



CLINICAL GUIDELINES

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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Abbreviations for Abdomen Imaging Guidelines

AAA	abdominal aortic aneurysm
AASLD	American Association for the Study of Liver Diseases
ACE	angiotensin-converting enzyme
ACG	American College of Gastroenterology
ACR	American College of Radiology
ACTH	adrenocorticotrophic hormone
AFP	alpha-fetoprotein
AGA	American Gastroenterological Association
ALT	alanine aminotransferase
ASGE	American Society for Gastrointestinal Endoscopy
AST	aspartate aminotransferase
AUA	American Urological Association
BEIR	Biological Effects of Ionizing Radiation
BUN	blood urea nitrogen
CAG	Canadian Association of Gastroenterology
CNS	central nervous system
CT	computed tomography
CTA	computed tomography angiography
CTC	computed tomography colonography (aka: virtual colonoscopy)
DVT	deep vein thrombosis
ERCP	endoscopic retrograde cholangiopancreatography
EUS	endoscopic ultrasound
FNH	focal nodular hyperplasia
GFR	glomerular filtration rate
GGT	gamma glutamyltransferase
GI	gastrointestinal
HCC	hepatocellular carcinoma
HCPCS	Healthcare Common Procedural Coding System (commonly pronounced: "hix pix")

HU	Hounsfield units
IAA	iliac artery aneurysm
IV	intravenous
KUB	kidneys, ureters, bladder (plain frontal supine abdominal radiograph)
LFT	liver function tests
MRCP	magnetic resonance cholangiopancreatography
MRA	magnetic resonance angiography
MRI	magnetic resonance imaging
mSv	millisievert
NAFLD	nonalcoholic fatty liver disease
PA	posteroanterior projection
PET	positron emission tomography
RAS	renal artery stenosis
RBC	red blood cell
SBFT	small bowel follow through
SPECT	single photon emission computed tomography
VC	virtual colonoscopy (CT colonography)
PFT	pulmonary function tests
WBC	white blood cell
ZES	Zollinger-Ellison Syndrome

AB-1: General Guidelines

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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 involve a lower quadrant of the abdomen.
 - ◆ 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 **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 **AB-23: Inflammatory Bowel Disease Rule Out Crohn's Disease or Ulcerative Colitis**
- ◆ Triple-phase CT -There is a common misunderstanding about the imaging sequences of a triple-phase CT for evaluation of the liver. In this setting, the 3 phases of a triple-phase CT are: 1) a hepatic arterial phase, 2) a portal venous phase, and 3) a washout or delayed acquisitions phase. It should be noted that, in general, a precontrast or noncontrast CT is generally not needed, except in those individuals previously treated with locoregional embolic or ablative therapies. Thus, for the evaluation of liver lesions EITHER a CT abdomen with contrast (CPT®74160) or CT abdomen without and with contrast (CPT®74170) can be approved. This is in contradistinction to MRI, in which precontrast imaging is needed.

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 scandescribes 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: Contrast-Enhanced Ultrasound

Ultrasound with contrast (CEUS, CPT® 76978, CPT® 76979) is only considered when MRI or CT cannot be performed, and the clinical situation requires ultrasound contrast to further delineate the nature of the lesion. CEUS of the liver is otherwise considered investigational or experimental at this time..

AB-1.10: 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: General Guidelines – Other Imaging Situations** in the Head Imaging Guidelines.

- Fever of unknown origin; unexplained weight loss
 - ◆ In the Oncology Imaging Guidelines, SeeONC-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.^{3,4}

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AB-2: Abdominal Pain

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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:

AB-2.2 Abdominal Pain				
Pain Location	Initial Ultrasound?	Conservative Treatment?	Advanced Imaging Indicated?	Comments
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
 - History of bariatric surgery
- 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 TVUS (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
Generalized, men and also women not of childbearing age	Yes Complete or limited abdomen	No*	*If equivocal ultrasound or if pain is accompanied with: any one red flag ➤ CT of the Abdomen and Pelvis with contrast	See red flags in <u>AB-2.1</u>
Generalized, women of childbearing age, not pregnant,	Yes Complete abdomen and/or transvaginal and/or complete pelvis	No*	*If equivocal ultrasound or if pain is accompanied with any one red flag: ➤ CT Abdomen and Pelvis with contrast <i>or</i> ➤ MRI Abdomen and/or Pelvis without and with contrast	See red flags in <u>AB-2.1</u> See imaging for pregnant women in <u>AB-2.1</u>
Generalized, pregnant	Yes Complete abdomen and/or transvaginal and/or complete pelvis	No	➤ If ultrasound is equivocal with acute pain or any one red flag, MRI Abdomen and/or Pelvis without contrast. ➤ 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. Requests for CT should go to MD for review.	See red flags in <u>AB-2.1</u> and imaging for pregnant women in <u>AB-2.1</u>
Left Lower Quadrant, rule out diverticulitis – ALL men and non-pregnant women	No	No	➤ CT Abdomen and Pelvis with contrast	See imaging for pregnant women in <u>AB-2.1</u>
Left Lower Quadrant, suspected or known intraabdominal abscess – ALL men and non-pregnant women	No	No	If fever or elevated WBC, then CT Abdomen and/or Pelvis with contrast.	See imaging for pregnant women in <u>AB-2.1</u> See <u>AB-3: Abdominal Sepsis (Suspected Abdominal Abscess)</u>

Abdomen Imaging

AB-2.2 Abdominal Pain				
Pain Location	Initial Ultrasound?	Conservative Treatment	Advanced Imaging Indicated?	Comments
Left Lower Quadrant, follow-up known intraabdominal abscess – ALL men and non-pregnant women	No	No	Serial abdominal and/or pelvic ultrasound (CPT®76700 and/or CPT®76856) or CT Abdomen and/or Pelvis with contrast: ➤ The interval can be days, weeks, or months	See imaging for pregnant women in AB-2.1 See AB-3: Abdominal Sepsis (Suspected Abdominal Abscess)
Left Upper Quadrant – ALL men and non-pregnant women	See AB-2.4: Left Upper Quadrant (LUQ) Pain	See AB-2.4: Left Upper Quadrant (LUQ) Pain	See AB-2.4: Left Upper Quadrant (LUQ) Pain	See imaging for pregnant women in AB-2.1
Right Lower Quad, rule out appendicitis in – ALL men and non-pregnant women	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 AB-2.1
Right Upper Quadrant, rule out cholecystitis - ALL men and non-pregnant women	See AB-2.3: Right Upper Quadrant Pain including Suspected Gallbladder Disease	See AB-2.3: Right Upper Quadrant Pain including Suspected Gallbladder Disease	See AB-2.3: Right Upper Quadrant Pain including Suspected Gallbladder Disease	See imaging for pregnant women in AB-2.1
Epigastric pain, dyspepsia, gastritis, and postprandial fullness – ALL men and non-pregnant women	See AB-2.5: Epigastric Pain and Dyspepsia	See AB-2.5: Epigastric Pain and Dyspepsia	See AB-2.5: Epigastric Pain and Dyspepsia	See imaging for pregnant women in AB-2.1
Acute epigastric pain with <u>any</u> red flag symptoms – ALL men and non-pregnant women	See AB-2.5: Epigastric Pain and Dyspepsia	See AB-2.5: Epigastric Pain and Dyspepsia	See AB-2.5: Epigastric Pain and Dyspepsia	See imaging for pregnant women in AB-2.1

