AmeriHealth Caritas Louisiana

National Imaging Associates, Inc.	
Clinical guidelines **ABDOMEN MRI** **MRCP (Magnetic Resonance Cholangiopancreatography)** **MRE (Magnetic Resonance Enterography)** **MRU (Magnetic Resonance Urography)**	**Original Date: September 1997**
CPT Codes: 74181, 74182, 74183, S8037, +0698T	**Last Revised Date: ~~March 2022~~May 2023**
Guideline Number: NIA_CG_031	**Implementation Date: January 202~~3~~4**

GENERAL INFORMATION

- *It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*
- ***Where a specific clinical indication is not directly addressed in this guideline, medical necessity determination will be made based on widely accepted standard of care criteria. These criteria are supported by evidence-based or peer-reviewed sources such as medical literature, societal guidelines and state/national recommendations.***

IMPORTANT NOTE: A single authorization for CPT codes 74181, 74182, 74183, S8037 covers imaging of the biliary tree and its attached organs, i.e., the liver, gallbladder (GB), and pancreas. These same codes also cover MRI abdomen, ~~MRE (~~Magnetic Resonance Enterography (MRE), and ~~MRU (~~Magnetic Resonance Urography (MRU). Multiple authorizations are not typically required. When both Magnetic Resonance Cholangiopancreatography (MRCP) and MRI abdomen are requested, documentation requires a medical reason clearly indicating why both are needed, i.e., that meets guidelines for imaging of bowel, kidneys, or areas other than liver, pancreas, GB, and biliary tree as well.

Note: There ~~is~~are no MRI Abdomen/Pelvis combo (comparable to a CT Abdomen/Pelvis) such that if imaging of both the abdomen and pelvis are indicated, two separate exams (and authorization) are required (i.e., MRI Abdomen and MRI Pelvis)

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INDICATIONS FOR ABDOMEN MRI

Evaluation of ~~suspicious known mass/tumors~~masses seen on ultrasound or CT for further evaluation of indeterminate or questionable findings:

- ~~Initial evaluation of suspicious abdomen masses/tumors found only in the abdomen by physical exam or imaging study, such as ultrasound (US), or CT.[1]~~
  - ~~Surveillance:~~ **Initial imaging (see organ specific guidance below)**
  - One follow-up exam to ensure no suspicious change has occurred in a tumor in the pelvis. No further surveillance MR unless tumor(s) is/are specified as highly suspicious, or change was found on exam or last follow-up imaging~~.~~.[1]
  - **For abnormal incidental pelvic lymph nodes when follow-up is recommended based on prior imaging (initial 3-month follow-up)[2]**

Initial staging of known cancer

~~**Follow-up of known cancer[2, 3]:**~~

- ~~In patient undergoing active treatment within the past year or per surveillance imaging tip sheet that summarizes NCCN recommendations[3]~~

Follow-up of known cancer[3, 4]:

- **In a patient undergoing active treatment within the past year or as per surveillance imaging guidance for that cancer**
- With suspected ~~pelvic~~**abdominal** metastasis based on a sign, symptom, (e.g., anorexia, early satiety, intestinal obstruction, night sweats, pelvic pain, weight loss, vaginal bleeding) or an abnormal lab value (alpha-fetoprotein, CEA, CA 19-9, p53 mutation)

- ~~For abnormal incidental abdominal lymph nodes when follow-up is recommended based on prior imaging (initial 3-month follow-up)[4]~~
- ~~For known prostate cancer abdomen MRI can be approved when requested in combination with pelvis MRI when meets GL for pelvis MRI~~

For evaluation of an organ or abnormality seen on previous imaging

ADRENAL

- ~~To locate a pheochromocytoma once there is clear biochemical evidence (See Background)[5]~~
- ~~Suspected adrenal secreting tumor after full clinical and biochemical work-up[6, 7]~~
  - **Indeterminate adrenal lesion seen on prior imaging**
  - **For further evaluation of** suspected adrenal **tumors and/or endocrine disorders when there is clinical and laboratory evidence to suggest an adrenal source; see Background for specific laboratory testing that is needed based on suspected diagnosis**
  - **Adrenal** mass ~~≥ 1~~**< 4** cm incidentally discovered with ~~no history of malignancy (~~**benign characteristics,** one follow-up ~~in 6 – 12 months to document stability~~**at 6 months then annually x 2 years (no further imaging if stable, see Background for details)**

