1</u></b>
<b>Left Lower Quadrant, suspected or known intraabdominal abscess – ALL men and non-pregnant women</b>	No	No	If fever or elevated WBC, then CT Abdomen and/or Pelvis with contrast.	See imaging for pregnant women in <b><u>AB-2.1</u></b> See: <b><u>AB-3-Abdominal Sepsis (Suspected Abdominal Abscess)</u></b>

AB-2.2 Abdominal Pain				
Pain Location	Initial Ultrasound?	Conservative Treatment	Advanced Imaging Indicated?	Comments
<b>Left Lower Quadrant, follow-up known intraabdominal abscess – ALL men and non-pregnant women</b>	No	No	Serial abdominal and/or pelvic ultrasound (CPT®76700 and/or CPT®76856) or CT Abdomen and/or Pelvis with contrast: <ul style="list-style-type: none"> <li>➤ The interval can be days, weeks, or months, but not to exceed 3 follow-up studies based on the clinical course of the individual.</li> </ul>	See imaging for pregnant women in: <b><u>AB-2.1</u></b> See: <b><u>AB-3-Abdominal Sepsis (Suspected Abdominal Abscess)</u></b>
<b>Left Upper Quadrant – ALL men and non-pregnant women</b>	See <b><u>AB-2.4 Left Upper Quadrant (LUQ) PAIN</u></b>	See <b><u>AB-2.4 Left Upper Quadrant (LUQ) PAIN</u></b>	See <b><u>AB-2.4 Left Upper Quadrant (LUQ) PAIN</u></b>	See imaging for pregnant women in: <b><u>AB-2.1</u></b>
<b>Right Lower Quad, rule out appendicitis in – ALL men and non-pregnant women</b>	Ultrasound may be performed but is not required prior to performing a CT of the Abdomen and Pelvis with contrast or without contrast.	No	CT of the Abdomen and Pelvis either with contrast or without contrast.	See imaging for pregnant women in: <b><u>AB-2.1</u></b>
<b>Right Upper Quadrant, rule out cholecystitis - ALL men and non-pregnant women</b>	Yes  Complete or limited abdomen	No	CT Abdomen with contrast, or MRI Abdomen without contrast or without and with contrast if ultrasound equivocal.	See imaging for pregnant women in <b><u>AB-2.1</u></b>
<b>Epigastric pain, dyspepsia, gastritis, and postprandial fullness – ALL men and non-pregnant women</b>	Yes  Complete or limited abdomen	Yes  4 week trial of antisecretory and/or <i>H. Pylori</i> medication must be completed	If pain persists after failure of conservative treatment, CT Abdomen with contrast or MRI Abdomen without and with contrast can be performed.	See imaging for pregnant women in <b><u>AB-2.1</u></b>

Abdomen Imaging

<b>Acute epigastric pain with <u>any</u> red flag symptoms – ALL men and non-pregnant women</b>	No	No	If pain is accompanied with any one red flag, then CT Abdomen with contrast or MRI Abdomen without and with contrast.	See imaging for pregnant women in <b><u>AB-2.1</u></b>
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CPT® Codes for AB 2.2			
CPT® 74150	CT Abdomen without contrast	CPT® 76700	Ultrasound, complete Abdomen
CPT® 74160	CT Abdomen with contrast	CPT® 76705	Ultrasound, limited Abdomen
CPT® 74176	CT Abdomen and Pelvis without contrast	CPT® 76830	Ultrasound, Transvaginal
CPT® 74177	CT Abdomen and Pelvis with contrast	CPT® 76856	Ultrasound, complete Pelvis
CPT® 74181	MRI Abdomen without contrast	CPT® 72195	MRI Pelvis without contrast
CPT® 74183	MRI Abdomen without and with contrast	CPT® 72197	MRI Pelvis without and with contrast

### **AB-2.3: Right Upper Quadrant Pain and Gallbladder Disease**

- Hepatobiliary System Imaging (HIDA) without pharmacologic intervention (CPT® 78226) can be considered:
  - ◆ If there is strong clinical consideration of gallbladder disease and a negative or equivocal ultrasound study or a suboptimal ultrasound study in a morbidly obese patient.
    - NOTE: If the gallbladder does not fill during the study it may be necessary to give Morphine. The study may be converted at the time of imaging to CPT® 78227. The member will not need to return for a second study with a second injection of radiopharmaceutical.
  - ◆ Suspected bile leak after trauma or surgery.
  - ◆ Monitoring of liver regeneration
  - ◆ Assessment of liver transplant
  - ◆ Assessment of choledochal cyst
  - ◆ Pre-operative assessment prior to partial hepatectomy.
- Hepatobiliary System Imaging (HIDA) with pharmacologic intervention (CPT® 78227) can be considered:
  - ◆ Suspected gallbladder dysfunction; biliary dyskinesia with evaluation of gallbladder ejection fraction.
  - ◆ Sphincter of Oddi dysfunction

- ◆ Chronic acalculous cholecystitis with recurrent RUQ pain and no evidence of gallstones on ultrasound.

### **AB-2.4 Left Upper Quadrant (LUQ) PAIN**

- LUQ pain is more difficult to categorize with regards to imaging as there are many potential etiologies, which might be better evaluated with different imaging procedures.
- Most common causes which may be more specifically evaluated:
  - ◆ Splenic etiologies:
    - Suspected trauma, or splenomegaly
      - See: **AB-34: Spleen**
    - Suspected infarct or abscess (severe pain and tenderness, fever, history of atrial fibrillation)
      - CT Abdomen without and with contrast or with contrast (CPT® 74170 or CPT® 74160)
  - ◆ Pancreatic etiologies:
    - Suspected pancreatitis
      - See: **AB-33.1: Pancreatitis**
  - ◆ Renal etiologies
    - Suspected nephrolithiasis
      - See: **AB-4.1: Suspected Renal Stone**
    - Suspected pyelonephritis or abscess
      - See: **AB-40.1: Upper (Pyelonephritis)**
  - ◆ Suspected small or large bowel etiologies (e.g., ischemia, obstruction, volvulus, diverticulitis, mesenteric adenitis)
    - CT Abdomen and/or Pelvis as ordered (CPT® 74160, CPT® 74177)
  - ◆ Gastric etiologies
    - If there is concern for peptic ulcer disease, or if the complaint is dyspepsia, without any red flags suggesting possible perforation or penetration, endoscopy would be the best study for assessing these potential conditions.
    - If there is concern for a more urgent gastric problem, such as perforation, or any red flag is present, then a CT Abdomen (74160) or CT Abdomen and Pelvis (CPT® 74177) can be approved.
  - ◆ Suspected aortic dissection
    - See: **AB-19: Aortic Dissection and Imaging for Other Aortic Conditions**
  - ◆ Unknown etiology, simply reported as LUQ pain
    - LUQ pain with any red flag: A CT Abdomen or CT Abdomen and Pelvis (CPT® 74160 or CPT® 74177) can be approved.
    - LUQ pain without any red flags
      - Prior to advanced imaging, an adequate history and physical examination, with lab work to include: CBC, chemistry profile including electrolytes, BUN, creatinine, LFTs (ALT, AST, alkaline phosphatase and bilirubin)



lipase, amylase, and urinalysis, should be performed with the intention of trying to establish a potential etiology.

- If these evaluations and lab studies are negative or inconclusive for establishing a potential etiology which can be more specifically evaluated as described above, a CT Abdomen or CT Abdomen and Pelvis (CPT® 74160 or CPT® 74177) can be approved.

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# **AB-3: Abdominal Sepsis (Suspected Abdominal Abscess)**

## **AB-3.1: Abdominal Sepsis**

**19**

### **AB-3.1: Abdominal Sepsis**

- CT Abdomen and/or Pelvis with contrast (CPT® 74160, or CPT® 72193, or CPT® 74177) for abdominal symptoms associated with fever and/or elevated white blood cell count.<sup>1</sup>
- Intraperitoneal abscess can undergo interval CT Abdomen and Pelvis with contrast (CPT® 74177).
- Serial Ultrasound (CPT® 76705) or CT with contrast (CPT® 74160, or CPT® 72193, or CPT® 74177) studies may be performed for follow-up of known abnormal fluid collections, especially following catheter drainage. The interval can be days, weeks, or months, but should not exceed 3 follow-up studies, based on the clinical course of the individual.

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## AB-4: Flank Pain, Rule Out or Known Renal/Ureteral Stone

<b>AB-4.1: Suspected Renal Stone</b>	<b>21</b>
<b>AB 4.2: Observation of Known Ureteral Stone</b>	<b>21</b>
<b>AB-4.3: Follow-Up of Treated Ureteral Stone</b>	<b>22</b>
<b>AB-4.4: Ultrasound</b>	<b>22</b>
<b>AB 4.5: Nuclear Kidney Imaging</b>	<b>23</b>

### **AB-4.1: Suspected Renal Stone**

- Suspected renal stone with symptoms in non-pregnant adults (flank pain/renal colic).<sup>1,2</sup>
  - ◆ CT Abdomen and Pelvis without contrast (CPT® 74176)
- Suspected renal stone in pregnant women (flank pain/renal colic)<sup>3,4</sup>
  - ◆ Ultrasound (CPT® 76770 or CPT® 76775) or MRI Abdomen and Pelvis without contrast (CPT® 74181 and CPT® 72195).
    - The use of gadolinium contrast agents is contraindicated during pregnancy unless the specific need for that procedure outweighs risk to the fetus.
- Suspected renal Stone in Children (flank pain/renal colic)<sup>4</sup>
  - ◆ In children, ultrasound (CPT® 76770 or CPT® 76775) or MR urography (MRI Abdomen and Pelvis, without or with and without contrast [CPT® 74181 or CPT® 72195 or CPT® 74183 or CPT® 72197]) is the best initial study to avoid radiation exposure.
  - ◆ See **PEDAB-4: Flank Pain, Renal Stone**
- Suspicion Renal Stones (Flank pain/renal colic) with Hematuria
  - ◆ CT Abdomen and Pelvis without contrast (CPT® 74176) or CT Urogram (CPT® 74178)

### **AB 4.2: Observation of Known Ureteral Stone**

- If the stone is radiopaque, individual is symptomatic, and/or has not passed the stone: The individual should be followed with retroperitoneal ultrasound (CPT® 76770 or CPT® 76775) and KUB x-ray.
  - ◆ If the individual is asymptomatic and has passed the stone, follow-up imaging is not necessary.
  - ◆ If the individual has not passed the stone, but is asymptomatic and no stone or hydronephrosis is seen with the retroperitoneal US and KUB, follow-up imaging is not necessary.
- If the stone is non-radiopaque, the individual is symptomatic, and/or has not passed the stone, the individual should be followed with CT Abdomen and Pelvis without contrast (CPT® 74176).
  - ◆ If the individual is not symptomatic and has passed the stone, follow up imaging is not necessary.
- Annual surveillance for stable individuals who have a history of stones may be indicated to assess for stone growth or formation of new stones:
  - ◆ Plain x-ray (KUB) should be performed for individuals with radiopaque stones.
  - ◆ Retroperitoneal ultrasound (CPT® 76770 or CPT® 76775) is the preferred modality for individuals with non-radiopaque stones.

### **AB-4.3: Follow-Up of Treated Ureteral Stone**

- Post-shock wave lithotripsy (SWL):
  - ◆ Retroperitoneal ultrasound (CPT® 76770 or CPT® 76775) is the appropriate initial follow-up imaging.
  - ◆ Retroperitoneal ultrasound (CPT® 76770 or CPT® 76775) and/or CT Abdomen and Pelvis without contrast (contrast as requested) may be indicated for:
    - Individuals who are symptomatic
    - Individuals with hydronephrosis
    - Individuals who have residual fragments
  - ◆ Individuals treated by SWL who have passed fragments, are asymptomatic and without hydronephrosis: No further imaging is required.
- Post-medical expulsive therapy (MET):
  - ◆ Individuals treated by MET who have passed a stone and are symptomatic should undergo retroperitoneal US.
    - If hydronephrosis is demonstrated with US, a CT Abdomen/Pelvis without and with contrast (CPT® 74178) is indicated.
  - ◆ Individuals treated by MET who have passed a stone and are asymptomatic do not usually require follow-up imaging.
- Post-ureteroscopic extraction with an intact stone:
  - ◆ Individuals without symptoms should have a retroperitoneal US.
  - ◆ Individuals with symptoms or hydronephrosis with US should have a CT Abdomen and Pelvis with contrast (CPT® 74177).
  - ◆ Individuals without symptoms or hydronephrosis with US do not usually require follow-up imaging.
- Post-ureteroscopic extraction requiring fragmentation of the stone(s):
  - ◆ Individuals without symptoms should have a retroperitoneal US.
    - Individuals without symptoms, but hydronephrosis with US, should have a CT Abdomen/Pelvis without contrast (CPT® 74176).
    - Individuals without symptoms or hydronephrosis with US do not usually require follow-up imaging.
  - ◆ Individuals with symptoms and a radiopaque stone should have a retroperitoneal US and KUB.
  - ◆ Individuals with symptoms and a non-radiopaque stone should have a CT Abdomen/Pelvis without contrast (CPT® 74176).
- Individuals with persistent symptoms and/or hydronephrosis: Retroperitoneal US and/or CT Abdomen and Pelvis with contrast (CPT® 74177) as requested may be indicated.

### **AB-4.4: Ultrasound**

- Retroperitoneal ultrasound (CPT® 76770 or CPT® 76775) can be used in place of CT Abdomen and Pelvis at any of the initial or follow-up indications, if requested by Provider.

## **AB 4.5: Nuclear kidney imaging**

- Nuclear kidney imaging (CPT® 78707, CPT® 78708, or CPT® 78709) can be considered for evaluation of any of the following:<sup>5,6</sup>
  - ◆ Recurrent flank pain when CT and ultrasound are non-diagnostic.
  - ◆ Prior imaging (CT or US) shows hydronephrosis and to determine if this truly obstructive in nature.

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## AB-5: Gastroenteritis

### AB-5.1: Gastroenteritis

25



## **AB-5.1: Gastroenteritis**

- CT Abdomen and Pelvis with contrast (CPT® 74177) if:
  - ◆ Acute abdomen suggesting bowel obstruction, toxic megacolon (abdominal swelling, fever, tachycardia, elevated white blood cell count), or perforation.
  - ◆ Any “Red Flag” (see: **AB-2.1**: General Information), bloody stools, immunocompromised, or have had a previous gastric bypass.

### ***Practice Note***

Gastroenteritis is a nonspecific term which denotes a constellation of symptoms including, to a varying degree, nausea, vomiting, diarrhea, and abdominal pain. It is usually caused by infectious agents such as norovirus. The broad differential of such symptoms evades establishing a guideline to evaluate gastroenteritis, as a specific entity, from an imaging standpoint.