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 including Suspected Gallbladder Disease

- For Pregnant Women, refer to **AB-2.1: General Information**
- For all others:
 - ◆ Abdominal US (complete or limited) is the initial diagnostic test in the absence of red flags.
 - ◆ CT abdomen with contrast, or MRI abdomen without or without and with contrast if US is equivocal or red flags present
- Hepatobiliary System Imaging (HIDA) with OR without pharmacologic intervention (CPT® 78226 or CPT® 78227) can be considered:
 - ◆ If there is suspicion of gallbladder disease, with an equivocal or non-diagnostic ultrasound
 - NOTE: If findings on US suggest acute cholecystitis in a symptomatic patient (presence of gallstones with gallbladder wall thickening, Murphy's sign, and peri-cholecystic fluid) then a HIDA scan is generally not needed.
 - If the HIDA without pharmacologic intervention (CPT® 78226) is initially performed and is normal or inconclusive, the site can convert the study to HIDA with pharmacologic intervention (CPT® 78227). The member will not need to return for a second study with injection of a pharmaceutical.
 - ◆ 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.

- ◆ Chronic acalculous cholecystitis can be imaged with a HIDA with or without pharmacologic intervention (CPT® 78226 or CPT® 78227)

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 (CPT® 74160) or CT Abdomen and Pelvis (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 (CPT® 74160) or CT Abdomen and Pelvis (CPT® 74177) can be approved.
 - ◆ Suspected aortic dissection
 - See **PV-6.7: Aortic Dissection and 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

AB-2.5: Epigastric Pain and Dyspepsia

- Epigastric pain with red flags: (non-pregnant individuals)
 - ◆ Any of the following:
 - US abdomen (CPT® 76700 or CPT® 76705)
 - CT abdomen with contrast (CPT® 74160)
 - MRI abdomen with and without contrast (CPT® 74183)
- Epigastric pain without red flags and dyspepsia (defined by the ACG and CAG as predominant epigastric pain lasting at least one month and can be associated with any upper gastrointestinal symptoms such as epigastric fullness, nausea, vomiting, or heartburn):

(Note: Those individuals with abnormal laboratory tests or physical findings should also be assessed under the appropriate guidelines for those findings, e.g. LFTs, jaundice, etc.)

 - ◆ US abdomen (CPT® 76700 or CPT® 76705) to assess for biliary/pancreatic disease
 - ◆ CT abdomen (CPT® 74160) or MRI abdomen (CPT® 74183), or MRCP (CPT® 74181 or CPT® 74183), may be appropriate to evaluate positive findings on US. The use of these advanced imaging procedures to evaluate the US findings may be specifically addressed in the dedicated guideline. For example, the use of MRCP to evaluate potential pathology in the biliary tree or pancreatic duct is addressed in **AB-27: MR Cholangiopancreatography (MRCP)**.
 - ◆ Advanced imaging (CT abdomen CPT® 74160, or MRI abdomen CPT® 74183) can be considered for persistent symptoms after a negative or inconclusive upper gastrointestinal endoscopy and ultrasound as well as one of the following:
 - Test and treat for *Helicobacter pylori* (*H. pylori*) and a trial of acid suppression with a proton pump inhibitor (PPI) for 4–8 weeks if eradication is successful, but symptoms do not resolve OR
 - An empiric trial of acid suppression with a PPI for 4–8 weeks.

NOTE: See imaging for pregnant women **AB-2.1: General Information**

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AB-3: Abdominal Sepsis (Suspected Abdominal Abscess)

AB-3.1: Abdominal Sepsis

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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.¹
- 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, based on the clinical course of the individual.

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

AB-4.1: Suspected Renal Stone	23
AB 4.2: Observation of Known Ureteral Stone	23
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AB-4.1: Suspected Renal Stone

- Suspected renal stone with symptoms in non-pregnant adults (flank pain/renal colic).^{1,2}
 - ◆ CT Abdomen and Pelvis without contrast (CPT® 74176)
- Suspected renal stone in pregnant women (flank pain/renal colic)^{3,4}
 - ◆ 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)⁴
 - ◆ 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® 74183 and CPT® 72195 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 (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:^{5,6}
 - ◆ 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

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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.

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AB-6: Mesenteric/Colonic Ischemia

AB-6.1: Mesenteric Ischemia	29
AB-6.2: Colonic ischemia (including ischemic colitis)	29

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.

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 Abdomen and Pelvis 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

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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).^{1,2}
- Beyond 60 days postoperatively, See **AB-2: Abdominal Pain**

References

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AB-8: Abdominal Lymphadenopathy

AB-8.1: Abdominal Lymphadenopathy	34
AB-8.2: Inguinal Lymphadenopathy	34

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/CT (CPT® 78815) 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.
- High suspicion of lymphoma See **ONC-27: Non-Hodgkin Lymphomas** and **ONC-28: Hodgkin Lymphoma** in the Oncology Imaging Guidelines
- Prior history of malignancy See **ONC-31: Metastatic Cancer, Carcinoma of Unknown Primary Site, and Other Types of Cancer** in the Oncology Imaging Guidelines

References

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AB-9: Bariatric Surgery

AB-9.1: Bariatric Surgery

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AB-9.1: Bariatric Surgery

- Pre-operative Assessment:
 - ◆ Abdominal US (CPT® 76700 or CPT® 76705) to assess the liver and gallbladder
- Post-operative complications:
 - ◆ CT Abdomen and Pelvis with contrast (CPT® 74177) or CT abdomen with contrast (CPT® 74160) may be used for individuals who have had weight loss surgery and present with suspected complications including:
 - Weight loss failure
 - Heartburn
 - Nausea or vomiting
 - Abdominal pain
 - Fever
 - Abdominal distension
 - Suspected hernia
- Note: 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**

Practice Notes:

- Bariatric procedures include gastric banding, gastric bypass, sleeve gastrectomy, and biliopancreatic diversion procedures.
- Though abdominal pain in post-operative bariatric patients may be gallbladder-induced and an US would be helpful for this diagnosis, the complications of bariatric surgery can become quickly life-threatening, and so any request for CT imaging in the post-operative bariatric patient should not be delayed with recommendations for US, even if the examination does not indicate any “red flags”.