- If adrenal mass ≥ 4 cm and no diagnosis of cancer, can approve for ~~preoperative~~**either pre-operative** planning ~~(~~**OR if** surgery ~~to rule out adrenal cortical carcinoma)~~**is not done, can repeat imaging in 6-12 months**

- ~~For adrenal mass < 4 cm with history of malignancy (if ≥ 4 cm consider biopsy or FDG-PET/CT unless pheochromocytoma is suspected)~~
- ~~Yearly surveillance for patients with Multiple Endocrine Neoplasia type 1 (MEN1) beginning at age 10~~[8]
- ~~For patients with Von Hippel Lindau (VHL) surveillance at least every other year starting at age 16 (abdominal ultrasound starting at age 8)~~[9]
- ~~Surveillance MRI (include pelvis) every 2-3 years for patients with Hereditary Paraganglioma syndromes types 1-5~~[10]
  - **Multiple Endocrine Neoplasia type 1 (MEN1) every 1-3 years (chest CT or MRI also approvable for this syndrome at same interval)** [5, 6]
  - **Von Hippel Lindau (VHL) at least every other year starting at age 16, can also approve pelvis MRI (abdomen and pelvis ultrasound starting at age 8)**[7]
  - **Hereditary Paraganglioma syndromes every 2-3 years IF whole body MRI (unlisted MRI CPT 76498) not available (WB MRI is the preferred study; if unable to do whole body MRI may approve abdomen MRI, pelvis MRI, skull base and neck MRI and chest CT. SDHB mutation may start at age 6, all other SDHx start at age 10.**

LIVER

- ~~Indeterminate liver lesion ≥ 1cm seen on prior imaging~~[11]
- ~~Indeterminate liver lesion < 1cm on initial imaging, with known history of extrahepatic malignancy, or known chronic liver disease~~
  - ~~Hepatitis/hepatoma~~ **Indeterminate liver lesion seen on prior imaging**[8, 9]
  - **For evaluation of rising AFP (requires a ≥7 ng/mL increased in AFP per month) in patients at high risk for HCC (known cirrhosis and/or chronic hepatitis B**[10]**, see Background for additional risk categories)**
  - **For** screening ~~after ultrasound is abnormal, equivocal,~~**in patients at high risk for HCC (see above) every 6 months when prior ultrasound is insufficient to evaluate the liver due to steatosis/fatty liver** or ~~non-diagnostic (may be limited in patients who are obese,~~**nodular liver**
    - **The finding of steatosis/fatty liver and/or nodular liver alone on an ultrasound report is insufficient for approval; the report must specify that** those ~~with underlying hepatic steatosis, as well as nodular livers).~~[12-15] ~~(No literature supports the use of AFP alone in the screening of HCC).~~ **findings prevent adequate visualization of the liver by ultrasound**
  - For jaundice or abnormal liver function tests after equivocal or abnormal ultrasound~~[16]~~[11]
  - For surveillance of HCC **(MRI or CT)** in patients who have received liver-directed therapy, surgical resection, medical treatment, or transplant ~~(MRI or CT)~~ at one-month post treatment and then every 3 months for up to two years ~~(See Background)~~[16, 17]**, then every 6 months**[11, 12]

- For follow-up of suspected adenoma every 6-12 months
- For surveillance of patients with primary sclerosing cholangitis (also CA 19-9), every 6-12 months after the age of 20 (MRI and MRCP preferred over CT)[18]~~3~~
- For follow-up of focal nodular hyperplasia (FNH~~) annually~~**), repeat imaging in 6-12 months to ensure stability. Additional imaging beyond that is needed only** if ~~US is inconclusive~~[19]**atypical features or diagnosis is still in question**[14]**.**