### **References**

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**AB-6: Mesenteric/Colonic Ischemia**

<b>AB-6.1: Mesenteric Ischemia</b>	<b>27</b>
<b>AB-6.2: Colonic ischemia (including ischemic colitis)</b>	<b>27</b>

### **AB-6.1: Mesenteric Ischemia**

- Suspicion of acute mesenteric ischemia – typical presentation based on severe abdominal pain out of proportion to findings on physical exam, usually in individuals with underlying risk factors including cardiovascular disease, atrial fibrillation, hypertension, etc.:
  - ◆ Abdominal and/or Pelvic (Mesenteric) CTA (CPT® 74174, CPT® 74175, or CPT® 72191) (preferable), **or**
  - ◆ Abdominal and/or Pelvic MRA (CPT® 72198 and/or CPT® 74185), **or**
  - ◆ CT Abdomen and Pelvis with contrast (CPT® 74177).
- Routine post-procedure imaging following invasive treatment for mesenteric ischemia (bowel resection, embolectomy, etc.) is not needed in asymptomatic individuals.
- For “Mesenteric Ischemia” see: **PVD-6: Aortic Disorders, Renal Vascular Disorders, and Visceral Artery Aneurysms** in the Peripheral Vascular Disease Imaging Guidelines.

### **AB-6.2: Colonic ischemia (including ischemic colitis)**

- CT Abdomen and Pelvis with contrast (CPT® 74177) is considered the first imaging modality in order to assess the distribution and phase of the colitis, and it can be performed if:
  - ◆ Abdominal pain; **and**
  - ◆ Rectal bleeding; **or**
  - ◆ Moderate or severe tenderness; **or**
  - ◆ Fever (101 degrees or greater); **or**
  - ◆ Guarding, rebound tenderness, or other peritoneal signs; **or**
  - ◆ Elevated WBC as per the testing laboratory’s range
- Repeat imaging for asymptomatic or improving patients is not needed.
- Abdominal CTA (CPT® 74175) or MRA (CPT® 74185) can be performed for suspicion of right sided or pancolonic ischemia (as suggested on the initial CT A/P or by history)

#### ***Practice Note***

Suspicion of colonic ischemia based on sudden cramping abdominal pain accompanied by urgency to defecate and passage of bright red blood, maroon blood, or bloody diarrhea, with risk factors including cardiovascular disease, diabetes mellitus, kidney disease, previous abdominal surgery, use of constipating medications, COPD, and atrial fibrillation.

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## **AB-7: Post-Operative Pain With-in 60 Days Following Abdominal Surgery – Abdominal Procedure**

**AB-7.1: Post-Op Pain within 60 Days**

**30**

### **AB-7.1: Post-Op Pain within 60 Days**

- CT Abdomen and/or Pelvis with contrast (CPT® 74177 or CPT® 74160 or CPT® 72193) can be performed for suspected postoperative/post procedure complications (For example: bowel obstruction, abscess or anastomotic leak).<sup>1,2</sup>
- Beyond 60 days postoperatively, see: **AB-2: Abdominal Pain**

#### ***References***

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**AB-8: Abdominal Lymphadenopathy**

<b>AB-8.1: Abdominal Lymphadenopathy</b>	<b>32</b>
<b>AB-8.2: Inguinal Lymphadenopathy</b>	<b>32</b>

### **AB-8.1: Abdominal Lymphadenopathy**

- History of malignancy
  - ◆ Refer to oncology guidelines specific for that known malignancy
  - ◆ Biopsy may be considered
- Clinical or lab findings suggesting a lymphoproliferative disorder:
  - ◆ Biopsy
  - ◆ If biopsy is negative or inconclusive, PET/CT (CPT® 78815) can be considered
  - ◆ PET can be considered if requested to find the most appropriate LN for biopsy in this scenario.  
Clinical note: Due to its relative lack of specificity as well as higher cost, PET is a less efficient alternative to biopsy.
- Clinical or laboratory findings suggesting benign etiology, and no history of malignancy:
  - ◆ 3-month follow-up CT Abdomen/Pelvis (CPT® 74177).
  - ◆ If no changes at 3 months, 2 additional follow-up scans (at 6 months and one year) can be approved.
  - ◆ If no changes by one year, the finding can be considered benign. No further imaging.
- If a follow-up CT demonstrates a concerning change, biopsy should be performed. If biopsy is inconclusive, PET/CT (CPT® 78815) can be approved

### **AB-8.2: Inguinal Lymphadenopathy**

There is no evidence-based support for advanced imaging of clinically evidenced inguinal lymph adenopathy without biopsy.

- Localized inguinal lymphadenopathy should prompt:
  - ◆ Search for adjacent extremity injury or infection;
  - ◆ 3 to 4 weeks of observation if clinical picture is benign;
  - ◆ Excisional or image guided core needle biopsy under ultrasound or CT guidance of most abnormal lymph node if condition persists or malignancy suspected;
  - ◆ No advanced imaging indicated.
- Generalized inguinal lymphadenopathy should prompt:
  - ◆ Diagnostic work-up, including serological tests, for systemic diseases and
  - ◆ Excisional or image guided core needle biopsy under ultrasound or CT guidance of most abnormal lymph node if condition persists or malignancy suspected.
- See: **ONC-27: : Non-Hodgkin Lymphomas;** ONC-28: Hodgkin Lymphoma in the Oncology Imaging Guidelines
- See: **ONC-31: Metastatic Cancer, Carcinoma of Unknown Primary Site, and Other Types of Cancer**



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## **AB-9: Bariatric Surgery**

### **AB-9.1: Bariatric Surgery**

**35**

## **AB-9.1: Bariatric Surgery**

- CT Abdomen and Pelvis with contrast (CPT® 74177) may be used for individuals who have had weight loss surgery and present with suspected complications related to the bariatric surgery such as any one of the following: fever, abdominal pain, abdominal distention, frequent vomiting, or suspected hernia.
  - ◆ Internal hernias in patients who have had Roux-En-Y gastric bypasses may have intermittent and relatively mild abdominal symptoms which require immediate evaluation with CT imaging.
- See **AB-7: Post-Operative Pain With-in 60 Days Following Abdominal Surgery – Abdominal Procedure**

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## AB-10: Blunt Abdominal Trauma

### AB-10.1: Blunt Abdominal Trauma

37

## **AB-10.1: Blunt Abdominal Trauma**

- Ultrasound (CPT® 76700 and/or CPT® 76856) should be used initially for trauma with low probability of intra-abdominal injury (minimal pain, no evidence of peritoneal irritation on physical examination, no hemodynamic instability, no elevated AST/ALT). In patients with BMI  $\geq$  35, ultrasound imaging may be suboptimal and CT Abdomen and Pelvis with contrast may be performed.
- To determine whether individuals need hospitalization for observation as a result of blunt renal trauma with hematuria, CT Abdomen and Pelvis without and with contrast (CPT® 74178) should be used initially.<sup>1,2</sup>
- CT Abdomen and/or Pelvis with contrast (CPT® 74160, or CPT® 72193, or CPT® 74177):
  - ◆ High probability intra-abdominal injury
    - Seat belt sign
    - Rebound tenderness or guarding
    - Hypotension
    - Abdominal distension
    - Concomitant femur fracture (may indicate blunt abdominal trauma in patients struck by automobiles)
  - ◆ If ultrasound demonstrates any positive finding(s)

### ***References***

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## AB-11: Gaucher's Disease and Hemochromatosis

<b>AB-11.1: Gaucher's Disease</b>	<b>39</b>
<b>AB-11.2: Hereditary (Primary) Hemochromatosis (HH) and Other Iron Storage Diseases</b>	<b>39</b>

See also: **PN-6.3: Gaucher's Disease** in the Peripheral Nerve Disorders Imaging Guidelines

### **AB-11.1: Gaucher's Disease**

- MRI abdomen without contrast (CPT® 74181) and MRI lower extremity without contrast (CPT® 73718) should be used as follows:
  - ◆ Individuals not on enzyme therapy every 12 to 24 months<sup>1</sup>
  - ◆ Individuals on enzyme therapy every 12 months:
    - For change in dose of medication, complication from medication specific for treatment of Gaucher's disease or clinical complication, individuals with active bone disease may require more frequent monitoring than once a year.

#### *Practice Note:*

Gaucher's disease is a lysosomal storage disease characterized by glucosylceramide accumulation in the spleen, liver, kidneys, lung, brain, and bone marrow

### **AB-11.2: Hereditary (Primary) Hemochromatosis (HH) and Other Iron Storage Diseases**

- 
- MRI for the quantification of iron can be approved for the evaluation of suspected hepatic iron overload, if the following requirements are met:
  - ◆ Elevated serum ferritin and
    - If serum transferrin saturation > 45%, **and**
      - Hemochromatosis genetic testing results other than homozygous C282Y or compound heterozygosity for C282Y/H63Asp (i.e., negative or inconclusive genetic testing for hemochromatosis)
    - If serum transferrin saturation < 45% **and**
      - No history of metabolic syndrome or NAFLD
  - ◆ For the evaluation of suspected hepatic iron overload in chronic transfusional states (e.g., sickle cell disease, thalassemia, oncology patients, bone marrow failure, and stem cell transplant patients)
- See: **PEDAB-18.2: Transfusion-Associated (Secondary) Hemochromatosis** in the Pediatric Abdomen Imaging guidelines regarding transfusion-associated hepatic iron deposition.

#### *Practice Note*

- MRI for iron quantification is useful for the evaluation of suspected hemochromatosis if the diagnosis is uncertain, based on elevated ferritin and transferrin saturation and the absence of the classic genetic profile. It can also be of value if the transferrin saturation is normal, if there is no history of metabolic syndrome or non-alcoholic fatty liver disease.

- The role of serial MRI for monitoring hepatic iron concentration in hemochromatosis has not been defined. Treatment is phlebotomy and results are monitored by serum ferritin.

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**AB-12: Hernias**

<b>AB-12.1: Inguinal or Femoral Hernia</b>	<b>42</b>
<b>AB-12.2: Spigelian, Ventral, Umbilical, or Incisional Hernia</b>	<b>42</b>
<b>AB-12.3: Hiatal Hernia</b>	<b>42</b>
<b>AB-12.4: Indeterminate Groin Pain</b>	<b>43</b>

### **AB-12.1: Inguinal or Femoral Hernia**

- Initial imaging for known or suspected primary or recurrent inguinal or femoral hernia.
  - ◆ Limited (CPT® 76857) or complete (CPT® 76856) pelvic ultrasound; **and/or**
  - ◆ Limited (CPT® 76705) or complete (CPT® 76700) abdominal ultrasound
- CT Pelvis with contrast (CPT® 72193) or without contrast (CPT® 72192) should be used if there is suspected incarceration or strangulation of an inguinal or femoral hernia or if requested by a specialist or surgeon.
- In most cases, a clinical examination alone is sufficient for the diagnosis of an inguinal or femoral hernia, and the patient can proceed to surgery without additional imaging.
  - ◆ Ultrasound (pelvic limited or pelvic complete) is the initial imaging study if:
    - Vague groin swelling with diagnostic uncertainty
    - Poor localization of swelling (as might be seen with a small hernia and prominent overlying fat)
    - Intermittent swelling not present on examination
    - Other groin complaints without swelling
  - ◆ CT Pelvis (with contrast, CPT® 72193, or without contrast, CPT® 72192) if ultrasound is indeterminate, or if a complication such as incarceration or strangulation is suspected.
  - ◆ MRI Pelvis if CT and US are indeterminate or non-diagnostic.
- For chronic post-surgical groin pain (after hernia repair):
  - ◆ Pelvic ultrasound or US-guided nerve block
  - ◆ CT Pelvis or MRI Pelvis can be approved if either of the above studies are indeterminate or non-diagnostic, to assess for non-neuropathic causes.

### **AB-12.2: Spigelian, Ventral, Umbilical, or Incisional Hernia**

- Known or suspected primary or recurrent Spigelian hernia (anterior abdominal wall hernia through the semilunar line), ventral hernia, umbilical, or incisional hernia:
  - ◆ CT Abdomen without or with contrast (if above the umbilicus) (CPT® 74150 or CPT® 74160)
  - ◆ CT Pelvis without or with contrast (if below the umbilicus) (CPT® 72192 or CPT® 72193)
  - ◆ CT Abdomen and/or Pelvis without or with contrast (if above and below the umbilicus) (CPT® 74176 or CPT® 74177)

### **AB-12.3: Hiatal Hernia**

- Chest and/or Abdomen CT with contrast (CPT® 71260 and/or CPT® 74160) to evaluate any of the following:
  - ◆ GI specialist or surgeon request for treatment/pre-operative planning.
  - ◆ Suspected complication of primary disease or surgery.

## **AB-12.4: Indeterminate Groin Pain**

- Occurs after intra-abdominal/genitourinary causes have been ruled out and musculoskeletal evaluation does not identify a specific cause.
  - ◆ Plain X-ray of the pelvis is the initial study.
  - ◆ Further advanced imaging can then be considered with MRI Pelvis without contrast.
  - ◆ Pelvic Ultrasound (CPT® 76856 or CPT® 76857) can be considered in the evaluation of sports hernia (athletic pubalgia).

### ***Practice Note***

Sports hernia, also referred to as *athletic pubalgia*, is not a true hernia. Sports hernia is a term used to describe a condition characterized by groin pain, often in an athlete, in which there is no identifiable hernia.

See: **MS-23: Pelvis** in the Musculoskeletal Guidelines for Athletic Pubalgia

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**AB-13: Abdominal Mass**

<b>AB-13.1: Abdominal Wall Mass</b>	<b>45</b>
<b>AB-13.2: Intra-Abdominal Mass</b>	<b>45</b>

### **AB-13.1: Abdominal Wall Mass**

- Ultrasound (CPT® 76700 or CPT® 76705) or CT Abdomen and/or Pelvis (if below the umbilicus) with contrast (CPT® 74160 or CPT® 72193 or CPT® 74177) or without contrast (CPT® 74150 or CPT® 72192 or CPT® 74176).
- MRI Abdomen without and with contrast (CPT® 74183) or MRI Abdomen without contrast (CPT® 74181) can be considered if ultrasound and/or CT are equivocal, or for preoperative planning.<sup>1</sup>

### **AB-13.2: Intra-Abdominal Mass**

- If the physical exam suggests a palpable mass or a mass is seen on prior imaging, imaging can include one of the following:
  - ◆ CT Abdomen and/or Pelvis (if mass palpated below the umbilicus) with contrast (CPT® 74160 or CPT® 72193 or CPT® 74177) **or**
  - ◆ CT Abdomen and/or Pelvis (if mass palpated below the umbilicus) without contrast (CPT® 74150 or CPT® 72192 or CPT® 74176) **or**
  - ◆ MRI Abdomen and/or Pelvis (if mass palpated below the umbilicus) without contrast (CPT® 74181 and/or CPT® 72195) **or**
  - ◆ MRI Abdomen and/or Pelvis (if mass palpated below the umbilicus) without and with contrast (CPT® 74183 and/or CPT® 72197)
- Pregnant individual:
  - ◆ Initial Imaging: Abdominal and/or Pelvic and/or Transvaginal ultrasound (CPT® 76700 and/or CPT® 76856 and/or CPT® 76830) is appropriate.
  - ◆ Follow-up Imaging if ultrasound findings are indeterminate (see **AB-2.1**)
- Subcutaneous mass: Abdominal and/or Pelvic ultrasound (CPT® 76700 and/or CPT® 76856) is appropriate.

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## AB-14: Lower Extremity Edema

See: **PVD-7.5: Lower Extremity, Deep Venous Thrombosis (DVT) and/or Lower Extremity Edema** in the Peripheral Vascular Disease Imaging Guidelines.

## **AB-15: Zollinger-Ellison Syndrome (ZES)**

### **AB-15.1: Zollinger-Ellison Syndrome (ZES)**

**48**

## **AB-15.1: Zollinger-Ellison Syndrome (ZES)**

- For known ZES, CT Abdomen with contrast (CPT® 74160) **or** MRI Abdomen without and with contrast (CPT® 74183).