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AB-10: Blunt Abdominal Trauma

AB-10.1: Blunt Abdominal Trauma

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AB-10.1: Blunt Abdominal Trauma

- Abdominal and/or pelvic ultrasound (CPT® 76700 and/or CPT® 76856) can be approved for the evaluation of blunt abdominal trauma when requested.
- CT Abdomen and/or Pelvis with contrast (CPT® 74160, or CPT® 72193, or CPT® 74177):
 - ◆ High probability intra-abdominal injury
 - Abdominal pain or tenderness
 - Pelvic or femur fracture
 - Lower rib fracture
 - Costal margin tenderness or evidence of thoracic wall trauma
 - Diminished breath sounds
 - Vomiting
 - Pneumothorax
 - Hematocrit < 30%
 - Hematuria
 - Elevated AST
 - Non-examinable individual (intoxicated, less than fully conscious, Glasgow Coma Scale Score > 13, etc.)
 - Evidence of abdominal wall trauma or seat-belt sign
 - ◆ If ultrasound demonstrates any positive finding(s)

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AB-11: Gaucher's Disease and Hemochromatosis

AB-11.1: Gaucher's Disease	41
AB-11.2: Hereditary (Primary) Hemochromatosis (HH) and Other Iron Storage Diseases	41

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 months¹
 - ◆ 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.
- See **PEDPN-4: Gaucher's Disease** in the Pediatric Guidelines

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

- Elevated serum ferritin and transferrin saturation >45%
 - ◆ Positive HFE genetic testing (C282Y homozygote or C282Y/H63D or C282Y/S65C heterozygotes):
 - Transient elastography (CPT® 91200) or MRI abdomen without contrast (CPT® 74181) for iron quantification if:
 - Elevated AST or ALT or
 - Serum ferritin >1000
 - ◆ Negative HFE genetic testing
 - MRI abdomen without contrast (CPT® 74181) for iron quantification
- Elevated serum ferritin (males >300ng/mL, females >200ng/mL) and transferrin saturation <45%
 - ◆ MRI abdomen without contrast (CPT® 74181) for iron quantification
- 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):
 - ◆ MRI abdomen without contrast (CPT® 74181) for iron quantification can be performed annually
- See **PEDAB-18.2: Transfusion-Associated (Secondary) Hemochromatosis** in the Pediatric Abdomen Imaging guidelines regarding transfusion-associated hepatic iron deposition.
- If transient elastography, biopsy, or MR reveal advanced fibrosis or cirrhosis, then follow HCC screening guidelines (See **AB-26.1: Chronic Liver Disease, Cirrhosis and Screening for HCC**).

Practice Note

- An elevated serum ferritin >1000mcg/l is associated with an increased risk of cirrhosis and mortality in C282 homozygotes, while a serum ferritin <1000 mcg/l is associated with a very low likelihood of cirrhosis.
- 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

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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 [CPT® 76857] or pelvic complete [CPT® 76856]) 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 without contrast (CPT® 72195) or with and without (CPT® 72197) if CT and US are indeterminate or non-diagnostic.
- For chronic post-surgical groin pain (after hernia repair):
 - ◆ Pelvic ultrasound (CPT® 76856 or CPT® 76857) or US-guided nerve block
 - ◆ CT Pelvis with contrast (CPT® 72193) or without contrast (CPT® 72192) or MRI Pelvis without contrast (CPT® 72195) 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.

Practice Note

- Some complications might include suspicion of a gastric volvulus (torsion) within the chest cavity, vomiting, chest pain, and difficulty in swallowing

AB-12.4: Indeterminate Groin Pain

- See **MS-23: Pelvis** in the Musculoskeletal Guidelines

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AB-13: Abdominal Mass

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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.¹

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: General Information**)
- 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)

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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).^{1,2,3}

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AB-16: Adrenal Cortical Lesions

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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

- The initial imaging study for adrenal masses incidentally detected on ultrasound is CT abdomen without contrast (CPT® 74150)

Imaging Decision Tree: Incidentally Discovered Adrenal Mass ^{1,2,3,4}		
Mass Details	Primary Study	Additional Studies
➤ Asymptomatic adrenal mass ≥ 1 cm ➤ No history of cancer	Incidentally detected on any CT or MRI exam	➤ No further imaging, regardless of size, if imaging is diagnostic for benign findings, including any of the following: ◆ Myelolipoma (macroscopic fat) or ◆ Calcified mass or ◆ ≤ 10 HU on CT or decreased signal on Chemical Shift MRI (CS-MRI, CPT® 74181) consistent with benign adenoma, or ◆ If imaging was completed with and without contrast and no enhancement (defined as < 10 HU change between unenhanced and enhanced/contrasted CT scan e.g. cyst, hemorrhage)*
➤ 1 cm to <4 cm ➤ No history of cancer ➤ Asymptomatic ➤ No prior imaging for comparison	Indeterminate imaging on any CT or MRI	➤ 1 cm to 2 cm: ◆ 12 month CT Abdomen without and with contrast (adrenal protocol), or may consider CS-MRI (chemical shift MRI, CPT® 74181), especially if CT contraindicated ■ If stable ≥ 1 year, no further imaging-likely benign ■ If enlarging (or new lesion present): ■ biochemical evaluation; ■ consider resection for possible primary adrenocortical carcinoma; ■ exclude pheochromocytoma prior to resection. ➤ >2 cm to <4 cm: ◆ CT Abdomen without and with contrast (adrenal protocol); may consider CS-MRI (chemical shift MRI, CPT® 74181), especially if CT contraindicated ◆ No further follow up imaging if: ■ Absolute Percentage Washout/Relative Percentage Washout (APW/RPW) $\geq 60/40\%$: Benign adenoma; ■ No enhancement (defined as change in pre- and post-contrast imaging of <10 HU Cyst or hemorrhage)

		◆ If APR/RPW <60/40%: ■ Consider 6-12 month follow up imaging, or ■ Resection for possible primary adrenocortical carcinoma, with biochemical evaluation to determine functional status and to exclude pheochromocytoma prior to resection ◆ If not resected, follow-up CT abdomen with and without contrast (or CS-MRI, CPT® 74181) in 6 – 12 months. May consider CS-MRI (chemical shift MRI, CPT® 74181), especially if CT contraindicated. ■ 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.
➤ ≥4 cm ➤ No history of cancer ➤ or > 10 HU on NCCT	Indeterminate imaging features on any CT or MRI	➤ Biochemical assays to determine functional status to exclude pheochromocytoma prior to resection ➤ Consider resection for possible primary adrenocortical carcinoma
➤ 1 cm to <4 cm ➤ History of cancer ➤ No prior imaging for comparison	Indeterminate imaging on any CT or MRI	➤ CT abdomen without and with contrast(adrenal protocol); or ◆ May consider CS-MRI (chemical shift MRI, CPT® 74181), especially if CT contraindicated ◆ No further follow up imaging if; ■ APW/RPW > 60/40%: Benign adenoma; or ■ No enhancement (defined as change in pre- and postcontrast imaging of <10 HU e.g. cyst or hemorrhage); ◆ APW/RPW <60/40%: ■ PET CT; consider biopsy; ■ Biochemical evaluation to determine functional status and exclude pheochromocytoma prior to biopsy/resection. ◆ If enlarging or new lesion: ■ PET/CT or biopsy; ■ Biochemical evaluation to determine functional status and exclude pheochromocytoma prior to biopsy/resection

➤ ≥ 4 cm ➤ History of cancer ➤ > 10 HU on NCCT	Indeterminate imaging features on any CT or MRI	➤ PET/CT or biopsy ➤ Consider biochemical assays to determine functional status and exclude pheochromocytoma prior to biopsy/resection
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Suspected Condition	Initial Imaging	Additional Information
➤ Suspected Cushing's Syndrome, or virilizing adrenal tumors	CT Abdomen without contrast*	➤ Laboratory: dexamethasone suppression, serum ACTH level, virilizing hormone levels, and/or 24 hour urine for adrenal hormones confirm adrenal cortical endocrine syndrome
➤ Suspected Pheochromocytoma	MRI Abdomen or CT Abdomen (contrast as requested)	➤ Chemical shift MRI (CPT® 74181) is the preferred imaging
➤ Conn's Syndrome (hyperaldosteronism)	CT abdomen without contrast	➤ If PAC (plasma aldosterone concentration) > 20ng/dl plus undetectable PRA (plasma renin activity), plus spontaneously low potassium level (e.g. not diuretic-induced): proceed with advanced imaging. ➤ If PAC 15-19ng/dl plus low PRA plus PAC/PRA ratio > 20: Confirmatory testing demonstrating lack of aldosterone suppression needed prior to advanced imaging (See Practice Note). ➤ If adrenal vein sampling (AVS) is planned once primary aldosteronism is confirmed on biochemical and/or suppression testing: CT abdomen with contrast is indicated.