- ~~For elastography in chronic liver disease to stage hepatic fibrosis~~[15] ~~when transient elastography with ultrasound is insufficient~~
  - **For annual elastography in chronic liver disease to stage hepatic fibrosis when transient elastography with ultrasound is insufficient**
  - In patients with Beckwith-Wiedemann syndrome and abnormal ultrasound or rising AFP[20]15
- ~~In Gaucher Disease when ultrasound (including Doppler assessment of portal blood flow) is insufficient~~[21]
  - ~~For initial evaluation~~
  - ~~To evaluate gross scarring and/or portal hypertension~~
  - ~~To monitor hepatic volume/hepatomegaly annually~~
  - **For evaluation of known liver metastases (Dedicated liver MRI with Eovist is not considered overlapping to a PET if there are known metastases in the liver (see Background))**
  - **For evaluation and monitoring of Gaucher Disease at initial diagnosis and every 12 to 24 months**[16]

Evaluation of iron overload in the following settings

- Initial evaluation of liver iron in Hemochromatosis diagnosed in lieu of liver biopsy[22]17
- Annual evaluation for high-risk patients: transfusion-dependent thalassemia major, sickle cell disease, Gaucher Disease, and other congenital anemias[23]18 when ultrasound is insufficient

PANCREAS

- Pancreatic ~~cystic lesion found~~**cyst** on initial imaging**, approve for initial characterization of lesion**

- ~~For follow-up of known intraductal papillary mucinous neoplasm (IPMN) and mucinous cystic neoplasm (MCN) (if there are no high-risk characteristics, see Background section)~~[24]~~:~~
  - **Follow-up imaging for pancreatic cyst as below**[19]
    - For incidental and asymptomatic cysts <**1.**5 mm, ~~one follow-up at three years~~[25]**-AND:**
      - ~~For cysts 5mm-1cm~~**Age < 65,** image **annually x 5 years, then** every 2 years ~~for 4 years, and~~ if stable ~~may lengthen intervals~~
      - ~~For cysts 1-2cm image~~**Age 65-79, imaging** every ~~year for 3~~**2** years ~~and~~**x 5, then stop** if stable
    - **For cysts 1.5-1.9 cm with main pancreatic duct communication (MPD), image annually x 5 years, then** every 2 years ~~for 4 years, and~~**x 2, stop** if stable ~~may lengthen intervals~~**at year 9.**

- ~~Cysts that are 2-3 cm followed~~**For cysts 2.0-2.5 cm with MPD communication, image** every 6~~ 12~~ months ~~for 3~~**x 4, then annually x 2, then every 2** years ~~and~~**x 3, stop** if stable ~~then yearly for 4 years and if stable may lengthen intervals (can also use EUS-Endoscopic ultrasound)~~**at year 10.**
- For ~~lesions ≥ 30 mm MRI/CT~~ **cysts 1.5-2.5 cm with NO MPD communication (**or ~~EUS~~**cannot be determined), image** every 6 ~~months for 3 years~~**mos. x 4**, then ~~imaging alternating with EUS~~**annually x 2 then** every ~~year for 4~~**2** years ~~and consider lengthening interval~~**x 3, stop** if stable **at year 10.**
- ~~Annual surveillance~~**For cysts > 2.5 cm on surveillance (i.e., intervention has not been chosen), image every 6 mos. x 4, then annually x 2 years, then every 2 years x 3. Stop if stable at year 10.**
- **Patients > 80 years of age at presentation are imaged less frequently: image every 2 years x 2, stop if stable at year 4 (intervals are the same regardless of size if surveillance chosen)**
- **GROWTH or suspicious change on follow-up imaging scan may warrant more frequent surveillance**