### ***Practice Notes***

Zollinger-Ellison Syndrome is a complex condition in which one or more tumors form in the pancreas or upper part of the small intestine (duodenum).

Imaging is sometimes combined with Somatostatin Receptor Scintigraphy in the evaluation of suspected gastrinoma (elevated serum gastrin (normal value is < 100 pg/ml) and/or abnormal gastric acid secretory test).<sup>1,2,3</sup>

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## AB-16: Adrenal Cortical Lesions

<b>AB-16.1: Adrenal Cortical Lesions</b>	<b>50</b>
<b>AB-16.2: Normal Laboratory Values</b>	<b>53</b>
<b>AB-16.3: Adrenal Insufficiency</b>	<b>53</b>
<b>AB-16.4: Additional Adrenal Imaging</b>	<b>53</b>

CPT® 74150	CT Abdomen without contrast
CPT® 74160	CT Abdomen with contrast
CPT® 74170	CT Abdomen without and with contrast
CPT® 74181	MRI Abdomen without contrast
CPT® 74183	MRI Abdomen without & with contrast
CPT® 78812	PET, Skull Base to Mid-Thigh
CPT® 78815	PET/CT, Skull Base to Mid-Thigh

## AB-16.1: Adrenal Cortical Lesions

Imaging Decision Tree: Incidentally Discovered Adrenal Mass <sup>1,2,3,4</sup>		
Mass Details	Primary Study	Additional Studies
<ul style="list-style-type: none"> <li>➤ Asymptomatic adrenal mass <math>\geq</math> 1 cm</li> <li>➤ No history of cancer</li> </ul>	Incidentally detected on any CT or MRI exam	<ul style="list-style-type: none"> <li>➤ No further imaging, regardless of size, if imaging is diagnostic for benign findings, including any of the following:                             <ul style="list-style-type: none"> <li>◆ Myelolipoma (macroscopic fat) <b>or</b></li> <li>◆ Calcified mass <b>or</b></li> <li>◆ <math>\leq</math> 10 HU on CT or decreased signal on Chemical Shift MRI (CS-MRI) consistent with benign adenoma, <b>or</b></li> <li>◆ If imaging was completed with and without contrast and no enhancement (defined as <math>&lt;</math> 10 HU change between unenhanced and enhanced/contrasted CT scan e.g. cyst, hemorrhage)*</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>➤ 1 to <math>&lt;</math> 4 cm</li> <li>➤ No history of cancer</li> <li>➤ Asymptomatic</li> <li>➤ No prior imaging for comparison</li> </ul>	Indeterminate imaging on any CT or MRI	<ul style="list-style-type: none"> <li>➤ 1 to 2 cm:                             <ul style="list-style-type: none"> <li>◆ 12 month CT Abdomen without and with contrast (adrenal protocol), <b>or</b> may consider CS-MRI (chemical shift MRI), especially if CT contraindicated                                     <ul style="list-style-type: none"> <li>■ If stable <math>\geq</math> 1 year, no further imaging-likely benign</li> <li>■ If enlarging (or new lesion present):   <ul style="list-style-type: none"> <li>▫ biochemical evaluation;</li> <li>▫ consider resection for possible primary adrenocortical carcinoma;</li> <li>▫ exclude pheochromocytoma prior to resection.</li> </ul> </li> </ul> </li> </ul> </li> <li>➤ <math>&gt;</math> 2 cm to <math>&lt;</math> 4 cm:                             <ul style="list-style-type: none"> <li>◆ CT Abdomen without and with contrast (adrenal protocol); may consider CS-MRI (chemical shift MRI), especially if CT contraindicated</li> <li>◆ No further follow up imaging if:                                     <ul style="list-style-type: none"> <li>■ Absolute Percentage Washout/Relative Percentage Washout (APW/RPW) <math>\geq</math> 60/40%: Benign adenoma;</li> <li>■ No enhancement (defined as change in pre- and post-contrast imaging of <math>&lt;</math>10 HU Cyst or hemorrhage)</li> </ul> </li> <li>◆ If APR/RPW <math>&lt;</math>60/40%:                                     <ul style="list-style-type: none"> <li>■ Consider 6-12 month follow up imaging, <b>or</b></li> </ul> </li> </ul> </li> </ul>

		<ul style="list-style-type: none"> <li>■ Resection for possible primary adrenocortical carcinoma, with biochemical evaluation to determine functional status and to exclude pheochromocytoma prior to resection</li> <li>◆ If not resected, follow-up CT abdomen with and without contrast (or CS-MRI) in 6 – 12 months. May consider CS-MRI (chemical shift MRI), especially if CT contraindicated.             <ul style="list-style-type: none"> <li>■ If enlarging on follow up imaging: Consider resection for possible primary adrenocortical carcinoma; biochemical evaluation to determine functional status and to exclude pheochromocytoma prior to resection.</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>➤ ≥ 4 cm</li> <li>➤ No history of cancer</li> <li>➤ or &gt; 10 HU on NCCT</li> </ul>	Indeterminate imaging features on any CT or MRI	<ul style="list-style-type: none"> <li>➤ Biochemical assays to determine functional status to exclude pheochromocytoma prior to resection</li> <li>➤ Consider resection for possible primary adrenocortical carcinoma</li> </ul>
<ul style="list-style-type: none"> <li>➤ 1 cm to &lt; 4 cm</li> <li>➤ History of cancer</li> <li>➤ No prior imaging for comparison</li> </ul>	Indeterminate imaging on any CT or MRI	<ul style="list-style-type: none"> <li>➤ CT abdomen without and with contrast(adrenal protocol); <b>or</b> <ul style="list-style-type: none"> <li>◆ May consider CS-MRI (chemical shift MRI), especially if CT contraindicated</li> <li>◆ No further follow up imaging if;               <ul style="list-style-type: none"> <li>■ APW/RPW &gt; 60/40%: Benign adenoma; <b>or</b></li> <li>■ No enhancement (defined as change in pre- and postcontrast imaging of &lt;10 HU e.g. cyst or hemorrhage);</li> </ul> </li> <li>◆ APW/RPW &lt; 60/40%:               <ul style="list-style-type: none"> <li>■ PET CT; consider biopsy;</li> <li>■ Biochemical evaluation to determine functional status and exclude pheochromocytoma prior to biopsy/resection.</li> </ul> </li> <li>◆ If enlarging or new lesion:               <ul style="list-style-type: none"> <li>■ PET CT or biopsy;</li> <li>■ Biochemical evaluation to determine functional status and exclude pheochromocytoma prior to biopsy/resection</li> </ul> </li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>➤ ≥ 4 cm</li> <li>➤ History of cancer</li> <li>➤ &gt; 10 HU on NCCT</li> </ul>	Indeterminate imaging features on any CT or MRI	<ul style="list-style-type: none"> <li>➤ PET CT or biopsy</li> <li>➤ Consider biochemical assays to determine functional status and exclude pheochromocytoma prior to biopsy/resection</li> </ul>

<ul style="list-style-type: none"> <li>➤ Suspected Cushing's Syndrome, or</li> <li>➤ Conn's Syndrome (hyperaldosteronism) or</li> <li>➤ virilizing adrenal tumors</li> </ul>	<p>CT Abdomen without contrast*</p>	<ul style="list-style-type: none"> <li>➤ <b>Laboratory:</b> dexamethasone suppression, serum ACTH level, serum aldosterone/renin, and/or virilizing hormone levels, and 24 hour urine for adrenal hormones confirm adrenal cortical endocrine syndrome</li> <li>➤ Prior to adrenal vein sampling:                         <ul style="list-style-type: none"> <li>◆ CT abdomen with contrast</li> </ul> </li> </ul>
<ul style="list-style-type: none"> <li>➤ Suspected Pheochromocytoma</li> </ul>	<p>MRI Abdomen or CT Abdomen (contrast as requested)</p>	<ul style="list-style-type: none"> <li>➤ Chemical shift MRI is the preferred imaging</li> </ul>

**Practice Note**

- Above imaging can be applied to patients with bilateral adrenal masses, with each lesion addressed separately.
- Incidental adrenal mass < 1 cm in short axis need not be pursued with further imaging, as it is uncertain as to whether subcentimeter nodularity or adrenal thickening qualifies as an adrenal mass on radiology reports.
- Benign calcified mass, such as and old hematoma or calcification from prior granulomatous infection needs no further imaging.
- Both benign and malignant adrenal masses may enlarge over time; there is not a known growth-rate threshold to differentiate benign from malignant adrenal masses.
- \*If an adrenal mass does not demonstrate *enhancement* (defined as < 10 HU change between unenhanced and enhanced/contrasted CT scan), mass represents a cyst or hemorrhage and no further imaging is needed. Conversely, when an adrenal mass shows avid enhancement (>110 – 120 HU), a pheochromocytoma should be considered and biochemical evaluation with serum catecholamines is recommended.

## **AB-16.2: Normal Laboratory Values**

<b>Normal Values</b>	
<b>Aldosterone</b>	
3 to 10 ng/dl (supine)	
5 to 30 ng/dl (upright)	
<b>Cortisol</b>	
at 8am	7 to 28 µgm/dL
at 4pm	2 to 18 µgm/dL
at 10pm	50% of 8am µgm/dL value

## **AB-16.3: Adrenal Insufficiency**

- CT Abdomen without contrast (CPT® 74150) or MRI Abdomen without contrast (CPT® 74181) is supported to determine the cause of primary adrenal insufficiency. Imaging is necessary if testing has confirmed adrenal insufficiency or adrenomyeloneuropathy.<sup>6,7</sup>

## **AB-16.4: Additional Adrenal Imaging**

- Additional adrenal imaging considerations include the following:
  - ◆ Adrenal Nuclear Imaging of the cortex and/or medulla (CPT® 78075) is indicated for the following:
    - Distinguishing adrenal adenoma from adrenal hyperplasia.
    - Evaluation of suspected pheochromocytoma or paraganglioma.
      - MIBG preferred (one of the following codes: CPT® 78800, CPT® 78801, CPT® 78802, CPT® 78803, or CPT® 78804).
      - For known pheochromocytoma or paraganglioma, see: **ONC-15: Neuroendocrine Cancers and Adrenal Tumors** for imaging guidelines.
    - Evaluation of suspected neuroblastoma, ganglioneuroblastoma, or ganglioneuroma.
      - MIBG preferred (one of the following codes: CPT® 78800, CPT® 78801, CPT® 78802, CPT® 78803, or CPT® 78804), see: **PEDONC-6: Neuroblastoma** for imaging guidelines.
    - History of multiple endocrine neoplasia syndromes: see: **PEDONC-2.8: Multiple Endocrine Neoplasia (MEN) Syndromes** for imaging guidelines.
    - History of neurofibromatosis: see: **PEDONC-2.3: Neurofibromatosis 1 and 2 (NF1 and NF2)** for imaging guidelines.
    - History of von Hippel-Lindau disease: see: **PEDONC-2.10: Von Hippel-Lindau Syndrome (VHL)** for imaging guidelines.

### Practice Notes

The majority of “incidentalomas” are benign adenomas. Primary Adrenal Carcinoma is a very rare disease and usually seen with adrenal masses greater than 5 cm in diameter. Metastases with history of malignancy are 25-75%. Routine screening for endocrine function is recommended since 5%-23% will be hormone secreting.

Resection or biopsy is often considered for mass lesions larger than 4 cm or hormone-secreting tumors.\*

Biopsy is often considered if pheochromocytoma is excluded.

➤ Signs and symptoms of pheochromocytoma:

- ◆ Flushing spells and/or poorly controlled hypertension.
- ◆ Elevated plasma or urine metanephrines support the diagnosis of pheochromocytoma with sensitivity for diagnosis at 99.7%
- ◆ If plasma metanephrines are not elevated, a 24-hour urine for catecholamine and metanephrine levels should be obtained prior to considering advanced imaging.
- ◆ If catecholamine and metanephrine levels are not elevated in a 24- hour urine test, then no advanced imaging is indicated unless unexplained symptoms suggestive of pheochromocytoma persist.
- ◆ Endocrine guidelines recommend biochemical evaluation in all incidental adrenal lesions with the exception of myelolipomas and cysts.

Adenoma imaging characteristics:

	Findings consistent with Adenoma	Indeterminate for Adenoma
<b>CT Abdomen w/o contrast</b>	≤ 10 Hounsfield Units	> 10 Hounsfield Units
<b>CT with contrast with washout (calculated)</b>	≥ 60% absolute washout or ≥ 40% relative washout	< 60% absolute washout < 40% relative washout
<b>Chemical Shift MRI</b>	Signal drop out	Lack of signal drop out

\*Size > 4 cm or growth of a lesion are concerning for malignancy (though occasionally adenomas can demonstrate very slight growth on 6 to 12 month follow up imaging).

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## **AB-17: Abdominal Aortic Aneurysm (AAA), Iliac Artery Aneurysm (IAA), and Visceral Artery Aneurysms Follow-Up of Known Aneurysms and Pre-Op Evaluation**

<b>AB-17.1: Abdominal Aortic Aneurysm (AAA)</b>	<b>57</b>
<b>AB-17.2: Iliac Artery Aneurysm (IAA)</b>	<b>58</b>
<b>AB-17.3: Visceral Artery Aneurysm</b>	<b>58</b>



## **AB-17.1: Abdominal Aortic Aneurysm (AAA)**

### **Non-Obese Individual**

- Ultrasound (CPT® 76706) is the preferred initial imaging study to screen and (CPT® 76775) to surveil for AAA or to evaluate a pulsatile abdominal mass.

### **Obese Individual (>/= 35)**

- CT Abdomen and Pelvis with contrast (CPT® 74177) can be substituted for US using the same timeline as non-obese individual.

### **Screening**

- One-time screening recommendations for AAA (Ultrasound (CPT® 76706))
  - ◆ Men age 65 to 75 who have smoked
  - ◆ Women and non-smokers – no routine screening
  - ◆ Medicare covers a one-time AAA screening ultrasound (CPT® 76706) if there is at least one of the following risk factors:
    - Family history of AAA
    - Individual is a male age 65 to 75 who has smoked at least 100 cigarettes in his lifetime.

### **Surveillance**

- Surveillance recommendations for AAA [Ultrasound (CPT® 76775)]
  - ◆ 2.6 to 2.9cm →once at 5 years
  - ◆ 3.0 to 3.4cm →once at 3 years
  - ◆ 3.5 to 4.4cm →annually
  - ◆ 4.5 to 5.4cm→every 6 months
- > 5.4 cm, or aortic diameter has increased in size by 0.7 cm in six months, or at least 1 cm in a year may undergo more frequent monitoring and should be evaluated by a Vascular Specialist.

### **Additional Imaging**

- CT of the Abdomen and Pelvis with contrast (CPT® 74177), CT of the Abdomen and Pelvis without and with contrast (CPT® 74178), or CTA (CPT® 74174, CPT® 74175 and CPT® 72191).
  - ◆ Preoperative imaging if endovascular or open repair of AAA is being considered.
  - ◆ New onset of back and/or abdominal pain in an individual with a known AAA.

Also see: **PVD-6: Aortic Disorders, Renal Vascular Disorders, and Visceral Artery Aneurysms** in the Peripheral Vascular Disease Imaging Guidelines.