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 an 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.
- The most commonly used Confirmatory Aldosterone Suppression tests include: Sodium loading testing (oral or IV), Fludrocortisone Suppression Test (FST) and Captopril Challenge Test.
- The laboratory's reference range performing renin (PRA) and serum potassium levels should be used for determining abnormalities of these levels.

AB-16.2: Normal Laboratory Values

Normal Values	
Cortisol	
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.^{6,7}

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 Neoplasias (MEN)** 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
CT Abdomen without contrast	≤10 Hounsfield Units	>10 Hounsfield Units
CT with contrast with washout (calculated)	≥60% absolute washout or ≥40% relative washout	<60% absolute washout <40% relative washout
Chemical Shift MRI	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

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AB-17.1: Abdominal Aortic Aneurysm (AAA)

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

AB-17.2: Iliac Artery Aneurysm (IAA)

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

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.

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	61
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AB-18.1: AAA, IAA, Post Endovascular or Open Aortic Repair

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

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

AB-19.1: Aortic Dissection and Other Aortic Conditions	63
AB-19.2: Imaging for Other Aortic Conditions	63

AB-19.1: Aortic Dissection and Other Aortic Conditions

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

AB-19.2: Imaging for Other Aortic Conditions

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

AB-20: Bowel Obstruction and Gastroparesis

AB-20.1: Bowel Obstruction	65
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AB-20.1: Bowel Obstruction

- Plain X-rays of the abdomen 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.¹
- 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

AB-21.1: Acute and Persistent Diarrhea (up to 30 days)	68
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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.^{9,10,11} (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 with contrast (CPT® 74160), CT Abdomen and Pelvis with contrast (CPT® 74177), CT Enterography (CPT® 74177), or MR Enterography (CPT® 74183 or CPT® 74183 and CPT® 72197), 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:
 - 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 or are inconclusive, **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 used in the evaluation of constipation to obtain information regarding the structural causes of outlet dysfunction (e.g. rectal prolapse, rectocele, or enterocele).

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

- Irritable bowel syndrome is characterized by abdominal pain associated with altered bowel habits, abdominal distention, and bloating. Subtypes include IBS-C (constipation-predominant), IBS-D (diarrhea-predominant) and IBS-M (mixed). Rome IV Criteria for the diagnosis of irritable bowel syndrome are:
 - ◆ Recurrent abdominal pain, on average ≥ 1 d/wk in the past 3 months, related to ≥ 2 of the following:
 - Defecation
 - Change in stool frequency
 - Change in stool appearance (form)
- In patients with IBS-D, colonoscopy should be performed prior to advanced imaging to rule out microscopic colitis or inflammatory bowel disease.
- Advanced imaging in the absence of alarm symptoms has a very low yield, but can be considered in the following circumstances (The ACG Task Force recommends against the routine use of abdominal imaging in patients with IBS symptoms and no alarm features):
 - ◆ CT abdomen (CPT® 74160) or CT abdomen and pelvis (CPT® 74177) can be considered in the following circumstances:
 - Presence of alarm symptoms
 - Weight loss
 - Frequent nocturnal awakenings due to gastrointestinal symptoms
 - Fever
 - Blood in the stool (See **AB-22: GI Bleeding**)
 - New onset and progressive symptoms
 - Onset of symptoms after age 50

- Recent antibiotic use
- Family history of colon cancer or inflammatory bowel disease
- Findings of an abdominal mass
- Presence of lymphadenopathy
- Positive findings on blood work including CBC (elevated WBC count), elevated CRP (a CRP $< \text{or} = 0.5$ essentially excludes inflammatory bowel disease in patients with IBS symptoms), and celiac testing
- Positive fecal calprotectin (Note: a fecal calprotectin level $< 40 \text{mcg/g}$ virtually excludes inflammatory bowel disease in patients with IBS) (See Practice Note in **AB-23.1: IBD Rule out Crohn's Disease or Ulcerative Colitis**)

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AB-22: GI Bleeding

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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)
 - ◆ If there is concern for an aorto-enteric fistula (known or suspected aortic aneurysm, history of any type of aortic aneurysm repair).
- Meckel's scan (CPT® 78290) can be approved if bleeding is suspected from a Meckel's diverticulum.
- 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 (CPT® 74177) if upper and lower endoscopy are negative and if VCE is negative. If there is a contraindication to CTE, MRE (CPT® 74183 or CPT® 74183 and CPT® 72197) 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 guideline 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 with contrast (CPT® 74177), CT Enterography (CPT® 74177), or MR Enterography (CPT® 74183 or CPT® 74183 and CPT® 72197) (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.

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

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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 with contrast (CPT® 74177) or CT Enterography (CPT® 74177) or MR Enterography (CPT® 74183 or CPT® 74183 and CPT® 72197).
 - ◆ If no red flag is present, and the request is for CT or MR Enterography for the evaluation of chronic abdominal pain associated with diarrhea due to a concern for inflammatory bowel disease, a CTE (CPT® 74177) or MRE (CPT® 74183 or CPT® 74183 and CPT® 72197) can be approved if:
 - There is a positive family history of inflammatory bowel disease, or
 - There are endoscopy or colonoscopy findings suggestive of inflammatory bowel disease, or
 - There is a CRP > or = 0.5 mg/dl, or a fecal calprotectin >40 mcg/g. (See Practice Note)

Practice Notes

Studies have demonstrated the negative predictive value of a low fecal calprotectin and CRP with regards to inflammatory bowel disease. Chey, et. al. in a meta-analysis demonstrated that a fecal calprotectin < 40mcg/g or a CRP < or = 0.5 mg/dl effectively excludes inflammatory bowel disease in patients with IBS. Katsinelos, et. a. reviewed wireless capsule endoscopy results in patients with abdominal pain and diarrhea, The diagnostic yield of capsule endoscopy in patients with abdominal pain and diarrhea with positive inflammatory markers was 90.1%, and 0% in patients with abdominal pain and diarrhea with negative inflammatory markers. This led the Canadian Association of Gastroenterology to recommend against the use of capsule endoscopy in persons with chronic abdominal pain or diarrhea as their only symptoms and no evidence of biomarkers associated with Crohn's Disease, stating "CE (capsule endoscopy) is not warranted in most patients who present with chronic abdominal pain in the absence of positive tests for inflammatory markers or abnormal findings on endoscopy or imaging.

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 or 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).^{2,3}

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.
 - ◆ Surveillance for cholangiocarcinoma in individuals with PSC can be done with US or MRI/MRCP every 6 months.