- **For localization of a functional pancreatic tumor, see Background (endocrine) once diagnosis is confirmed (or highly suspected)**
- **Annual surveillance** for individuals determined to have an increased lifetime risk of developing pancreatic cancer~~,~~ based on ~~genetic predisposition or family history~~**the following:**
  - **SKT11 variant (including Peutz-Jeghers):** starting at age ~~5~~**3**0 **(**or 10 years younger than the earliest ~~age of~~**pancreatic** cancer ~~affected first-degree relative (except with Peutz-Jeghers start at age 30-35~~**diagnosis in the family, whichever is earlier**)
  - ~~Von Hippel Lindau~~**CDKN2A variant:** starting at age ~~16 at least every other year (abdominal ultrasound~~**40 (or 10 years younger than the earliest pancreatic cancer diagnosis in the family, whichever is earlier)**
  - **Other variants and based on family history as detailed below:** Starting at age ~~8)~~**50 (or 10 years younger than the earliest pancreatic cancer diagnosis in the family, whichever is earlier) for the following:**
    - **≥ 1 first- or second-degree relative with history of pancreatic cancer from the same side of the family as the identified variant AND known mutation in other pancreatic susceptibility genes (ATM, BRCA1, BRCA2, MLH1 (Lynch), MSH2, MSH6, EPCAM, PALB2, TP53)**
    - **≥ 2 first-degree relatives with a history of pancreatic cancer from the same side of the family**
    - **≥ 3 first- and/or second-degree relatives with a history of pancreatic cancer from the same side of the family**
  - ~~o~~ Hereditary Pancreatitis **(such as PRSS1 variant)** starting ~~at age 40 or~~ 20 years ~~before first attack~~**after onset of pancreatitis, or at age 40 years, whichever is earlier**~~[3, 26, 27]~~[6, 20-22] ******
  - ~~For other approvable genetic syndromes that increase lifetime risks, see Background section~~

- ~~Annual surveillance for patients with MEN1 for primary neuroectodermal tumors (pNET) starting at age 10 (EUS also considered)~~
  ~~For localization of an insulinoma, once diagnosis is confirmed (CT preferred)[28]~~
    -
    - **Multiple Endocrine Neoplasia type 1 (MEN1) (to screen for PanNET (neuroendocrine tumor) every 1-3 years (chest CT or MRI also approvable for this syndrome at same interval)**

RENAL

- ~~For an indeterminate renal mass on other imaging[29]~~
  - **For an indeterminate renal mass on other imaging[23]**
  - Active surveillance for indeterminate cystic renal mass, not a simple renal cyst[30][24] (See Bosniak criteria in Background section).
  - Follow-up for solid renal masses under ~~1~~3 cm at 6 and 12 months, then annually[31][25, 26]
- ~~Annual surveillance for patient with tuberous sclerosis and known angiomyolipomas[32]~~
- ~~For surveillance of patients with Von Hippel Lindau at least every other year to assess for clear cell renal cell carcinoma to begin at age 16 (screening with ultrasound starting at around age 8)[9]~~
- ~~Active surveillance for renal cell carcinoma in patients with Birt-Hogg syndrome every 36 months[33]~~
  - **Surveillance for known angiomyolipoma (AML): annually if known tuberous sclerosis (TSC) or AML size is > 4 cm; every 2 years if AML size is 3-4 cm[27-29] (if AML < 3 cm, CT or MRI not needed unless pt has TSC)**
  - **For surveillance of patients with the following known genetic mutations at the following intervals (MRI preferred due to lifetime radiation risk, CT can be approved if needed for surgical planning or CI to MRI):**
    - **BAP1-TPDS (BAP-1 tumor predisposition syndrome) every 2 years starting at age 30**
    - **BHDS (Birt-Hogg-Dube) every 3 years starting at age 20**
    - **HLRCC (hereditary leiomyomatosis and renal cell cancer) annually starting at age 8**
    - **HPRC (hereditary papillary renal carcinoma) every 1-2 years starting at age 30**
    - **PGL/PCC (hereditary paraganglioma/pheochromocytoma) every 4-6 years starting at age 12**
    - **TSC (tuberous sclerosis complex) without known AML every 3-5 years starting at age 12**
      - **TSC + known AML annually**
  - **VHL (Von Hippel Lindau) every 2 years starting at age 15[30]**
  - MRU (may also approve MR pelvis for MR urography) when ultrasound is inconclusive, and CT (CTU) cannot be done or is inconclusive and MRI is recommended
  - Polycys~~y~~tic Kidney Disease
    - Total kidney volume (TKV) is an important measure for assessing disease progression as it can determine prognosis through its ability to predict decline in renal function