### ***Practice Note***

There is insufficient evidence to support the use of advanced imaging to screen for thoracic aortic aneurysm in individuals with known abdominal aortic aneurysm.

### **AB-17.2: Iliac Artery Aneurysm (IAA)**

- Evaluation of a suspected IAA should begin with ultrasound.
  - ◆ If ultrasound is equivocal, CT Pelvis with contrast (CPT® 72193) may be performed.
  - ◆ Follow-up imaging studies can be performed annually.

#### **Additional Imaging**

- CT of the Abdomen and Pelvis with contrast (CPT® 74177), CT of the Abdomen and Pelvis without and with contrast (CPT® 74178), or CTA Abdomen and Pelvis (CPT® 74174).
  - ◆ Preoperative imaging if endovascular or open repair is being considered.

#### ***Practice Notes***

- ◆ Iliac artery aneurysms are most commonly associated with aortic aneurysms.
- ◆ Isolated IAA's are rare.
- ◆ Approximately one third to one half of isolated IAA's are bilateral at time of presentation.
- ◆ The majority of individuals are male and between 50 and 70 years old.
- ◆ The normal size of the iliac artery is < 1 cm.
- ◆ Aneurysm rupture usually occurs at a diameter of 5 cm or larger, whereas common iliac aneurysms that are less than 3 cm in diameter almost never rupture.

### **AB-17.3: Visceral Artery Aneurysm**

See: **PVD-6: Aortic Disorders, Renal Vascular Disorders, and Visceral Artery Aneurysms** in the Peripheral Vascular Disease Imaging Guidelines.

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# **AB-18: Abdominal Aortic Aneurysm (AAA) and Iliac Artery Aneurysm (IAA)-Post Endovascular or Open Aortic Repair**

**AB-18.1: AAA, IAA, Post Endovascular or Open Aortic Repair 60**

## **AB-18.1: AAA, IAA, Post Endovascular or Open Aortic Repair**

- Any one of the following studies can be used after aortic intervention:
  - ◆ CT of the Abdomen and/or Pelvis with contrast (CPT® 74160 or CPT® 72193 or CPT® 74177), **or**
  - ◆ CT of the Abdomen and/or Pelvis without and with contrast (CPT® 74170 or CPT® 72194 or CPT® 74178) **or**
  - ◆ CTA of the Abdomen and/or Pelvis (CPT® 74175 or CPT® 72191 or CPT® 74174), **or**
  - ◆ MRA of the Abdomen and/or Pelvis (CPT® 74185 and CPT® 72198)
- Open Aortic Repair - every 3 years to screen for aneurysms in the remaining aorta.<sup>1</sup>
- Endovascular (Stent) Aortic Repair -1 month, 6 months, and 12 months following repair, then every year.<sup>2</sup>
  - ◆ An additional study at 3 months can be performed if there was evidence of endoleak on the 1 month study.
- Any of the following studies can be used after endovascular iliac repair (stent):
  - ◆ CT Pelvis (CPT® 72193 or CPT® 72194), or
  - ◆ CTA Pelvis (CPT® 72191), or
  - ◆ MRA Pelvis (CPT® 72198)
- Endovascular (Stent) Iliac Repair - 1 week, 1 month, 3 months, and 6 months after endovascular treatment, and then every 6 months thereafter.<sup>3</sup>

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## **AB-19: Aortic Dissection and Imaging for Other Aortic Conditions**

<b>AB-19.1: Aortic Dissection and Other Aortic Conditions</b>	<b>62</b>
<b>AB-19.2: Imaging for Other Aortic Conditions</b>	<b>62</b>

## **AB-19.1: Aortic Dissection and Other Aortic Conditions**

- **Any** of the following studies can be used if acute dissection is suspected:
  - ◆ CT Chest (CPT® 71260 or CPT® 71270) **and/or**
  - ◆ CT Abdomen (CPT® 74160 or CPT® 74170) **and/or**
  - ◆ CT Pelvis (CPT® 72193 or CPT® 72194) **or**
    - If CT Abdomen and Pelvis with or with and without is requested, codes: (CPT® 74177 or CPT® 74178) are appropriate.
  - ◆ CTA Chest (CPT® 71275) and/or CTA Abdomen and/or Pelvis (CPT® 74175 or CPT® 72191 or CPT® 74174), *or*
  - ◆ MRA Chest and/or Abdomen and/or Pelvis (CPT® 71555 and/or CPT® 74185 and/or CPT® 72198)
  - ◆ See **CH-29: Thoracic Aortic** in the Chest Imaging Guidelines.

## **AB-19.2: Imaging for Other Aortic Conditions**

- Chest CTA (CPT® 71275) prior to minimally invasive or robotic surgery.
  - See: & ' 7 U D Q V W K R U D F L F ± , (QF GK LR FF DD WJ LG RL OR VJ  
& ' & D U G L D F 0 5 , ± \$ R U W L F 5 R R W D  
 in the Cardiac Imaging Guidelines
  - ◆ For diverticulitis, see: **AB-2.2: Abdominal Pain**
  - ◆ For mesenteric/colonic ischemia, see: **AB-6: Mesenteric/Colonic Ischemia**

## **AB-20: Bowel Obstruction and Gastroparesis**

<b>AB-20.1: Bowel Obstruction</b>	<b>64</b>
<b>AB-20.2: Gastroparesis</b>	<b>64</b>

### **AB-20.1: Bowel Obstruction**

- Plain X-rays of the abdomen (obstructive series) should be obtained as the initial study in individuals with suspected bowel obstruction.
- CT of the Abdomen and Pelvis with contrast (CPT® 74177) may be used for:
  - ◆ Plain X-rays that are abnormal or equivocal.
  - ◆ High index of suspicion for bowel obstruction (abdominal pain, vomiting, constipation, abdominal distention, failure to pass flatus), especially in individuals with prior history of abdominal surgery, history of malignancy, or individuals with current hernias.<sup>1</sup>
- For bariatric surgery individuals, see: **AB-9.1: Bariatric Surgery**

### **AB-20.2: Gastroparesis**

- Gastric Emptying Study (CPT® 78264) with delayed gastric emptying and one of the following:
  - ◆ Nausea, or vomiting of old food ingested several hours earlier
  - ◆ Bloating
  - ◆ Early satiety, or Postprandial fullness
  - ◆ Nausea, vomiting or recurrent aspiration
  - ◆ Unexplained poor glucose control in diabetes
  - ◆ Gastroesophageal reflux refractory to medical management
  - ◆ Non-ulcer dyspepsia
  - ◆ Retained gastric contents on endoscopy
- Gastric emptying study with small bowel transit (CPT® 78265) can be used in the evaluation of suspected abnormalities in both total and regional times for gastrointestinal transit in small bowel.
- Gastric emptying study with small bowel and colon transit (CPT® 78266) can be used in the evaluation of suspected abnormalities in both total and regional time for gastrointestinal transit to the colon.



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## **AB-21: Diarrhea, Constipation, and Irritable Bowel**

<b>AB-21.1: Acute and Persistent Diarrhea (up to 30 days)</b>	<b>67</b>
<b>AB-21.2: Chronic Diarrhea (more than 30 days)</b>	<b>67</b>
<b>AB-21.3: Constipation</b>	<b>67</b>
<b>AB-21.4: Bloating and/or Irritable Bowel Syndrome</b>	<b>68</b>

### **AB-21.1: Acute and Persistent Diarrhea (up to 30 days)**

- Routine advanced imaging is not supported for acute, or persistent (up to 30 days) uncomplicated, including infectious diarrhea.
- Travel and dysenteric (including bloody) diarrhea should undergo biological assessment and antimicrobial treatment.<sup>9,10,11</sup> (see: **AB-2.1: General Information**)
- CT of the Abdomen and Pelvis with contrast (CPT® 74177) can be used if:
  - ◆ Red Flags (see: **AB-2.1: General Information**)
  - ◆ Suspected ischemia (see **AB-6: Mesenteric/Colonic Ischemia**)
  - ◆ Older (over 50) individuals with significant abdominal pain
  - ◆ Previous gastric bypass
  - ◆ Immunocompromised
  - ◆ Obstruction, toxic megacolon, or perforation suspected

### **AB-21.2: Chronic Diarrhea (more than 30 days)**

- Basic lab work including routine CBC, chemistries, as well as stool tests for pathogens should be done prior to advanced imaging.
  - If diarrhea is watery – a secretory or osmotic etiology should be identified.
  - If diarrhea is bloody, it is inflammatory – requiring colonoscopy.
- CT Abdomen, CT Abdomen and Pelvis, CT Enterography, or MR Enterography, can be considered if both basic lab work and colonoscopy are negative.

### **AB-21.3 Constipation**

- The workup and treatment of constipation usually proceeds with a history and physical followed by empiric medication or dietary trials.
  - ◆ In general, a colonoscopy is performed prior to advanced imaging in a patient presenting with chronic constipation if the alarm symptoms of blood in the stool, anemia, or weight loss are present.
- Advanced imaging in the evaluation of constipation is appropriate as follows:
  - ◆ CT Abdomen/Pelvis with contrast (CPT® 74177) if:
    - Red flags (see: **AB-2.1: General Information**)
    - Concern for obstruction
  - ◆ Defecography for the evaluation of constipation:
    - Defecography can be used in the evaluation of constipation to obtain information regarding the structural causes of outlet dysfunction (e.g. rectal prolapse, rectocele, or enterocele). (See Practice Note).
    - MRI Defecography (CPT® 72195 MRI Pelvis without contrast) can be approved if the following conditions are met:
      - Patient has undergone ano-rectal manometry **and** a balloon-expulsion test, and the results confirm a defecatory disorder, **and** the patient has undergone a barium defecography **and** the results are inconclusive or negative, **and** the patient has failed a trial of biofeedback or other conservative therapy.

- or**
- Balloon expulsion test is normal and there is a need to identify structural lesions
- or**
- To guide planned surgical therapy for rectoceles, cystoceles, or uterine prolapse.

### **Practice Note**

Defecography can be performed either as a barium study with fluoroscopy (conventional defecography or CD), or with MRI (D-MRI). In a comparative study, D-MRI was found to be less diagnostic than CD for diagnosing rectocele and enterocele, but superior in identifying intussusception. Arnold Wald, the lead author of the American College of Gastroenterology's clinical guidelines for the management of ano-rectal disorders concludes (UpToDate, last update May 12, 2016) that while pelvic MR or dynamic MRI can evaluate "global pelvic floor anatomy and sphincter morphology and assess dynamic motion", thus providing "more valuable information without radiation", he concludes that MR and dynamic MR defecography "have uncertain added value compared to standard defecography".

### **AB-21.4: Bloating and/or Irritable Bowel Syndrome**

- Advanced imaging is not needed for suspected or known Irritable Bowel Syndrome (IBS) which is a diagnosis of exclusion with the following symptoms:
  - ◆ Abdominal pain
  - ◆ Change in frequency (diarrhea, constipation, or both) and form of stool
  - ◆ Relief of symptoms with defecation

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## AB-22: GI Bleeding

<b>AB-22.1: GI Bleeding</b>	<b>71</b>
<b>AB-22.2: Small Bowel Bleeding Suspected</b>	<b>71</b>

### **AB-22.1: GI Bleeding**

- Endoscopy for upper GI bleeding as initial evaluation
- Colonoscopy for lower GI bleeding as initial evaluation
- CTA Abdomen (CPT® 74175) or CTA Abdomen and Pelvis (CPT® 74174) or CT Abdomen and Pelvis with contrast (CPT® 74177):
  - ◆ Active bleeding and if endoscopy is negative
  - ◆ If conventional angiography is being considered
  - ◆ If surgery is being considered
  - ◆ If colonoscopy cannot be performed in a patient with GI bleeding
    - CT Abdomen/Pelvis (CPT® 74177) with contrast can be performed instead of CTA
  - ◆ GI bleeding and severe abdominal pain
  - ◆ GI bleeding and hemodynamic instability (shock)
- Gastrointestinal Bleeding Scintigraphy (CPT® 78278) can be considered if there is brisk active bleeding with negative endoscopy
- For TIPS placement, see **AB-26.3: Portal Hypertension**

### **AB-22.2: Small Bowel Bleeding Suspected**

- If small bowel bleeding is suspected as the source of bleeding, and if upper and lower endoscopies are negative:
  - ◆ Video capsule endoscopy (VCE) is performed prior to advanced imaging.
    - VCE is not required prior to advanced imaging if small bowel obstruction or stricture is suspected.
  - ◆ CT Enterography if upper and lower endoscopy are negative and if VCE is negative. If there is a contraindication to CTE, MRE may be performed.
- Iron Deficient Anemia
  - ◆ If the bleeding is determined to be non-gastrointestinal (e.g. hematuria or vaginal bleeding), refer to the appropriate GL for these conditions.
  - ◆ If the source is determined to be gastrointestinal:
    - Upper endoscopy and colonoscopy should be performed, unless contraindicated.
    - Small bowel video capsule endoscopy is next, if endoscopies are negative (unless contraindicated).
    - CT Abdomen and Pelvis w/contrast, CT Enterography, or MR Enterography (if CT enterography is contraindicated) can be performed, if small bowel video capsule endoscopy is negative, or for further evaluation of abnormal video capsule findings. CT Enterography should be considered the test of choice given the lack of motion artifact and its superior spatial resolution.
    - Gastric Mucosa Imaging (CPT® 78261) study to determine if Meckel's diverticulum (must have lower GI bleeding or unexplained anemia with guaiac positive stools).



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## **AB-23: Inflammatory Bowel Disease Rule Out Crohn's Disease or Ulcerative Colitis**

<b>AB-23.1: IBD Rule Out Crohn's Disease or Ulcerative Colitis</b>	<b>74</b>
<b>AB-23.2: Known IBD</b>	<b>74</b>
<b>AB-23.3: Rectal Disease</b>	<b>74</b>
<b>AB-23.4: Primary Sclerosing Cholangitis (PSC)</b>	<b>74</b>
<b>AB-23.5: Special Considerations</b>	<b>75</b>

### **AB-23.1: IBD Rule out Crohn's Disease or Ulcerative Colitis**

- Suspected Crohn's Disease or Ulcerative Colitis
  - ◆ Chronic diarrhea without "Red Flags" (see: **AB-2.1: General Information**) and **AB-21: Diarrhea, Constipation, and Irritable Bowel**)
  - ◆ Any "Red Flag" (see: **AB-2.1: General Information**) can undergo:
    - CT Abdomen and Pelvis w/contrast (CPT® 74177) or CT Enterography (CPT® 74177) or MR Enterography (CPT® 74183 and CPT® 72197).

### **AB-23.2: Known IBD**

- Known Crohn's Disease or Ulcerative Colitis with suspected complications including abscess, perforation, fistula or obstruction, or monitoring response to therapy:
  - ◆ CT Abdomen/Pelvis (CPT® 74177), CT Enterography (CPT® 74177), or MR Enterography (CPT® 74183 and CPT® 72197)
  - ◆ MRI Enterography is the test of choice for the follow up of young patients with IBD given the lack of ionizing radiation and the need for lifetime follow up in many patients.