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.^{6,7,8}

AB-23.5: Special Considerations

- CT 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

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AB-24.1: Celiac Disease

- Diagnosis is made by blood testing¹:
 - ◆ 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® 74177) or CT Enteroclysis (CPT® 74176 or CPT® 74177) is appropriate for:
 - ◆ One time study after initial, confirmed diagnosis of Celiac Disease.
 - ◆ Confirmed Celiac disease and despite adherence to a gluten free diet the individual is experiencing new or continued weight loss, diarrhea, abdominal distention, or anemia.

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).

Reference

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AB-25: CT Colonography (CTC)

AB-25.1: CTC

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AB-25.1: CTC

Certain payers (e.g. Medicare) 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) every 5 years for colorectal cancer^{1,2,3} 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.
 - ◆ 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:⁴
 - 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

AB-26.1: Cirrhosis and Liver Screening for HCC	85
AB-26.2: Ascites	86
AB-26.3: Portal Hypertension	86

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

- US (CPT® 76700 or CPT® 76705) 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)⁹ 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 (BMI >35), intestinal gas, or chest wall deformity.
 - ◆ MRI abdomen (CPT® 74183) or Multiphase CT abdomen (either CPT® 74160 or CPT® 74170).
- 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.
- Ultrasound with contrast (CEUS, CPT® 76978, CPT® 76979) is only considered when MRI or CT cannot be performed, and the clinical situation requires ultrasound contrast to further delineate the nature of the lesion. CEUS of the liver is otherwise considered investigational or experimental at this time.

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.”⁷

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 al⁸ performed a retrospective analysis of 1597 patient to compare US alone with US and AFP. Their findings suggest that an AFP cut-off of 20ng/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

- Most cases of portal hypertension are caused by cirrhosis, and the most feared complication is that of esophageal variceal hemorrhage. Causes of portal hypertension can be divided into prehepatic (e.g. portal vein thrombosis, extrinsic compression from a tumor), intrahepatic (e.g. cirrhosis) and post-hepatic (e.g. hepatic vein thrombosis) causes. The differentiation of some of these causes may require workup which includes measurement of the hepatic venous pressure gradient (HVPG) which is considered the gold standard for the evaluation of portal hypertension.
- The gold standard for the assessment for portal hypertension is the Hepatic Venous Pressure Gradient (HPVG [pressure gradient between portal vein and the inferior vena cava]), which is an invasive test.
- For noninvasive abdominal imaging:
 - ◆ Initial evaluation: abdominal US (CPT®76700 or CPT®76705) (including Duplex Doppler US [CPT®93975] of the liver and upper abdomen) to assist in determining the cause (pre-hepatic[e.g. portal vein thrombosis, extrinsic compression from a tumor], intrahepatic [e.g. cirrhosis], and post-hepatic[e.g. hepatic vein thrombosis]).US is very accurate for detecting portal vein or hepatic vein thrombosis.
- For inconclusive US or further evaluation of US findings:
 - ◆ Multiphase CT Abdomen (CPT® 74160 or CPT® 74170), multiphase CTAAbdomen (CPT® 74175), multiphase MRA Abdomen (CPT® 74185), or MRI Abdomen liver protocol (CPT® 74183)
- TIPS (transjugular intrahepatic portosystemic shunt)
 - ◆ Pre-procedure evaluation:
 - Abdominal US, including Doppler (CPT® 76700 and/orCPT® 93975), Multiphase CT Abdomen (CPT®74160 or CPT®74170), multiphase CTA Abdomen (CPT®74175), multiphaseMRAAbdomen (CPT®74185), or MRI Abdomen liver protocol (CPT®74183) See **AB-43.1:Hepatic Arteries and Veins**

- ◆ For routine follow-up to monitor stent patency:
 - US with Doppler (CPT® 93975) 7-14 days after shunt creation, and then at 3 months, 6 months, and then every 6 months thereafter.
 - (Note: If requested earlier than the above intervals because of a clinical deterioration or suspicion of stent occlusion, the Doppler can be approved).
 - If Doppler imaging is indeterminate or if there is a negative Doppler with clinical signs of worsening portal hypertension:
 - Multiphase CT Abdomen (CPT® 74160 or CPT® 74170), multiphase CTAAbdomen (CPT® 74175), multiphase MRA Abdomen (CPT® 74185), or MRI Abdomen liver protocol (CPT® 74183)
- 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.

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AB-27: MR Cholangiopancreatography (MRCP)

AB-27.1: MRCP

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AB-27:MR Cholangiopancreatography (MRCP) - General

MRCP is an alternative to endoscopic retrograde cholangiopancreatography (ERCP) for evaluating the biliary system and pancreatic ducts.

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

AB-28.1: Jaundice	93
AB 28.2: Gallbladder Polyps	93

AB-28.1: Jaundice

- Ultrasound¹ (CPT® 76700 or CPT® 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 CT² without and with contrast (CPT® 74170) or Abdomen CT with contrast (CPT® 74160) should be considered in the following scenarios:
 - ◆ If non-diagnostic or equivocal ultrasound
 - e.g. large amounts of intestinal gas
 - ◆ Individual is obese (BMI >35).
 - ◆ 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.¹
- 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^{3,4}
- Polyps 6 to 9mm:
 - ◆ Ultrasound (CPT® 76700 or CPT® 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® 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® 74160 or CPT® 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 Abdomen (CPT® 74160 or CPT® 74170) 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

96

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)^{7, 8}
- Ultrasound¹(CPT®76700 or CPT®76705) 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, CPT®76978, CPT®76979) is only considered when MRI or CT cannot be performed, and the clinical situation requires ultrasound contrast to further delineate the nature of the lesion. CEUS of the liver is otherwise considered investigational or experimental at this time.
- 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)^{11,12}

Liver Lesion	Initial Imaging	Repeat Imaging	Practice Notes
Lesion with Chronic Liver Disease (see Cirrhosis) ⁹	See Cirrhosis (<u>AB-26</u>)	See Cirrhosis (<u>AB-26</u>)	
Liver lesion with significant risk factors such as a history of malignancy, elevated tumor markers, or unintentional weight loss ⁹	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 ⁹	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.	

Suspected Hepatic Adenoma ⁹	MRI Abdomen (CPT® 74183) is considered the best technique for characterization.	Follow-up CT or MRI every 6 months for 2 years, and then annually, to establish any growth patterns and assess for malignant transformation.	Risks include spontaneous rupture, and rarely, malignant transformation. Almost all cases of rupture occur in lesions > 5 cm in size. HCAs < 5 cm are generally managed conservatively, with discontinuation of OCPs or anabolic steroids.
Hepatic Hemangioma (HH) ⁹	Multiphase CT (CPT® 74160 or CPT® 74170) or Liver MRI (MRI Abdomen [CPT® 74183]) are reliable in establishing the diagnosis.	Follow-up imaging is not required if the advanced imaging study demonstrates classic features of hemangioma. The exception is giant hemangiomas (> 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.	Most common benign hepatic tumor.
Focal Nodular Hyperplasia (FNH) ⁹	MRI (CPT® 74183) or Multiphase CT (CPT® 74160 or CPT® 74170) to confirm a diagnosis of FNH. The use of Eovist contrast is often diagnostic in differentiating FNH from other lesions seen on MRI or CT	FNH based on prior imaging characteristics or biopsy, and are not using oral contraceptives, do not require follow-up imaging. Follow-up annual US for 2 to 3 years is appropriate in women diagnosed with FNH who are continuing to use OCPs. Follow-up with CT (CPT® 74160 or CPT® 74170) or MRI (CPT® 74183) can be done if the lesion is not adequately visualized on US.	
Hepatic cysts ⁹	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.	Asymptomatic, simple cysts do not require additional follow-up.	Simple hepatic cysts are not felt to be precursors to biliary cystadenomas or cystadenocarcinomas. The vast majority of cysts are benign.