- Abdomen MRI is approvable prior to treatment (an ultrasound is not required prior to MR)
- If MR is contraindicated or cannot be performed, Abdomen CT is approvable

SPLEEN

- ~~Incidental findings of the spleen on ultrasound or CT that are indeterminate[34]~~
- ~~In Gaucher Disease when ultrasound is insufficient[21]~~
  - ~~For initial evaluation~~
  - ~~To evaluate splenic fibrosis or the presence of focal splenic lesions~~
  - ~~To monitor splenic volume/splenomegaly annually~~
- **Incidental findings of the spleen on ultrasound or CT that are indeterminate[31]**
- **For evaluation and monitoring of Gaucher Disease at initial diagnosis and every 12 to 24 months[16]**

Suspected Hernia

- Occult, spigelian, incisional or epigastric hernia when physical exam and prior imaging (ultrasound **AND** CT) is non-diagnostic or equivocal[~~35-38~~32-35] and limited to the abdomen
- Suspected incarceration or strangulation based on physical exam (guarding, rebound) or prior imaging (CT preferred)[~~39~~36]

For evaluation of suspected infection or ~~for follow-up known infection (may approve in conjunction with~~inflammatory disease when a contraindication to CT has been provided (includes MR urography (MRU) which includes Pelvis MRI when indicated~~)~~)[8, 37-39]

- Persistent abdominal pain not explained by previous imaging/procedure
- Any known infection that is clinically suspected to have created an abscess in the abdomen

- ~~Any history of fistula limited to the abdomen that requires re-evaluation or is suspected to have recurred~~
- Abnormal fluid collection limited to the abdomen seen on prior imaging that needs follow-up evaluation
- Suspected peritonitis (would typically need to include MRI Pelvis) when abdominal pain and tenderness to palpation are present, and **at LEAST one** of the following:
  - Rebound, guarding or rigid abdomen, **OR**
  - Severe tenderness to palpation over the entire abdomen

- ~~Complications of diverticulitis with severe abdominal pain or severe tenderness or mass, not responding to antibiotic treatment (prior imaging study is not required for diverticulitis diagnosis)[40]~~

- **Complications of diverticulitis (diagnosed either clinically or by imaging) with severe abdominal pain or severe tenderness or mass, not responding to antibiotic treatment)[40]**

For evaluation of ~~suspected inflammatory bowel disease or follow-up known disease~~Inflammatory Bowel Disease (IBD) such as Crohn's or Ulcerative Colitis (includes MR enterography and can also approve Pelvis MRI/MRE~~)~~)[12, 41-45]

- ~~For~~ For suspected inflammatory bowel disease ~~(Crohn's disease or ulcerative colitis) with abdominal pain **AND** one of the following[17, 41, 42]:~~
  - ~~Chronic diarrhea~~
  - ~~Bloody diarrhea~~
  - ~~High clinical suspicion~~ after complete work up including physical exam, labs, ~~endoscopy with biopsy[17, 41-43]~~**and recent colonoscopy**
  - Known inflammatory bowel disease ~~(Crohn's or ulcerative colitis) with recurrence or worsening signs/symptoms requiring re-evaluation or for monitoring therapy[42]~~**with recurrence or worsening signs/symptoms requiring re-evaluation or for monitoring therapy**

Other indications for abdominal MRI (and pelvis where appropriate)

- **For history of fistula in the abdomen that requires re-evaluation or is suspected to have recurred**
- **Prior to liver transplantation (MRCP also approvable), may repeat studies immediately prior to transplantation with known HCC, PSC, or cholangiocarcinoma**
- **Prior to solid organ transplantation**

Other indications for abdominal MRI (and pelvis where appropriate) when CT is inconclusive or cannot be completed