### **AB-23.3: Rectal Disease**

- Rectal/Peri-Rectal evaluation for fistula.
  - ◆ Endoscopic ultrasound, rectal ultrasound (CPT® 76872), MRI Pelvis without and with contrast (CPT® 72197), or CT Pelvis with contrast (CPT® 72193).<sup>2,3</sup>

### **AB-23.4: Primary Sclerosing Cholangitis (PSC)**

- Primary Sclerosing Cholangitis
  - ◆ MRCP should be considered after an ultrasound excludes biliary obstruction in those:
    - With IBD and elevated liver enzymes (any above normal).
    - Without IBD persistent cholestatic liver tests.
  - ◆ Annual screening for cholangiocarcinoma in individuals with PSC can be done with US or MRI/MRCP.
- SPECT, PET and PET/CT Enterography are considered investigational.

#### ***Practice Notes***

Primary sclerosing cholangitis (PSC) is a chronic liver and biliary tract disease that can result in stricturing and fibrosis of the intra- and extra- hepatic biliary ducts, as well as end-stage liver disease. It is most often associated with inflammatory bowel disease. Biliary obstruction can occur anywhere along the biliary tree, resulting in cholangitis, and there is a high risk of the development of cholangiocarcinoma, which must be strongly considered in individuals with PSC and a dominant stricture, as well as an increased risk of gallbladder polyps and other malignancies. As such, imaging plays an important role in the diagnosis and follow-up of PSC.<sup>6,7,8</sup>

## **AB-23.5: Special Considerations**

- CT of the Abdomen and Pelvis either with or without contrast (CPT® 74177 or CPT® 74176) can be performed prior to endoscopy if requested by the physician who will be performing the endoscopy, especially if there is suspected inflammatory bowel disease.

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## AB-24: Celiac Disease (SPRUE)

### AB-24.1: Celiac Disease

77

## **AB-24.1: Celiac Disease**

- Diagnosis is made by blood testing<sup>1</sup>:
  - ◆ Anti-tissue transglutaminase antibody [anti-tTG], anti-endomysium antibody (EMA), total IgA count, CBC to detect anemia, ESR, C-reactive protein, complete metabolic panel, vitamin D, E, B12 levels.
- Endoscopy and biopsy of the small bowel is performed to confirm the diagnosis if the anti-tTG and EMA tests are positive.
- CT Abdomen and Pelvis with contrast (CPT<sup>®</sup> 74177) or CT Enteroclysis (CPT<sup>®</sup> 74176 or CPT<sup>®</sup> 74177) is appropriate for:
  - ◆ One time study after initial, confirmed diagnosis of Celiac Disease.
  - ◆ Confirmed Celiac disease and the individual is experiencing new or continued weight loss, diarrhea, abdominal distention, or anemia despite adherence to a gluten free diet.

### ***Practice Notes***

Celiac is an autoimmune disease in which the villi of the small intestine are damaged from eating gluten (found in wheat, barley, and rye).

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## AB-25: CT Colonography (CTC)

AB-25.1: CTC

79

## **AB-25.1: CTC**

Certain payers consider CTC investigational and their coverage policies will take precedence over eviCore guidelines with either requested CTC (CPT® 74263 or CPT® 74261).

- Screening CTC (CPT® 74263) for colorectal cancer<sup>1,2,3</sup> can be performed as follows, unless one of the following has been completed:
  - FIT-DNA (multi-targeted stool DNA test) within the last 3 years. See Lab Management Guidelines: **ColoGuard Screening for Colorectal Cancer**.
  - Colonoscopy within the last 10 years.
  - This coverage may vary according to health plan/payer policies.
  - ◆ Every 5 years in average-risk non-African American individuals ages 50 to 75 (average risk is defined as no previously diagnosed colorectal cancer, colonic adenomas, or inflammatory bowel disease involving the colon)
  - ◆ Screening CTC can be performed in individuals between 76 to 85 if there is no history of a previously negative colonoscopy or CTC
  - ◆ Screening CTC can be performed in African-Americans beginning at age 45
  - ◆ Individuals with a SINGLE first-degree relative diagnosed at age > 60 years with colorectal cancer or an advanced adenoma can be screened with CTC beginning at age 40. (If there are 2 or more first degree relatives at any age with CRC or an advanced adenoma, or a first degree relative < 60, the patient should be screened via colonoscopy, not CTC).
- Diagnostic CTC (CPT® 74261, without contrast or CPT® 74262, with contrast, including non-contrast images if performed) can be used in:
  - ◆ Failed conventional colonoscopy (e.g. due to a known colonic lesion, structural abnormality, or technical difficulty), and/or
  - ◆ Conventional colonoscopy is medically contraindicated. Contraindications may include:<sup>4</sup>
    - Coagulopathy
    - Intolerance to sedation
    - Elderly greater than or equal to 80 years of age
    - Recent (within the last 60 days) myocardial infarction (MI)

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## **AB-26: Cirrhosis and Liver Screening for Hepatocellular Carcinoma (HCC); Ascites and Portal Hypertension**

<b>AB-26.1: Cirrhosis and Liver Screening for HCC</b>	<b>81</b>
<b>AB-26.2: Ascites</b>	<b>82</b>
<b>AB-26.3: Portal Hypertension</b>	<b>82</b>



## **AB-26.1: Chronic Liver Disease, Cirrhosis and Screening for HCC**

- US every 6 months in the presence of chronic liver disease, regardless of etiology
  - ◆ If liver nodule identified:
    - Less than 1 cm
      - Repeat US in 3 months, then every 3 to 6 months.
      - If stable for 2 years, then return to US every 6 months screening.
    - Greater than or equal to 1 cm
      - Multiphase CT (either CPT® 74160 or CPT® 74170)<sup>9</sup> or MRI (CPT® 74183) should be performed
      - If not characteristic of HCC, repeat CT or MRI or consider biopsy.
      - If second advanced imaging is not diagnostic – then consider biopsy.
- Advanced imaging may be appropriate if the US is technically limited by such factors as obesity, intestinal gas, or chest wall deformity.
  - ◆ Ultrasound requests can be CPT® 76700 or CPT® 76705.
- For negative US with AFP > 20 AND a > 2X increase in AFP from the previous low point within the past year:
  - ◆ MRI abdomen (CPT® 74183) or CT abdomen (CPT® 74170) can be approved, and if negative for a hepatic lesion, follow-up imaging resumes with US, unless further increases in AFP are documented.
- Further studies are needed to assess the value of Contrast-Enhanced US (CEUS) in this setting.

### ***Practice Note***

When performed for liver lesion evaluation, a multiphase CT protocol may include non-contrast imaging as well as arterial, portal venous, and delayed-phase post-contrast imaging. However, these protocols do not always require non-contrast imaging which may not provide additional information in many scenarios. Therefore, a multiphase CT for liver lesion evaluation can be requested as CPT® 74160 (abdominal CT with contrast) or CPT® 74170 (abdominal CT without and with contrast).

The American Association for the Study of Liver Diseases (AASLD) revised its guidelines with respect to surveillance for HCC in patients with cirrhosis in 2017. The recommended algorithm now includes either US alone or US with serum AFP every 6 months. It should be noted that “modification of this surveillance strategy based on the etiology of liver diseases or risk stratification models cannot be recommended at this time.”<sup>7</sup>

While AFP can be used in conjunction with US, its significance is controversial, and it is unclear that the use of US and AFP, as opposed to US alone improves survival. No specific cut-off value for AFP is endorsed by the AASLD as an indication for more advanced imaging, which are based solely on US findings. However, many specialists continue to use AFP as part of surveillance. In an effort to address this question, Cheng, et al<sup>8</sup> performed a retrospective analysis of 1597 patient to compare US alone with US and AFP. Their findings suggest that an AFP cut-off of 20 ng/ml accompanied with a >

2X increase in the AFP level from its nadir (low point) within the previous year produced a significant increase in sensitivity (with a very small decrease in specificity). The sequential increase in AFP value is important, since absolute values in cirrhosis may vary depending on the degree of inflammation.

### **AB-26.2: Ascites**

- All initial evaluations require Abdominal Ultrasound (CPT® 76700 or CPT® 76705) with diagnostic paracentesis to determine the need for advanced imaging.

### **AB-26.3: Portal Hypertension**

- All initial evaluations require abdominal US (Duplex Doppler US of the liver and upper abdomen) to assist in determining the cause (pre-hepatic, intrahepatic pre-sinusoidal, and post-hepatic; portal vein or hepatic vein thrombosis) prior to TIPS (transjugular intrahepatic portosystemic shunt) or prior to advanced imaging
- TIPS advanced imaging
  - ◆ Multiphase CT Abdomen (CPT® 74160 or CPT® 74170), multiphase CTA Abdomen (CPT® 74175), multiphase MRA Abdomen (CPT® 74185), or MRI Abdomen liver protocol (CPT® 74183) may be indicated when surgical or radiologic interventions are planned.
  - ◆ US is usually the first study to evaluate the portal circulation prior to TIPS placement.
  - ◆ Follow-up scanning is important and is usually done by US with color Doppler Imaging.
  - ◆ CT or MRI is used to evaluate stent patency if preceded by an indeterminate US, or if there is a negative US with clinical signs of worsening portal hypertension.
- Certain requests are made for advanced imaging to evaluate an individual with cirrhosis for the presence of esophageal varices. In general, and in the absence of a contraindication, endoscopy should be performed in individuals to assess for the presence of varices, and should be repeated in 1 to 3 year intervals, depending on the findings and circumstances.
- Fatty Liver
  - ◆ See **AB-29: Liver Lesion Characterization**
- Liver Transplant:
  - ◆ See: **AB-42.1: Liver Transplant, Pre-Transplant**

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# AB-27: MR Cholangiopancreatography (MRCP)

## AB-27.1: MRCP

85

MRCP is an alternative to endoscopic retrograde cholangiopancreatography (ERCP) for evaluating the biliary system and pancreatic ducts. It should not be used if there is a high probability of biliary obstruction based on CT or endoscopic ultrasound (EUS) and if therapeutic intervention will likely be needed. In this situation ERCP should be used.<sup>1</sup>

### **AB-27.1: MRCP**

- Rule out pathology in the biliary system or pancreatic duct.
  - ◆ Examples include:
    - Suspected or known gallstone pancreatitis
    - Suspected biliary pain
    - Pancreatic pseudocyst (for preoperative cyst drainage and/or pancreatic trauma with suspected duct injury)
    - Pancreatic trauma
    - Recurrent acute pancreatitis with no known cause
- Preoperative planning
- Evaluation of congenital anomaly of pancreaticobiliary tract.
- Altered biliary anatomy that precludes ERCP (e.g. post-surgical distorted anatomy).
- Failed ERCP in an individual who needs further investigation.
- Evaluation of pancreaticobiliary anatomy proximal to a biliary obstruction that cannot be opened by ERCP.
- ERCP is indicated but is not available, is contraindicated, or is expected to be difficult.
  - ◆ Examples include: coagulopathy, severe cardiopulmonary disease, allergy to iodinated contrast, distorted anatomy, and pregnant individuals.
- Requests for 3D rendering do not need to be sent to MD for review when criteria are met for MRCP as indicated above.

#### ***Coding Notes***

Code assignment for MRCP

- There is no CPT® code that specifically describes MRCP.
- To report an MRCP, select **one** of these codes: CPT® 74181 **or** CPT® 74183. The specific MRI code should be selected based on whether or not intravenous contrast was administered.
- There is a Level II HCPCS code for MRCP, S8037 (Magnetic resonance cholangiopancreatography).
  - ◆ S8037 (and any other code beginning with the letter “S”) is not payable by Medicare. Some other payers may accept this code.
- Reporting/billing a second MRI code, to represent the “MRCP portion” of the study is not supported.

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**AB-28: Biliary Tract Disease Jaundice**

<b>AB-28.1: Jaundice</b>	<b>88</b>
<b>AB 28.2: Gallbladder Polyps</b>	<b>88</b>

### **AB-28.1: Jaundice**

- Ultrasound<sup>1</sup> (CPT<sup>®</sup> 76700 or CPT<sup>®</sup> 76705) is the preferred initial imaging study to visualize the biliary ductal system when pain is present. Ultrasound often demonstrates the level and cause of any obstruction.
- Abdomen CT<sup>2</sup> without and with contrast (CPT<sup>®</sup> 74170) or Abdomen CT with contrast (CPT<sup>®</sup> 74160) should be considered in the following scenarios:
  - ◆ If non-diagnostic or equivocal ultrasound
    - e.g. large amounts of intestinal gas
  - ◆ Individual is obese.
  - ◆ Painless jaundice
  - ◆ Acute abdominal pain and one of the following: fever, previous biliary surgery, or known cholelithiasis.
  - ◆ If there is high pretest probability of obstruction due to malignancy.<sup>1</sup>
- MR Cholangiopancreatography (MRCP) (See: **AB-27: MR Cholangiopancreatography (MRCP)**) may be used to assess the extent and cause of intrahepatic bile duct obstruction:
  - ◆ Suggested by either ultrasound or CT if further characterization is warranted.
  - ◆ Contraindications to the use of IV contrast for CT imaging.

### **AB 28.2: Gallbladder Polyps**

- Incidentally identified polyps less than 6mm in size do not require further follow-up<sup>3,4</sup>
- Polyps 6 to 9 mm:
  - ◆ Ultrasound (CPT<sup>®</sup> 76700 or CPT<sup>®</sup> 76705) can be repeated in 6 months, and if no change in size or morphology, repeat US in another 12 months. If no changes, no additional imaging.
- Polyps of any size associated with primary sclerosing cholangitis:
  - ◆ Surgical consultation is appropriate
  - ◆ In this setting, CT (CPT<sup>®</sup> 74170) may be approved for further characterization of the lesion and for surgical planning.
- Advanced imaging for the evaluation of gallbladder polyps can be considered in the following circumstances:
  - ◆ CT abdomen (CPT<sup>®</sup> 74160 or CPT<sup>®</sup> 74170) if:
    - Age > 60
    - Polyp noted to have a sessile morphology or is suspicious for malignancy in the radiology report.
    - Polyps > 10mm
  - ◆ Follow-up imaging with CT can be done at 6 months, and then at another 12 months.



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# AB-29: Liver Lesion Characterization

## AB-29.1: Liver Lesion Characterization 91

**AB-29.1: Liver Lesion Characterization**

- No further diagnostic imaging is needed if:
  - ◆ Simple cyst
  - ◆ Fatty liver (steatosis) without findings suspicious for a focal liver lesion(s)<sup>7, 8</sup>
- Ultrasound<sup>1</sup>(CPT® 76700 or CPT® 76705) or ultrasound with contrast (C9744) should be considered:
  - ◆ For suspected hepatomegaly
  - ◆ For suspected simple cyst
  - ◆ For initial study if suspect liver lesion without history of malignancy
- Ultrasound with contrast (CEUS, C9744) is only considered, when MRI or CT could not be performed, and the clinical situation requires ultrasound contrast (C9744) to further delineate the nature of the lesion.<sup>13,14</sup>
- See: **AB-26: Cirrhosis and Liver Screening for Hepatocellular Carcinoma (HCC); Ascites and Portal Hypertension**
- Abdominal MRI or CT are the best studies to evaluate an indeterminate liver lesion (ACR 2014)<sup>11,12</sup>

Liver Lesion	Initial Imaging	Repeat Imaging	Practice Notes
Lesion with Chronic Liver Disease (see Cirrhosis) <sup>9</sup>	See Cirrhosis ( <b><u>AB-26</u></b> )	See Cirrhosis ( <b><u>AB-26</u></b> )	
Liver lesion with significant risk factors such as a history of malignancy, elevated tumor markers, or unintentional weight loss <sup>9</sup>	Multiphase CT (CPT® 74160 or CPT® 74170) or Liver MRI (MRI Abdomen [CPT® 74183])	If indeterminate, follow-up CT or MRI every 6 months for 2 years, and then annually, to establish any growth patterns and assess for malignant transformation.	
Incidental lesions on US or CT without a dedicated liver protocol <sup>9</sup>	Multiphase CT (CPT® 74160 or CPT® 74170) or Liver MRI (MRI Abdomen [CPT® 74183])	If indeterminate, follow-up CT or MRI every 6 months for 2 years, and then annually, to establish any growth patterns and assess for malignant transformation.	