- 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.⁴
 - ◆ Diagnosis for HCC is done with imaging, biopsy is not needed for diagnosis.⁵
 - ◆ Suspected liver metastases; See **ONC-31.2: Liver Metastases**.
 - ◆ Fatty liver on US with a focal liver lesion(s).⁷
- 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:¹⁰⁻¹¹
 - 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.^{7,8}

References

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AB-30: Elevated Liver Function (LFT) Levels

AB-30.1: Elevated Liver Function Levels

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AB-30.1: Elevated Liver Function Levels

- The standard laboratory tests commonly referred to as “LFTs” include bilirubin, alkaline phosphatase (alkphos 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/or 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

AB-31.1: Pancreatic Cystic Lesions	104
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AB-31.1: Pancreatic Cystic Lesions

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.

➤ Note:

- ◆ Patients who are not medically fit for surgery should not undergo further surveillance of incidentally found pancreatic cysts, irrespective of size.
- ◆ Surveillance should be discontinued if a patient is no longer a surgical candidate. However, follow-up imaging can be performed if requested for a symptomatic cyst (such as the development of jaundice secondary to cyst), in which palliative treatment might be available.

➤ This guideline applies to the following pancreatic cystic lesions:

- ◆ Intraductal papillary mucinous neoplasms (IPMN)
- ◆ Mucinous cystic neoplasms (MCN)
- ◆ Serous Cystadenomas (SCA)
- ◆ Solid-pseudopapillary neoplasms (SPN)

➤ Pancreatic Cyst seen on Imaging-Initial Management:

- ◆ MRI Abdomen (CPT® 74183) and/or MRCP are the tests of choice for initial evaluation.
- ◆ Pancreatic protocol CT (CPT® 74170) or EUS are alternatives in patients who are unable to undergo MRI.
- ◆ Indeterminate cysts may benefit from a second imaging modality or EUS prior to proceeding with surveillance. If a previous US or CT Abdomen has been performed, a request for an MRI/MRCP can be approved to better characterize the lesion, without reference to the timeframe for follow-up imaging.
- ◆ Radiographic diagnosis of a non-neoplastic cyst or classic features of a serous cystadenoma
 - No further imaging
- ◆ If any of the following are present the patient should proceed to EUS + FNA and depending on findings, surgical consultation:
 - Main duct >5mm
 - Cyst > 3cm
 - Change in main duct caliber with upstream atrophy
- ◆ If EUS does not reveal findings of main duct involvement, patulous ampulla, cytology with high-grade dysplasia or pancreatic malignancy, or a mural nodule, then follow up MRI should be performed in 6 months.

➤ Pancreatic Cyst Follow up Imaging

- ◆ If high risk features are not present, then the next follow-up imaging proceeds as follows:
 - Cyst <1cm: MRI in 2 years
 - Cyst 1-2cm: MRI in 1 year
 - Cyst 2-3cm: if cyst is not clearly an IPMN or MCN then proceed with EUS. If it is an IPMN or MCN, then MRI at 6-12 months.

- If the cyst is determined to be a serous cystadenoma, then no further evaluation unless symptomatic.
- Additional Surveillance for a presumed IPMN or MCN (imaging from time of presentation):

(Note: MRCP or MRI/MRCP is the preferred modality for surveillance due to non-invasiveness, lack of radiation, and improved delineation of the main pancreatic duct)

 - ◆ Cyst <1cm
 - MRI every 2 years for 4 years.
 - If stable after 4 years consider lengthening of interval imaging.
 - If increase in cyst size, then MRI or EUS in 6 months.
 - If stable, repeat again in 1 year and if stable return to MRI every 2 years.
 - ◆ Cyst 1-2cm
 - MRI yearly for 3 years
 - If stable for 3 years, then change to MRI every 2 years for 4 years
 - If stable after the additional 4 years, consider lengthening of interval for surveillance.
 - If increase in cyst size, repeat MRI in 6 months. If stable, repeat MRI in 1 year and if remains stable, resume original surveillance schedule.
 - ◆ Cyst 2-3cm
 - MRI every 6-12 months for 3 years
 - If stable after 3 years, change to MRI every year for 4 years
 - If remains stable, consider lengthening of surveillance interval
 - ◆ Cyst >3cm
 - MRI alternating with EUS every 6 months for 3 years
 - If stable for 3 years, increase interval to MRI alternating with EUS yearly for 4 years.
 - If remains stable, consider lengthening of surveillance interval.
 - If increase in cyst size, EUS + FNA
 - ◆ Additional considerations
 - Patients with asymptomatic cysts that are diagnosed as pseudocysts on initial imaging and clinical history, or are determined to be serous cystadenomas, do not require further evaluation.
 - Patients with IPMNs or MCNs with new onset or worsening diabetes, or a rapid increase in cyst size (>3mm/year) during surveillance may have an increased risk of malignancy and should undergo a short-interval MRI or EUS. Additional features which may prompt early evaluation are:
 - Jaundice secondary to the cyst, acute pancreatitis secondary to the cyst, significantly elevated CA 19-9
 - The presence of a mural nodule or solid component either within the cyst or in the pancreatic parenchyma, dilation of the main pancreatic duct >5mm, a focal dilation of the pancreatic duct concerning for main duct IPMN or an obstructing lesion, IPMNs or MCNs measuring ≥ 3 cm in diameter

- The presence of high-grade dysplasia or pancreatic cancer on cytology. In these circumstances, imaging should be at the discretion of the provider.
- Post-op surveillance
 - ◆ Surgically resected serous cystadenomas, pseudocyst, or other benign cyst:
 - No additional imaging after resection
 - ◆ Surgically resected mucinous cystic neoplasms (MCNs) without an associated pancreatic malignancy (can have low, intermediate, or high-grade dysplasia):
 - No additional post-op surveillance
 - ◆ Surgically resected MCNs with invasive cancer:
 - Standard surveillance-based pancreatic cancer guidelines (See **ONC-13.5: Surveillance/Follow Up**) for 5 years. No surveillance required after 5 years.
 - ◆ Surgically resected IPMNs
 - IPMN with cancer
 - Pancreatic cancer surveillance guidelines (See **ONC-13.5: Surveillance/Follow Up**)
 - IPMN with high-grade dysplasia
 - MRI abdomen (CPT® 74183) or EUS every 6 months
 - IPMN with low- or intermediate-grade dysplasia
 - MRI abdomen (CPT® 74183) every 2 years
 - ◆ Surgically resected solid-pseudopapillary neoplasm with negative margins:
 - MRI abdomen (CPT® 74183) yearly for 5 years.
- See **AB-27: MR Cholangiopancreatography (MRCP)** for coding guidelines for MRCP.