<p>Suspected Hepatic Adenoma<sup>9</sup></p>	<p>MRI Abdomen (CPT<sup>®</sup> 74183) is considered the best technique for characterization.</p>	<p>Follow-up CT or MRI every 6 months for 2 years, and then annually, to establish any growth patterns and assess for malignant transformation.</p>	<p>Risks include spontaneous rupture, and rarely, malignant transformation. Almost all cases of rupture occur in lesions &gt; 5 cm in size. HCAs &lt; 5 cm are generally managed conservatively, with discontinuation of OCPs or anabolic steroids.</p>
<p>Hepatic Hemangioma (HH)<sup>9</sup></p>	<p>Multiphase CT (CPT<sup>®</sup> 74160 or CPT<sup>®</sup> 74170) or Liver MRI (MRI Abdomen [CPT<sup>®</sup> 74183]) are reliable in establishing the diagnosis.</p>	<p>Follow-up imaging is not required if the advanced imaging study demonstrates classic features of hemangioma.</p> <p>The exception is giant hemangiomas (&gt; 4 cm) in which follow up ultrasound can be done in 6 to 12 months, and if there is no change in size, no further follow up is indicated, unless it becomes symptomatic.</p>	<p>Most common benign hepatic tumor.</p>
<p>Focal Nodular Hyperplasia (FNH)<sup>9</sup></p>	<p>MRI (CPT<sup>®</sup> 74183) or Multiphase CT (CPT<sup>®</sup> 74160 or CPT<sup>®</sup> 74170) to confirm a diagnosis of FNH.</p> <p>The use of Eovist contrast is often diagnostic in differentiating FNH from other lesions seen on MRI or CT</p>	<p>FNH based on prior imaging characteristics or biopsy, and are <b>not</b> using oral contraceptives, do not require follow-up imaging.</p> <p>Follow-up annual US for 2 to 3 years is appropriate in women diagnosed with FNH who are continuing to use OCPs.</p> <p>Follow-up with CT (CPT<sup>®</sup> 74160 or CPT<sup>®</sup> 74170) or MRI (CPT<sup>®</sup> 74183) can be done if the lesion is not adequately visualized on US.</p>	
<p>Hepatic cysts<sup>9</sup></p>	<p>US shows internal septations, fenestrations, calcifications, irregular walls, as well as the presence of daughter cysts should be evaluated with CT or MRI for features of biliary cystadenoma or a hydatid cyst.</p>	<p>Asymptomatic, simple cysts do <b>not</b> require additional follow-up.</p>	<p>Simple hepatic cysts are not felt to be precursors to biliary cystadenomas or cystadenocarcinomas. The vast majority of cysts are benign.</p>

- Other indications for MRI Abdomen without and with contrast (CPT® 74183), CT Abdomen without and with contrast (CPT® 74170), or CT with contrast (CPT®74160):
  - ◆ Percutaneous liver biopsy is to be considered if imaging is atypical or inconclusive.<sup>4</sup>
  - ◆ Diagnosis for HCC is done with imaging, biopsy is not needed for diagnosis.<sup>5</sup>
  - ◆ Suspected liver metastases; see **ONC-31.2: Liver Metastases**.
  - ◆ Fatty liver on US with a focal liver lesion(s).<sup>7</sup>
- Further evaluation
  - ◆ MRI Abdomen without and with contrast (CPT® 74183) can be considered if an initially performed CT Abdomen without and with contrast (CPT® 74170) or CT with contrast (CPT® 74160) is equivocal.
  - ◆ MRA Abdomen (CPT® 74185) or CTA Abdomen (CPT® 74175) for preoperative study in individuals with large hemangiomas or adenomas considered for resection.
  - ◆ Nuclear medicine imaging of the liver (CPT® 78201, CPT® 78202, CPT® 78205, CPT® 78206, CPT® 78215, CPT® 78216) are rarely performed, but can be considered when ultrasound, CT, and MRI are unavailable or contraindicated with:<sup>10-11</sup>
    - Evaluation of liver mass, trauma, or suspected focal nodular hyperplasia (FNH).
    - Differentiation of hepatic hemangioma from FNH.
    - Diffuse hepatic disease or elevated liver function tests.

### Practice Notes

If fatty infiltration is demonstrated by US, neither CT nor MRI can distinguish between steatosis and steatohepatitis. Clinically, additional workup of fatty liver is biochemical, serologic, and may include a liver biopsy as potential etiologies are sought.<sup>7,8</sup>

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## **AB-30: Elevated Liver Function (LFT) Levels**

### **AB-30.1: Elevated Liver Function Levels**

**96**

## **AB-30.1: Elevated Liver Function Levels**

- The standard laboratory tests commonly referred to as “LFTs” include bilirubin, alkaline phosphatase (alk phos or ALKP), aspartate transaminase (AST), alanine transaminase (ALT), and gamma-glutamyl transferase (GGT). There are 4 major patterns of elevation which affect workup:
  - ◆ hepatocellular (AST and ALT disproportionately elevated to ALKP.)
  - ◆ cholestatic (ALKP elevated disproportionately to AST and ALT)
  - ◆ mixed pattern (ALKP, AST, and ALT all elevated)
  - ◆ isolated hyperbilirubinemia (elevated bilirubin and normal ALKP, ALT and AST)
- For elevated AST and ALT (> 33 IU/l for males, > 25 IU/l for females) and other LFTs are normal:
  - ◆ < 2X normal
    - Repeat lab after 3 weeks and discontinuation of medications associated with elevated LFTs (such as statins, niacin, sulfa, rifampin, tetracycline, estrogen) if applicable.
    - If LFTs remain elevated: Abdominal US (CPT® 76700 or CPT® 76705)
  - ◆ 2 to 15X normal:
    - Abdominal US (CPT® 76700 or CPT® 76705)
  - ◆ > 15X normal :
    - Abdominal US with Doppler(CPT® 76700 or CPT® 76705 and CPT® 93975)
- Elevated alkaline phosphatase level, and other LFTs are normal
  - ◆ Etiology of elevated ALKP should be determined prior to imaging.
    - If isolated ALKP elevation, GGT should be obtained for confirmation of hepatic etiology, prior to imaging. If ALKP is elevated with other LFTs, no confirmatory test is necessary.
    - For confirmed hepatic etiology of elevated ALKP, RUQ ultrasound (CPT®76705)
      - If dilated biliary ducts on US: MRCP
    - If no dilated biliary ducts: anti-mitochondrial antibody (AMA) should be checked prior to advanced imaging.
      - if AMA is negative, and ALKP > 2X ULN: MRCP
      - if AMA is negative, and ALKP 1 to 2X ULN: observe for 6 months, If ALKP remains elevated: MRCP
- Isolated elevated bilirubin (no other LFTs elevated).
  - ◆ An isolated elevated bilirubin should be fractionated into direct (conjugated) and indirect (unconjugated) levels.
    - If elevation is unconjugated, and no other LFT elevations: No advanced imaging.
    - If elevation is conjugated: RUQ ultrasound
      - If biliary ducts dilated: MRCP
      - If biliary ducts not dilated: check AMA prior to advanced imaging.
        - If negative and elevation persists or is unexplained, MRCP or liver biopsy can be considered.



- For patients with elevated LFTs and suspicion of sclerosing cholangitis, such as those with IBD, see: **AB-23.4: Primary Sclerosing Cholangitis (PSC)**.
- For patients with elevated LFTs and history of underlying malignancy, please refer to the specific oncology guidelines, when appropriate.
- Requests for additional advanced imaging (CT, MRI, etc.) are based on the US or MRCP results, as appropriate to the finding (for example, if a lesion is identified that needs further characterization, refer to liver lesion imaging as per **AB-29.1: Liver Lesion Characterization**).

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**AB-31: Pancreatic Lesion**

<b>AB-31.1: Pancreatic Lesion</b>	<b>99</b>
<b>AB-31.2: Pancreatic Lesion (Incidental Pancreatic Cyst)</b>	<b>99</b>
<b>AB-31.3: Pancreatic Lesion (Incidental Pancreatic Mass or Suspected Metastatic Disease to Pancreas)</b>	<b>100</b>

### **AB-31.1: Pancreatic Lesion**

Screening studies for pancreatic cancer can be considered in those who are considered high risk in the following guideline: **ONC-13: Pancreatic Cancer** in the Oncology Imaging Guidelines.

- These guidelines do not pertain to solid papillary lesions, cystic adenocarcinoma, neuroendocrine tumors, or “main duct” intraductal papillary mucinous neoplasms due to its significantly higher risk of malignancy (compared to the more common side-branch IPMN, to which these guidelines do apply).
- It should be noted that the preferred imaging for the evaluation of pancreatic cystic lesions is MRI Abdomen (CPT® 74183) and/or MRCP due to its ability to better characterize the relationship of the cyst to the pancreatic duct. If a previous US or CT Abdomen has been performed, a request for an MRI can be approved to better characterize the lesion, without reference to the timeframe for follow-up imaging.
- Advanced imaging is no longer required if:
  - ◆ No significant change in the characteristics of the cyst after 5 years of surveillance or if the individual is no longer a surgical candidate.
  - ◆ No routine surveillance if there was no evidence of high-grade dysplasia or malignancy in the surgically resected cyst.

### **AB-31.2: Pancreatic Lesion (Incidental Pancreatic Cyst)**

- Pancreatic cysts < 3 cm without a solid component or a dilated pancreatic duct:
  - ◆ MRI Abdomen w/o and with contrast surveillance in 1 year, and then every 2 years for a total of 5 years if there is no change in size or characteristics. Surveillance is then discontinued after 5 years.
- Pancreatic cysts with at least 2 high risk features, such as (1) size  $\geq$  3 cm, (2) dilated main pancreatic duct, or the presence of an (3) associated solid component.
  - ◆ Endoscopic ultrasound-fine needle aspiration.
  - ◆ If the EUS-FNA results are not concerning, MRI surveillance should be done at 1 year, and then every 2 years to ensure no change in risk of malignancy. Requests for earlier imaging for individuals in this category can be considered.
- Concerning Features:
  - ◆ Significant changes in the characteristics of the cyst, including the development of a solid component, increasing size of the pancreatic duct and/or diameter  $\geq$  3 cm, are indications for EUS-FNA.
  - ◆ Both a solid component and a dilated pancreatic duct or other concerning features on EUS and FNA should undergo surgery to reduce the risk of mortality from carcinoma.
- Post-Surgical Surveillance after Removal of a Pancreatic Cyst.
  - ◆ MRI Abdomen every 2 years if there was invasive cancer or dysplasia in the surgically resected cyst.

- See **AB-27: MR Cholangiopancreatography (MRCP)** for coding guidelines for MRCP.

### **AB-31.3: Pancreatic Lesion (Incidental Pancreatic Mass or Suspected Metastatic Disease to Pancreas)**

- CT Abdomen with contrast with dual phase imaging (CPT® 74160), or CT Abdomen without and with contrast (CPT® 74170) (dedicated pancreatic protocol) since the majority of pancreatic tumors will enhance following IV contrast).<sup>2</sup>

#### ***Practice Notes***

In April, 2015, the American Gastroenterological Association (AGA) issued a technical review on the diagnosis and management of asymptomatic neoplastic pancreatic cysts. The AGA notes that these guidelines are conditional as the level of evidence is fairly low, but are advocated as a rational approach based on current knowledge and a very extensive review of the literature.

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## AB-32: Pancreatic Pseudocysts

### AB-32.1: Pancreatic Pseudocysts

102

### **AB-32.1: Pancreatic Pseudocysts**

- CT of the Abdomen with contrast (CPT® 74160), or without and with contrast (CPT® 74170),<sup>1</sup> or MRI Abdomen without and with contrast (CPT® 74183)
  - ◆ Minimal symptoms - every two weeks, up to six weeks total. Thereafter, every 4 weeks.
  - ◆ Anytime symptoms worsen, including development of ascites or pleural effusion, increasing serum amylase, or if drainage of the cyst is planned.
- MRCP for preoperative planning cyst drainage:
  - ◆ See **AB-27: MR Cholangiopancreatography (MRCP)** for coding guidelines for MRCP
- MRCP for pancreatic trauma with suspected duct injury or pseudocyst.

#### ***Practice Notes***

Endoscopic ultrasound has increasingly become an important imaging modality in evaluating pseudocysts.

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## AB-33: Pancreatitis

### AB-33.1: Pancreatitis

104

### **AB-33.1: Pancreatitis**

- Ultrasound<sup>2</sup> (CPT<sup>®</sup> 76700 or CPT<sup>®</sup> 76705) is the first study to evaluate:
  - ◆ Mild and uncomplicated symptoms of epigastric pain described as uncomfortable without guarding to rule out gallstone disease.
  - ◆ If ultrasound suggests uncomplicated pancreatitis, then advanced imaging is not necessary. For complicated pancreatitis, see below.
- CT Abdomen<sup>2</sup> with contrast (CPT<sup>®</sup> 74160), without contrast (CPT<sup>®</sup> 74150) or without and with contrast (CPT<sup>®</sup> 74170).
  - ◆ Suspected complications including peripancreatic effusions, pseudocysts, abscess, and pancreatic necrosis.
  - ◆ Lipase and/or amylase greater than or equal to three times the upper limit of normal and *any one* of the following:
    - Fever (101 degrees or greater)
    - Elevated WBC as per the testing laboratory's range
    - Mass
    - No improvement with medical therapy
  - ◆ Suspected pancreatitis and ultrasound findings do not explain symptoms (gallstones, common duct, etc.).
  - ◆ Plain abdominal X-ray (KUB) and ultrasound (CPT<sup>®</sup> 76700 or CPT<sup>®</sup> 76705) are not characteristic and diagnostic in known chronic pancreatitis.
- MRI Abdomen without and with contrast<sup>2</sup> (CPT<sup>®</sup> 74183) is considered if:
  - ◆ The clinical indications for CT are met or equivocal, but there are contraindications for its use.
- MR Cholangiopancreatography<sup>1,2</sup> can be considered if:
  - ◆ Suspected gallstone pancreatitis to screen for those individuals who would benefit from ERCP.
  - ◆ Recurrent, acute pancreatitis with no known cause.
  - ◆ Evaluation of individuals with suspicion of pancreatic ductal anomalies that may predispose them to pancreatitis.
  - ◆ Plain abdominal x-ray (KUB) and ultrasound (CPT<sup>®</sup> 76700 or CPT<sup>®</sup> 76705) are not characteristic and diagnostic in known chronic pancreatitis and the MRI findings will affect management decisions.
  - ◆ MRCP - See: **AB-27: MR Cholangiopancreatography (MRCP)** for coding guidelines for MRCP

#### ***Practice Notes***

The diagnosis of acute pancreatitis is often made by fulfilling two of the following three (3) conditions<sup>1</sup>:

1. Typical pain (acute onset of epigastric pain radiating to the back that is persistent without relief, frequently associated with nausea and vomiting, and associated with severe epigastric tenderness and/or guarding, and/or fever).
2. Lipase and/or amylase greater than or equal to three times the upper limit of normal.
3. Typical characteristics of pancreatitis on CT Abdomen.



Chronic pancreatitis that is **suspected** as evidenced by recurrent characteristic pancreatic pain, symptoms of maldigestion/malabsorption that improve with digestive enzymes, does not require the use of advanced imaging.<sup>1</sup>

For known chronic pancreatitis including hereditary pancreatitis, there is no evidence-based data supporting screening.<sup>1</sup>

Acute pancreatitis is divided clinically into non-severe (previously called mild) and severe pancreatitis.<sup>3</sup>

- Non-severe pancreatitis represents interstitial edematous pancreatitis, and severe pancreatitis manifests as necrotizing pancreatitis or as pancreatitis associated with organ failure.
- Serum enzyme levels do not correlate with the severity of the disease
- Clinical scoring systems and imaging tests have been advocated to classify individuals in terms of severity.
- The diagnosis may be overlooked in the absence of typical enzyme elevation; in some individuals, acute pancreatitis may be present in the absence of enzyme abnormalities.

### References

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**AB-34: Spleen**

<b>AB-34.1: Spleen</b>	<b>107</b>
<b>AB-34.2: Trauma - Spleen</b>	<b>107</b>

### **AB-34.1: Spleen**

- Incidental splenic findings on US:
  - ◆ CT abdomen (CPT® 74170) or MRI abdomen (CPT® 74183) can be obtained.
- Incidental splenic findings on CT or MRI:
  - ◆ Imaging is diagnostic of a benign lesion (simple cyst, hemangioma) or characteristics are benign-appearing (homogenous, low attenuation, no enhancement, smooth margins):
    - No follow-up imaging.
  - ◆ Imaging characteristics are not diagnostic:
    - Prior imaging available:
      - One year stability: no follow up imaging
      - Lack of stability: consider MRI if not done, biopsy, or PET.
    - No prior imaging:
      - No known malignancy:
        - Suspicious imaging features: (suggesting possible malignancy)
          - MRI if not already done or biopsy
          - If MRI still inconclusive and biopsy is not feasible then PET can be considered
        - Indeterminate imaging features: (equivocal but not suspicious for malignancy)
          - Follow up MRI in 6 and 12 months.
      - Known malignancy:
        - < 1 cm: follow up MRI in 6 and 12 months.
        - > 1 cm: consider MRI if not done, biopsy
          - If MRI still inconclusive and biopsy is not feasible then PET can be considered

(See diagnosis-specific in **Oncology Imaging Guideline**).
- Clinically detected splenomegaly
  - ◆ Abdominal US (CPT® 76700 or CPT® 76705) should be the first imaging study to evaluate splenic size.
  - ◆ If splenomegaly is confirmed, the following evaluation is indicated prior to advanced imaging:
    - CBC, evaluation of the peripheral blood smear, LFTs, UA, CXR, HIV testing.
      - If the etiology of the splenomegaly remains unexplained, CT Abdomen without and with contrast or with (CPT® 74170 or CPT® 74160) can be performed.
      - MRI Abdomen (CPT® 74183) can be considered for pregnant patients, or individuals with iodinated contrast allergy.
  - ◆ Nuclear medicine imaging of the liver/spleen (CPT® 78201, CPT® 78202, CPT® 78205, CPT® 78206, CPT® 78215 and CPT® 78216) is rarely performed, but can be considered if CT and MRI are contraindicated, as well as for evaluation of an accessory spleen.

## **AB-34.2: Trauma - Spleen**

- Ultrasound of the Abdomen (CPT® 76700 or CPT® 76705) and Pelvis (CPT® 76856 or CPT® 76857) or CT<sup>3,4,5</sup> of the Abdomen and Pelvis without and with contrast (CPT® 74178) or with contrast (CPT® 74177) are indicated in individuals with blunt abdominal trauma with suspected splenic rupture or in individuals with penetrating trauma to the left upper quadrant. See: **AB-10: Blunt Abdominal Trauma**

### ***Practice Notes***

Splenomegaly is usually the result of systemic disease, and diagnostic studies are directed toward identifying the causative disease. Complete blood count with differential, LFT's, and peripheral blood smear examination are often performed prior to considering advanced imaging. There is no evidence-based data to support performing serial CT or MRI to follow individuals with incidental splenic lesions.

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## **AB-35: Indeterminate Renal Lesion**

### **AB-35.1: Indeterminate Renal Lesion**

**110**

For acute flank pain, rule out renal stone, see: **AB-4: Flank Pain, Rule Out or Known Renal/Ureteral Stone**

### **AB-35.1: Indeterminate Renal Lesion**

Initial Imaging (Step 1)	Secondary Imaging (Step 2)	Tertiary Imaging or Biopsy (Step 3)
Ultrasound (CPT®.76770 <b>or</b> CPT®.76775); <b>or</b> CT Abdomen without and with contrast (CPT®.74170)	No further imaging if: <ul style="list-style-type: none"> <li>➤ Simple cyst or other benign lesion (e.g. Bosniak 1 or 2, angiomyolipoma without calcifications); <b>or</b></li> <li>➤ Biopsy makes the definitive diagnosis of angiomyolipoma, metanephric adenoma, <b>or</b> focal infection</li> </ul> Otherwise, imaging as follows: <ul style="list-style-type: none"> <li>➤ CT Abdomen without and with contrast (CPT®.74170); <b>or</b></li> <li>➤ MRI Abdomen without and with contrast (CPT®.74183)</li> </ul>	No further imaging if: <ul style="list-style-type: none"> <li>➤ Benign on CT/MRI (e.g. Bosniak 1 or 2, or angiomyolipoma without calcifications) <b>or</b></li> <li>➤ Biopsy diagnosis of angiomyolipoma or focal infection</li> </ul> Follow-up imaging with original diagnostic modality (US, CT or MRI) 6 to 12 months, then annually for 5 years if: <ul style="list-style-type: none"> <li>➤ Indeterminate on either CT/MRI or biopsy <b>or</b></li> <li>➤ Biopsy nonmalignant</li> </ul>

#### ***Practice Notes***

The most common renal mass is a cyst. The Bosniak Classification may be helpful to evaluate renal cysts. This classification relates CT renal cyst characteristics and their relationship with malignancy and need for follow-up. See the descriptions in the chart on the next page.

Bosniak Class	Characteristic	Work-Up	% Malignant
<b>Bosniak 1</b>	Simple cyst, anechoic, imperceptible wall, rounded	Nil	~0
<b>Bosniak 2</b>	Minimally complex, single thin (< 1mm) septations, thin Ca <sup>++</sup> ; non-enhancing high-attenuation renal lesions of less than 3 cm are also included in this category; these lesions are generally well marginated.	Nil	~0
<b>Bosniak 2F</b>	Minimally complex. <ul style="list-style-type: none"> <li>➤ Increased number of septa, minimally thickened or enhancing septa or wall</li> <li>➤ Thick Ca<sup>++</sup>,</li> <li>➤ Hyperdense cyst that is: <ul style="list-style-type: none"> <li>◆ &gt; 3 cm diameter, mostly intrarenal (less than 25% of wall visible); no enhancement</li> </ul> </li> </ul>	Ultrasound / CT follow up	~5
<b>Bosniak 3</b>	Indeterminate, thick or multiple septations, mural nodule, hyperdense on CT (see 2F)	Partial nephrectomy or RF ablation, in elderly/poor surgical risk	~50
<b>Bosniak 4</b>	Clearly malignant, solid mass with cystic spaces	Partial/total nephrectomy	>80

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## AB-36: Renal Failure

### AB-36.1: Renal Failure

114

### **AB-36.1: Renal Failure**

- Ultrasound (CPT® 76770 or CPT® 76775) of the kidney and bladder, preferably with Doppler (CPT® 93975 or CPT® 93976), is the preferred imaging study for in the evaluation of acute or chronic renal failure<sup>1</sup>.
- MRA Abdomen (CPT® 74185) can be utilized when there is suspected<sup>1</sup>:
  - ◆ Renal vein/caval thrombosis
  - ◆ Renal artery stenosis as cause of renal failure
  - ◆ MRA with contrast may be contraindicated in severe renal failure or patients on dialysis due to the risk of gadolinium agents in causing nephrogenic systemic sclerosis.
- CT Abdomen without contrast (CPT® 74150) is not needed except to rule out ureteral obstruction or retroperitoneal mass.<sup>1</sup>
- Nuclear renal imaging (CPT® 78701, CPT® 78707, CPT® 78708, CPT® 78709) can be considered for any of the following:<sup>3,4</sup>
  - ◆ Renal transplant follow-up
  - ◆ Kidney salvage vs. nephrectomy surgical decisions
  - ◆ Acute renal failure with no evidence of obstruction on recent ultrasound.
  - ◆ Chronic renal failure to estimate prognosis for recovery.
- Nuclear medicine studies of the kidney (CPT® 78700 or CPT® 78701) can be considered for evaluation of the following anatomic renal anomalies:<sup>3</sup>
  - ◆ Suspected horseshoe kidney
  - ◆ Suspected solitary or ectopic kidney
- Peritoneal-venous shunt patency study (CPT® 78291) is considered for evaluation of shunt patency and function in an individual with ascites.

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## **AB-37: Renovascular Hypertension**

### **AB-37.1: Renovascular Hypertension**

**116**

### **AB-37.1: Renovascular Hypertension**

- MRA without or with contrast (CPT® 74185) or CTA with contrast (CPT® 74175) of the Abdomen if<sup>1</sup>:
  - ◆ The individual is resistant to three blood pressure medications and has had two serial elevated blood pressure measurements (> 140/90 without history of diabetes or renal disease or > 130/80 with diabetes or renal disease).
    - Home blood pressure measurements thwarting “white coat syndrome” and other secondary causes may improve accuracy.<sup>2</sup>
  - ◆ Anyone under 40 years old with hypertension.
  - ◆ Sudden onset of significant hypertension (generally > 160/100) or flash pulmonary edema.
  - ◆ Women who develop hypertension ( $\geq$  140/90) within the first 20 weeks of pregnancy, if the hypertension persists > 12 weeks post-partum.
  - ◆ Previously stable hypertension, with worsening hypertension or worsening renal function/increasing creatinine (especially after the administration of an ACE inhibitor or with angiotensin receptor blocking agent).
  - ◆ Unexplained atrophic kidney or discrepancy in size between kidneys of greater than 1.5 cm.
  - ◆ Gadolinium agents may be contraindicated in patients with severe renal disease or on dialysis due to the risk of developing nephrogenic systemic sclerosis.
- US kidney retroperitoneal (CPT® 76775) **and/or** Doppler (CPT® 93975 or CPT® 93976) if expertise is available.
- Nuclear renal imaging (CPT® 78707, CPT® 78708, or CPT® 78709) can be considered if any of the following:
  - ◆ Severe hypertension with progressive renal insufficiency or failure to respond to 3 drug therapy)
  - ◆ Malignant or accelerated hypertension
  - ◆ Acute worsening of previously stable hypertension
  - ◆ Diastolic BP > 100 in individual < 35 years old
  - ◆ New onset severe hypertension (diastolic BP > 110) in individual > 50 years old
  - ◆ Hypertension in presence of asymmetric kidneys or diffuse atherosclerosis
  - ◆ Hypertension in presence of acute elevation in creatinine either unexplained or after treatment with ACE inhibitor
  - ◆ Abdominal bruit
  - ◆ Recurrent acute pulmonary edema and hypertension
  - ◆ Hypokalemia with normal or elevated plasma renin level in absence of diuretic therapy
  - ◆ Hypertension with known neurofibromatosis
- Captopril renography (CPT® 78709) can be considered in the evaluation of renovascular hypertension.

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## AB-38: Polycystic Kidney Disease

### AB-38.1: Polycystic Kidney Disease

119

## **AB-38.1: Polycystic Kidney Disease**

- Ultrasound<sup>1</sup> (CPT® 76770 or CPT® 76775) can be performed for:
  - ◆ Suspected polycystic kidney disease
  - ◆ Screening individuals at risk for autosomal dominant polycystic disease (ADPKD)

### ***Reference***

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**AB-39: Hematuria and Hydronephrosis**

<b>AB-39.1: Hematuria with Urinary Tract Infection (UTI)</b>	<b>121</b>
<b>AB-39.2: Hematuria, not Related to Urinary Tract Infection (UTI) or Flank Pain</b>	<b>121</b>
<b>AB-39.3: Hematuria and Flank Pain (suspicion for renal/urethral stones)</b>	<b>121</b>
<b>AB-39.4: Hydronephrosis of unexplained or indeterminate cause (3, 4)</b>	<b>121</b>



### **AB-39.1: Hematuria with Urinary Tract Infection (UTI)**

Signs and symptoms of UTI (urinary frequency, burning on urination, positive urine leukocyte esterase, presence of WBCs in the urine, fever, elevated WBC as per the testing laboratory's range)

- Females  $\leq$  40 years of age should receive at least a 3-day regimen of antibiotics followed by repeat dipstick urinalysis or complete urinalysis with microscopic exam. If the hematuria resolves, advanced imaging is not indicated. If symptoms persist, may receive CT Urogram (CPT<sup>®</sup> 74178).
- Females > 40 years of age, may undergo CT Urogram<sup>1</sup> (CPT<sup>®</sup> 74178)
- Males with UTI should be imaged, see: **AB-40: Urinary Tract Infection (UTI)**

### **AB-39.2: Hematuria, not Related to Urinary Tract Infection (UTI) or Flank Pain**

- CT Urogram (CPT<sup>®</sup> 74178)
- Evidence of primary generalized renal disease should have renal US (CPT<sup>®</sup> 76770 or CPT<sup>®</sup> 76775) in order to determine renal volume and morphology, prior to considering advanced imaging including CT Urogram.

### **AB-39.3: Hematuria and Flank Pain (suspicion for renal/urethral stones)**

- CT Abdomen and Pelvis without contrast (CPT<sup>®</sup> 74176) or CT Urogram (CPT<sup>®</sup> 74178)

### **AB-39.4:Hydronephrosis of unexplained or indeterminate cause**<sup>3, 4</sup>

- CT Urogram (CPT<sup>®</sup> 74178)

#### ***References***

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4. Expert Panel on Urologic Imaging. ACR Appropriateness Criteria<sup>®</sup> acute onset flank pain - suspicion of stone disease (urolithiasis). *American College of Radiology (ACR)*, 2015:11. Accessed October 19, 2017. <https://acsearch.acr.org/docs/69362/Narrative>.

**AB-40: Urinary Tract Infection (UTI)**

<b>AB-40.1: Upper (Pyelonephritis)</b>	<b>123</b>
<b>AB-40.2: Lower</b>	<b>123</b>

These guidelines refer to UTI without Hematuria.