AB-31.2: 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).²

References

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AB-32: Pancreatic Pseudocysts

AB-32.1: Pancreatic Pseudocysts

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AB-32.1: Pancreatic Pseudocysts

- CT Abdomen with contrast (CPT® 74160), or without and with contrast (CPT® 74170),¹ 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

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AB-33.1: Pancreatitis

- Ultrasound² (CPT® 76700 or CPT® 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 Abdomen² with contrast (CPT® 74160), without contrast (CPT® 74150) or without and with contrast (CPT® 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
 - ◆ If the initial presentation is atypical, with equivocal amylase or lipase, and if other etiologies for the abdominal pain, such as bowel perforation or ischemia are being considered.
 - ◆ Suspected pancreatitis and ultrasound findings do not explain symptoms (gallstones, common duct, etc.).
 - ◆ Plain abdominal X-ray (KUB) and ultrasound (CPT® 76700 or CPT® 76705) are not characteristic and diagnostic in known chronic pancreatitis.
- MRI Abdomen without and with contrast² (CPT® 74183) is considered if:
 - ◆ The clinical indications for CT are met or equivocal, but there are contraindications for its use.
- MR Cholangiopancreatography^{1,2} 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® 76700 or CPT® 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) conditions¹:

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.¹

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

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

- 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

AB-34.1: Spleen	113
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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/CT (CPT® 78815).
 - No prior imaging:
 - No known malignancy:
 - Suspicious imaging features: (suggesting possible malignancy)
 - MRI abdomen (CPT® 74183) if not already done or biopsy
 - If MRI still inconclusive and biopsy is not feasible then PET/CT (CPT® 78815) can be considered
 - Indeterminate imaging features: (equivocal but not suspicious for malignancy)
 - Follow up MRI abdomen (CPT® 74183) in 6 and 12 months.
 - Known malignancy:
 - < 1 cm: follow up MRI abdomen (CPT® 74183) in 6 and 12 months.
 - > 1 cm: consider MRI abdomen (CPT® 74183) if not done, biopsy
 - If MRI still inconclusive and biopsy is not feasible then PET/CT (CPT® 78815) 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 Abdomen (CPT® 76700 or CPT® 76705) and Pelvis (CPT® 76856 or CPT® 76857) or CT^{3,4,5} 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.

References

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AB-35: Indeterminate Renal Lesion

AB-35.1: Indeterminate Renal Lesion

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AB-35: Indeterminate Renal Lesion– General Information

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

- Incidental Renal Mass on Non-Contrast CT
 - ◆ If characterized as heterogeneous (thick or irregular wall, mural nodule, septa or calcification):
 - Considered indeterminate. MRI abdomen without and with contrast (CPT® 74183) or CT abdomen without and with contrast (CPT® 74170)
 - ◆ If characterized as homogenous (thin or imperceptible wall, NO mural nodule, septa or calcification):
 - 10 to 20 HU (Hounsfield units)
 - Likely benign, not fully characterized: no further workup
 - 21 to 69 HU
 - Indeterminate: MRI or CT abdomen without and with contrast (CPT® 74183 or CPT® 74170)
 - ≥70 HU
 - Hemorrhagic or proteinaceous cyst, unlikely to be neoplastic: no further workup
 - ◆ If characterized as TSTC (too small to characterize) and homogenous:
 - If labelled likely benign cyst, not fully characterized:
 - No further workup
 - If labelled inconclusive based on subjective evaluation:
 - Considered indeterminate. MRI abdomen without and with contrast (CPT® 74183) (preferred) or CT abdomen without and with contrast (CPT® 74170) within 6-12 months
- Incidental Renal Mass on Contrast-Enhanced CT
 - ◆ If characterized as heterogeneous: thick or irregular wall, mural nodule, septa or calcification:
 - Considered indeterminate. MRI abdomen without and with contrast (CPT® 74183) or CT abdomen without and with contrast (CPT® 74170)
 - ◆ If characterized as homogenous: thin or imperceptible wall, NO mural nodule, septa or calcification:
 - 10 to 20 HU
 - No further workup
 - >20 HU (solid or complicated cystic mass)
 - Considered indeterminate. MRI abdomen without and with contrast (CPT® 74183) or CT abdomen without and with contrast (CPT® 74170)
 - ◆ If characterized as TSTC, homogenous:
 - If labelled likely benign cyst, not fully characterized:
 - No further workup
 - If labelled inconclusive based on subjective evaluation:

- Considered indeterminate. MRI abdomen without and with contrast (CPT® 74183) (preferred), or CT abdomen without and with contrast (CPT® 74170) within 6-12 months
- Incidental cystic renal mass on CT or MRI without and with contrast (completely characterized, and does NOT contain fat)
 - ◆ Bosniak I (benign simple) or II (minimally complicated)
 - No further workup
 - ◆ Bosniak IIF
 - CT abdomen without and with contrast (CPT® 74170) or MRI abdomen without and with contrast (CPT® 74183) at 6 and 12 months, then yearly for 5 years
 - If no changes for 5 years, cyst is considered benign and of no clinical significance
 - ◆ Bosniak III or IV should be referred for additional management or if chosen, active surveillance (See Active Surveillance guideline)
- Incidental solid renal mass or incidental mass too small to characterize evaluated on CT or MRI without and with contrast and does NOT contain fat
 - ◆ TSTC
 - If labelled likely benign cyst:
 - No further workup
 - If labelled inconclusive based on subjective evaluation:
 - MRI abdomen without and with contrast (CPT® 74183) (preferred), or CT abdomen without and with contrast (CPT® 74170) within 6-12 months
 - ◆ If solid mass <1.0cm
 - MRI abdomen without and with contrast (CPT® 74183) (preferred), or CT abdomen without and with contrast (CPT® 74170) beginning at 6-12 months, then yearly for 5 years
 - If stable at 5 years (average growth ≤ 3 mm per year): No further workup
 - If mass shows growth (≥ 4 mm per year) or morphologic change: refer for management, consider renal biopsy. If biopsy is technically challenging or relatively contraindicated, a T2 weighted image MRI abdomen without and with contrast (CPT® 74183) can be performed
 - ◆ Solid mass 1.0-4.0cm:
 - Considered a small renal neoplasm: refer for management, consider biopsy. If biopsy is technically challenging or relatively contraindicated, a T2 weighted imaging MRI abdomen without and with contrast (CPT® 74183) can be performed. If active surveillance chosen due to limited life expectancy or co-morbidities, See Active Surveillance guideline.
 - ◆ Solid renal mass >4.0cm
 - Considered a renal neoplasm: refer for management, or biopsy. If biopsy is technically challenging or relatively contraindicated, a T2 weighted image MRI abdomen without and with contrast (CPT® 74183) can be performed. If active surveillance chosen due to limited life expectancy or co-morbidities, See Active Surveillance guideline

- Incidental renal mass containing fat (contains a region of interest measuring < -10 HU)
 - ◆ No calcification angiomyolipoma (AML)
 - Solitary and without documentation of growth:
 - <4cm: no further workup
 - ≥4cm, and considered an AML with potential for clinical symptoms: refer for management.
 - Multiple lesions or growth documented based on old studies:
 - Refer for management. If active surveillance chosen due to limited life expectancy or co-morbidities, See Active Surveillance guideline.
 - ◆ With calcification (suspected renal cell carcinoma):
 - CT abdomen without and with contrast (CPT® 74170) or MRI abdomen without and with contrast (CPT® 74183) if only a non-contrast CT has been performed. If active surveillance chosen due to limited life expectancy or co-morbidities, See Active Surveillance guideline.
- Active Surveillance
 - ◆ If active surveillance is chosen for a suspected or confirmed RCC in a patient with limited life expectancy or high surgical risk due to co-morbidities the schedule is as follows:
 - CT abdomen without and with contrast (CPT® 74170) or MRI abdomen without and with contrast (CPT® 74183) every 3 months for the first year, every 6 months for the second and third years, and then annually

NOTE: PET-CT or PET-MRI are not recommended because their role evaluating the incidental renal mass is limited.¹

Bosniak Classification:

I- Benign simple cyst with a hairline thin wall without septa, calcification, or solid component. Homogeneous near-water attenuation density (10 to 20 HU) without enhancement.

II- Benign minimally complicated cyst that may contain a few hairline thin septa that may have “perceived” but not measurable enhancement. Fine calcification or a segment of slightly thickened calcification may be present in the wall or septa. Also, a well-marginated nonenhancing homogeneous mass <3cm with density above simple fluid attenuation (hyperdense cyst).

IIF- Usually benign complicated renal cyst with multiple hairline thin septa or minimal smooth thickening of the wall or septa. Wall or septa may contain thick and nodular calcification and may have “perceived” but not measurable enhancement. Also, a well-marginated intrarenal nonenhancing mass >3cm with density above simple fluid.

III -Indeterminate complicated cystic renal mass with thickened irregular walls or septa that have measurable enhancement.

IV-Malignant cystic renal mass with enhancing soft tissue components (cystic renal cell carcinoma).

From the Journal of the American College of Radiology¹

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AB-36: Renal Failure

AB-36.1: Renal Failure

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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 failure¹.
- MRA Abdomen (CPT®74185) can be utilized when there is suspected¹:
 - ◆ 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.¹
- Nuclear renal imaging (CPT®78701, CPT®78707, CPT®78708, CPT®78709) can be considered for any of the following:^{3,4}
 - ◆ 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:³
 - ◆ 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

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AB-37.1: Renovascular Hypertension

- See **PVD-6.5: Renovascular Hypertension**

AB-38: Polycystic Kidney Disease

AB-38.1: Polycystic Kidney Disease

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AB-38.1: Polycystic Kidney Disease

- Ultrasound¹ (CPT®76770 or CPT®76775) can be performed for:
 - ◆ Suspected polycystic kidney disease
 - ◆ Screening individuals at risk for autosomal dominant polycystic disease (ADPKD)

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AB-39: Hematuria and Hydronephrosis

AB-39.1: Hematuria with Urinary Tract Infection (UTI)	127
AB-39.2: Hematuria, not Related to Urinary Tract Infection (UTI) or Flank Pain (Asymptomatic Hematuria)	127
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AB-39.4: Hydronephrosis of unexplained or indeterminate cause^(3, 4)	128

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 ≤ 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® 74178).
- Females >40 years of age, may undergo CT Urogram¹ (CPT® 74178)
- Males with UTI should be imaged, See **AB-40: Urinary Tract Infection (UTI)**
- NOTE: 3-D Reconstruction enhances a CT Urogram. Requests for 3-D reconstruction (CPT® 76377) for a CT Urogram can be approved.

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

- Multiphasic CT Urogram (CPT® 74178)
- If CT contraindicated (renal insufficiency, contrast allergy):
 - ◆ MR urography without and with contrast (CPT® 74183 and CPT® 72197) or without contrast
 - if pregnant or contrast contraindicated CPT® 74181 and CPT® 72195
 - If both multiphase CT and MRI are contraindicated:
 - CT urography without contrast (CPT® 74176) or renal US (CPT® 76775 or CPT® 76770) can be approved
- If persistent or recurrent asymptomatic hematuria with an initial negative urologic workup, repeat imaging within 3 to 5 years should be considered.
- NOTE: 3-D Reconstruction enhances a CT Urogram. Requests for 3-D reconstruction (CPT® 76377) for a CT Urogram can be approved.

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

- CT Abdomen and Pelvis without contrast (CPT® 74176) or CT Urogram (CPT® 74178)
- NOTE: 3-D Reconstruction enhances a CT Urogram. Requests for 3-D reconstruction (CPT® 76377) for a CT Urogram can be approved.

AB-39.4: Hydronephrosis of unexplained or indeterminate cause^{3, 4}

- CT Urogram (CPT® 74178)
- NOTE: 3-D Reconstruction enhances a CT Urogram. Requests for 3-D reconstruction (CPT® 76377) for a CT Urogram can be approved.
- Patients with known uncomplicated hydronephrosis, neurogenic bladder, myelomeningocele (open spinal dysraphism), or spina bifida can have follow-up/surveillance imaging with retroperitoneal ultrasound (CPT® 76770) every 6 to 12 months

References

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AB-40: Urinary Tract Infection (UTI)

AB-40.1: Upper (Pyelonephritis)	130
AB-40.2: Lower	130

AB-40: Urinary Tract Infection

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) if¹:
 - ◆ Suspected complicated: diabetes, immune-compromised, history of stones, prior renal surgery, elevated creatinine, or fever ≥ 101 F (≥ 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 ultrasound² (CPT® 76770 or CPT® 76775) and if further imaging is necessary, MRI Abdomen and Pelvis³ (contrast as requested).

AB-40.2: Lower

- CT Abdomen and Pelvis without and with contrast (CPT® 74178) if³:
 - ◆ Suspected complicated: diabetes or immunocompromised or history of stones or prior renal surgery, elevated creatinine or fever ≥ 101 F (≥ 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.
- See **PV-13: Periurethral Cysts and Urethral Diverticula** in the Pelvis Imaging Guidelines.

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AB-41: Patent Urachus

AB-41.1: Patent Urachus

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AB-41.1: Patent Urachus

- See **PV-23.1: Patent Urachus** in the Pelvis Guideline

AB-42: Transplant

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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 Carcinoma¹:
 - 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^{1,2}:
 - 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 Cholangitis¹ (PSC)
 - MRCP (See **AB-27: MR Cholangiopancreatography (MRCP)** for correct reporting/coding)
- Pre-operative studies immediately prior to liver transplant³:
 - ◆ 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 (CPT® 91200) (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.⁴

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

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AB-43: Hepatic and Abdominal Arteries

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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

- For the evaluation of a suspected neuroendocrine tumor of the abdomen, please refer to section **ONC-15.2: Gastrointestinal/Pancreatic Neuroendocrine Cancers - Suspected/Diagnosis**

AB-45: Liver Elastography

- Vibration-Controlled Transient Elastography (VCTE) (e.g. Fibroscan, CPT®91200) maybe considered appropriate 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 of the liver (MRE, CPT®76391) 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.
- The use of VCTE and MRE are considered experimental and investigational for all other indications with regards to liver disease
- The use of other ultrasound elastographic techniques (CPT® 76981, CPT®76982, and CPT®76983), including but not limited to acoustic radiation force impulse imaging or real-time tissue elastography for any indication is considered experimental or investigational at this time

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.

References

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