For UTI with Hematuria, see: **AB-39: Hematuria and Hydronephrosis**

### **AB-40.1: Upper (Pyelonephritis)**

- CT Abdomen and Pelvis without and with contrast (CPT® 74178) or CT Abdomen and Pelvis with contrast (CPT® 74177) if<sup>1</sup>:
  - ◆ Suspected complicated: diabetes, immune-compromised, history of stones, prior renal surgery, elevated creatinine, or fever  $\geq 101$  F ( $\geq 38.5$  C).
  - ◆ Not responding to therapy after 3 days.
  - ◆ Recurrent pyelonephritis (at least 1 prior pyelonephritis).
  - ◆ Males with first time UTI, or recurrent UTI without etiology.
- Pregnant women should be evaluated initially by renal ultrasound<sup>2</sup> (CPT® 76770 or CPT® 76775) and if further imaging is necessary, MRI Abdomen and Pelvis<sup>3</sup> (contrast as requested).

### **AB-40.2: Lower**

- CT Abdomen and Pelvis without and with contrast (CPT® 74178) if<sup>3</sup>:
  - ◆ Suspected complicated: diabetes or immunocompromised or history of stones or prior renal surgery, elevated creatinine or fever  $\geq 101$  F ( $\geq 38.5$  C).
  - ◆ Not responding to therapy after 3 days.
  - ◆ Males with first time UTI or recurrent UTI without etiology.
  - ◆ Recurrent UTI > 3 per year.
  - ◆ Recommendation by urologist or specialists.
- MRI Pelvis without and with contrast (CPT® 72197) if:
  - ◆ Suspected urethral diverticulum or other urethral abnormalities.
- See: **PV-13: Periurethral Cysts and Urethral Diverticula** in the Pelvis Imaging Guidelines.

### **References**

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## AB-41: Patent Urachus

AB-41.1: Patent Urachus

125

## **AB-41.1: Patent Urachus**

- CT Pelvis with contrast (CPT® 72193) can be performed if ultrasound (CPT® 76700 or CPT® 76705) is equivocal, or if needed for surgical planning.<sup>1,2</sup>

### ***Practice Note***

The urachus is a “tube” connecting the fetal bladder to the umbilical cord. It is usually obliterated during fetal growth, but if it remains patent, there can be a connection between the bladder and the umbilicus.

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**AB-42: Transplant**

<b>AB-42.1: Liver Transplant, Pre-Transplant</b>	<b>127</b>
<b>AB-42.2: Liver Transplant, Partial Liver Transplant Donors</b>	<b>127</b>
<b>AB-42.3: Liver Transplant, Post-transplant</b>	<b>127</b>
<b>AB-42.4: Liver Transplant, Post-Transplant Lymphoproliferative Disease (PTLD)</b>	<b>128</b>
<b>AB-42.5: Kidney Transplant, Pre-Transplant Imaging Studies</b>	<b>129</b>
<b>AB-42.6: Kidney Transplant, Post-transplant</b>	<b>129</b>
<b>AB-42.7: Heart Transplant</b>	<b>129</b>

### **AB-42.1: Liver Transplant, Pre-Transplant**

- See: **CD-1.6: Transplant Patients** in the Cardiac Imaging Guidelines for guidelines on cardiac stress testing.
- Individuals on the liver transplant waiting list can undergo advanced imaging per the participating institution's protocol, as long as the studies do not exceed the following:
  - ◆ If no known Hepatocellular Carcinoma<sup>1</sup>:
    - Liver ultrasound (CPT® 76705) with Doppler (CPT® 93975) every six months.
    - CT or MRI Abdomen (CPT® 74170 or CPT® 74183) every year.
    - CT chest (CPT® 71260) for initial placement on the transplant list, but repeat chest CT is not required.
    - MRI Bone Marrow Blood Supply (CPT® 77084) or bone-scan one time.
  - ◆ If known Hepatocellular Carcinoma<sup>1,2</sup>:
    - Liver ultrasound (CPT® 76705) with Doppler (CPT® 93975) every six months.
    - CT or MRI Abdomen (CPT® 74170 or CPT® 74183) every three months.
    - CT Chest (CPT® 71260) every six months.
    - Bone scan every six months.
  - ◆ If known Primary Sclerosing Cholangitis<sup>1</sup> (PSC)
    - MRCP (see: **AB-27: MR Cholangiopancreatography (MRCP)** for correct reporting/coding)
- Pre-operative studies immediately prior to liver transplant<sup>3</sup>:
  - ◆ CT or MRI Abdomen (CPT® 74170 or CPT® 74183)
    - If CT Abdomen was most recently done while on the transplant waiting list, then MRI Abdomen should be done immediately prior to transplant and vice versa.
  - ◆ CT Pelvis (CPT® 72193)
  - ◆ CTA Abdomen (CPT® 74175) or MRA Abdomen (CPT® 74185)
  - ◆ CT Chest (CPT® 71260)
  - ◆ MRI Bone Marrow Blood Supply (CPT® 77084) or bone scan

### **AB-42.2: Liver Transplant, Partial Liver Transplant Donors**

- Donors for partial liver transplant can be evaluated with CT of the Abdomen without and with contrast (CPT® 74170) or MRI of Abdomen without and with contrast (CPT® 74183) prior to transplant.

### **AB-42.3: Liver Transplant, Post-transplant**

See: **CD-1.6: Transplant Individuals** in the Cardiac Imaging Guidelines for guidelines on stress testing.

- If known hepatocellular carcinoma (i.e. transplant performed for treatment of HCC, or if a de novo HCC is discovered in the explant liver):
  - ◆ CT Abdomen (CPT® 74160 or CPT® 74170) every 6 months for 3 years.
  - ◆ CT chest (CPT® 71260) every 6 months for 3 years.
- If no history of hepatocellular carcinoma, but cirrhosis develops in the explant liver:

- ◆ See: **AB-26: Cirrhosis and Liver Screening for Hepatocellular Carcinoma (HCC); Ascites and Portal Hypertension** for HCC screening guidelines
- For fibrosis assessment post-liver transplant:
  - ◆ Transient Elastography (this is the most studied modality in this setting)
- If known cholangiocarcinoma:
  - ◆ Liver US (CPT® 76705) or MRI Abdomen and MRCP (CPT® 74183) every 6 months for 5 years post-transplantation.
  - ◆ CT chest (CPT® 71260) every 6 months for 5 years post-transplantation
- All other post-transplant individuals:
  - ◆ Routine screening of the chest or abdomen is not supported in the absence of HCC.
  - ◆ Bone mineral density yearly for individuals with known osteopenia and every 2 to 3 years in individuals with a normal bone mineral density.
  - ◆ Advanced imaging as indicated for suspected post-operative complications
  - ◆ .

#### *Practice Note*

**Consensus guidelines regarding post-transplant surveillance imaging have not yet been established. Guidelines are based on a reasonable approach and are in accordance with suggestions by the American Association for the Study of Liver Diseases (AASLD) and others. AB-42.4: Liver Transplant, Post-Transplant Lymphoproliferative Disease (PTLD)**

- Most cases of PTLD are observed in the first year following transplant. Frequency of developing PTLD:
  - ◆ Small bowel transplant—20% of individuals are at risk of developing PTLD
  - ◆ Lung transplant—10% risk
  - ◆ Heart transplant—6% risk
  - ◆ Liver transplant—1%-3% risk
  - ◆ Kidney transplant—1%-3% risk
- Evaluation of suspected PTLD is same as evaluation for lymphoma: (See: **ONC-27: Non-Hodgkin Lymphomas** and **ONC-28: Hodgkin Lymphoma** in the Oncology Imaging Guidelines).
- Chest/Abdomen/Pelvis CT with contrast (CPT® 71260 and CPT® 74177) can be performed. Biopsy of the involved organ should be performed if PTLD is suspected.
- There is insufficient evidence-based data to support the routine use of imaging to screen for PTLD.<sup>4</sup>



## **AB-42.5: Kidney Transplant, Pre-Transplant Imaging Studies**

See: **CD-1.6: Transplant Individuals** in the Cardiac Imaging Guidelines for guidelines on cardiac stress testing.

- Individuals on the kidney transplant waiting list can undergo advanced imaging per that institution's protocol as long as the studies do not exceed the following:
  - ◆ If stress test is positive for reversible ischemia, or if duration of diabetes is > 25 years and individual has additional cardiac risk factors, then diagnostic left heart catheterization can be performed.
  - ◆ Carotid duplex study (CPT® 93880 bilateral study or CPT® 93882 unilateral study) if there is history of stroke, TIA, or if carotid bruit is present on exam.
  - ◆ Abdomen and Pelvis CT (CPT® 74176 or CPT® 74177) or CTA Abdomen (CPT® 74175) one time.

## **AB-42.6: Kidney Transplant, Post-transplant**

- Ultrasound of transplanted kidney:
  - ◆ Current ultrasound imaging protocols of the transplanted kidney commonly include a Doppler study and are coded as CPT® 76776.
    - Do **not** report non-invasive vascular codes CPT® 93975 and CPT® 93976 in conjunction with CPT® 76776.
  - ◆ Ultrasound of the transplanted kidney performed without duplex Doppler should be reported as a limited retroperitoneal ultrasound (CPT® 76775).

## **AB-42.7: Heart Transplant**

See: **CD-1.6: Transplant Individuals** in the Cardiac Imaging Guidelines

### ***References***

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5. Liu, D. et al. Evidence-Based Surveillance Imaging Schedule After Liver Transplantation for Hepatocellular Carcinoma Recurrence. *Transplantation* 2017. Jan;101(1): 107-111. Accessed October 19, 2017. [http://journals.lww.com/transplantjournal/Abstract/2017/01000/Evidence\\_Based\\_Surveillance\\_Imaging\\_Schedule\\_After.23.asp](http://journals.lww.com/transplantjournal/Abstract/2017/01000/Evidence_Based_Surveillance_Imaging_Schedule_After.23.asp).
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**AB-43: Hepatic and Abdominal Arteries**

<b>AB 43.1: Hepatic Arteries and Veins</b>	<b>130</b>
<b>AB 43.2: Abdominal Veins other than Hepatic and Portal Veins</b>	<b>131</b>
<b>AB 43.3: Renal Vein Thrombosis</b>	<b>131</b>

### **AB 43.1: Hepatic Arteries and Veins**

- For the evaluation of the hepatic arteries and veins (including portal vein), CTA Abdomen and Pelvis (CPT® 74174), or CTA Abdomen (CPT® 74175) or MRA Abdomen (CPT® 74185) may be considered if one of the following:
  - ◆ Evaluation of portal and hepatic veins prior to or following TIPS (transjugular intrahepatic portosystemic shunt)
  - ◆ Evaluation of portal and hepatic veins prior to or following surgical intervention for portal hypertension
  - ◆ Evaluation of hepatic vasculature prior to and following embolization procedure
  - ◆ Evaluation of hepatic vasculature prior to planned hepatectomy
  - ◆ Evaluation of liver donor
  - ◆ Suspected hepatic vein thrombosis or Budd Chiari syndrome, one of the following:
    - Ascites
    - Hepatomegaly
    - Inadequate Doppler ultrasound of hepatic veins
  - ◆ Possible portal vein thrombosis with negative or inadequate Doppler study of the portal vein, one of the following:
    - Hypercoagulable state
    - Abdominal malignancy
  - ◆ Preoperative evaluation for pancreatic cancer

### **AB 43.2: Abdominal Veins other than Hepatic and Portal Veins**

- For the evaluation of abdominal veins other than hepatic and portal veins CTA Abdomen and Pelvis (CPT® 74174), or CTA Abdomen (CPT® 74175) or MRA Abdomen (CPT® 74185) may be considered if one of the following:
  - ◆ Nephrotic syndrome
  - ◆ Suspicion of iliac vein thrombus
  - ◆ Suspicion of inferior vena cava thrombus
  - ◆ Renal vein thrombosis
  - ◆ Mesenteric vein thrombosis

### **AB 43.3: Renal Vein Thrombosis**

- For suspected renal vein thrombosis MRA Abdomen (CPT® 74185) may be considered if one of the following:
  - ◆ Nephrotic syndrome
  - ◆ Proteinuria – 3 grams or more in 24 hours
  - ◆ Lupus nephritis
  - ◆ Hypercoagulable state, one of the following:
    - Antiphospholipid antibodies
    - Behçet's syndrome
    - Protein C deficiency
    - Protein S deficiency

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## AB-44: Suspected Neuroendocrine Tumors of the Abdomen

- Radiopharmaceutical Localization of Tumor (CPT<sup>®</sup> 78800, CPT<sup>®</sup> 78801, CPT<sup>®</sup> 78802, CPT<sup>®</sup> 78803, CPT<sup>®</sup> 78804)
  - ◆ Octreoscan<sup>®1,2,3</sup> can be consider in the suspected diagnosis (not recommended for routine surveillance) and any of the following:<sup>1,2,3</sup>
    - Neuroendocrine tumors of thymus, bronchopulmonary, stomach (may have elevated or normal gastrin levels), small bowel, appendix, or pancreas.
    - Carcinoid tumors [One of the following]
      - Elevated urine 5HIAA > 15 mg/24 hr
      - Elevated chromogranin A (CgA) > 39 ng/L
      - Elevated substance P > 270 ng/L or pg/mL
      - Elevated serotonin > 330 mcmol/L
      - Gastrinoma - Elevated serum gastrin >100 pg/mL
      - Insulinoma - Elevated serum insulin > 2.0ng/mg
      - Glucagonoma - Elevated serum glucagon > 100pg/mL
      - VIPoma- Elevated vasoactive intestinal polypeptide (VIP) > 75pg/mL
      - Somatostatinoma- Elevated somatostatin
      - Pheochromocytoma
      - Elevated VMA or metanephrine > 7 mg/24hr
      - Elevated blood catecholamines- Epinephrine > 20 ng/mL or Norepinephrine > 60 ng/mL

### References

1. Oberg K, Akerstrom G, Rindi G, et al. Neuroendocrine gastroenteropancreatic tumours: ESMO clinical practice guidelines for diagnosis, treatment and follow-up. *Annals of Oncology*. 2012;23(7):vii124-vii130. Accessed October 19, 2017. <http://www.esmo.org/Guidelines/Endocrine-and-Neuroendocrine-Cancers/Neuroendocrine-Gastroenteropancreatic-Tumours>.
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## AB-45: Liver Elastography

- Vibration-Controlled Transient Elastography (VCTE) (e.g. Fibroscan, CPT® 91200) can be approved to assess for advanced fibrosis and cirrhosis in the following conditions:
  - ◆ Hepatitis C
  - ◆ Hepatitis B
  - ◆ Chronic alcoholic liver disease
  - ◆ All other chronic liver diseases
- If requested, Magnetic Resonance Elastography (MRE) can be approved for
  - ◆ Non-alcoholic fatty liver disease (NAFLD) in high risk (for cirrhosis) populations:
    - Advanced age (65 years old or greater)
    - Obesity (BMI 30 or higher)
    - Diabetes
    - ALT > 2X upper limit of normal
  - ◆ For NAFLD in low risk populations (e.g. signs of fatty liver found on imaging only, without the above-noted risk factors) MRE would be considered investigational.

### Practice Note

For the assessment of cirrhosis in patients with hepatitis C, the AGA noted that MRE has little to no increase in identifying cirrhosis, but had poorer specificity and thus higher false-positive rates than VCTE. In view of this, the AGA concluded that MRE has a poorer diagnostic performance in this setting, compared to VCTE. In their recommendations for the assessment of fibrosis in chronic liver disease, VCTE was recommended over MRE with the exception of NAFLD in high risk populations, in which MRE resulted in a lower rate of false positives compared to VCTE. In low risk populations with NAFLD, both MRE and VCTE performed poorly, and their role is as yet, undefined.

### Reference

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