- Persistent abdominal/pelvic pain not explained by previous imaging
- To locate a pheochromocytoma once there is clear biochemical evidence (See Background)
- For **any** B symptoms of fevers more than 101° F, drenching night sweats, or unexplained weight loss of more than 10% of body weight over 6 **months with documented concern for lymphoma/malignancy when CT is inconclusive or cannot be completed (can also approve pelvis MRI, when appropriate)**

- ~~Unexplained weight loss of 10% of body weight in two months (patient history is acceptable); with second MD visit documenting further decline in weight[44]~~
- ~~Unexplained weight loss of 5% of body weight in six months confirmed by documentation to include the following[45, 46]:~~
  - ~~Related history and abdominal exam~~
  - ~~CXR~~
  - ~~Abdominal ultrasound~~
  - ~~Lab tests, including TSH~~
  - ~~Colonoscopy if 50-85 years old~~
- ~~For fever of unknown origin (temperature of ≥ 101 degrees for a minimum of 3 weeks) after standard diagnostic tests are negative[47]~~

- ~~For suspected or known retroperitoneal fibrosis after complete workup and ultrasound to determine extent of disease[48]~~
- ~~To screen patients with dermatomyositis for occult malignancy[49]~~
- ~~For diffuse, unexplained lower extremity edema with negative or inconclusive ultrasound[50]~~
  - **Clinically significant unintentional weight loss i.e., ≥5% of body weight in less than 12 months (or ≥2% in one month), with signs or symptoms suggestive of an abdominal cause (see Background)**
  - **Ongoing unexplained clinically significant weight loss i.e., ≥5% of body weight in less than 12 months (or ≥ 2% in one month)[46-48] after initial workup (see Background) has been completed, no cause identified, and second visit documenting further decline in weight[49]**
  - **For fever of unknown origin (temperature of ≥ 101 degrees for a minimum of 3 weeks) after standard diagnostic tests are negative (see Background)[50]**
  - **For suspected or known retroperitoneal fibrosis after complete workup and ultrasound to determine extent of disease[51]**
  - **For suspected paraneoplastic syndrome (including dermatomyositis) with high suspicion of abdominal malignancy and appropriate workup has been done (see Background for details)**
  - **Prior to Bone Marrow Transplant (BMT) (along with CT Chest[52], CT Sinus and Brain MRI)[53]). Alternatively, PET might be sufficient to evaluate the abdomen and pelvis if indicated based on that malignancy (see PET Guideline)For diffuse, unexplained lower extremity edema with negative or inconclusive ultrasound[54]**
  - For suspected May-Thurner syndrome (CTV/MRV preferred)~~[51, 52]~~[55, 56]
- ~~For further evaluation of an isolated right varicocele with additional signs and symptoms that suggest malignancy or suspicious prior imaging findings[53]~~

  - **For further evaluation of a new onset or non-reducible varicocele[57]**

Other Indications

Further evaluation of indeterminate findings on prior imaging (unless follow up is otherwise specified within the guideline):

- **For initial evaluation of an inconclusive finding on a prior imaging report that requires further clarification**
- **One follow-up exam of a prior indeterminate MR/CT finding to ensure no suspicious interval change has occurred. (No further surveillance unless specified as highly suspicious or change was found on last follow-up exam)**

Indication for combination studies for the initial pre-therapy staging of cancer, OR active monitoring for recurrence as clinically indicated OR evaluation of suspected metastases

- ≤ 5 concurrent studies to include CT or MRI of any of the following areas as appropriate depending on the cancer: Neck, Abdomen, Pelvis, Chest, Brain, Cervical Spine, Thoracic Spine, or Lumbar Spine

INDICATIONS FOR MRCP[54-56]58-60]

- To confirm choledocholithiasis in patients in the acute setting after ultrasound has been completed[56-58]60-62]
- Suspected acute pancreatitis with atypical signs and symptoms, including equivocal amylase and lipase and diagnosis other than pancreatitis may be possible. (MRCP and CT/MRI may be ordered simultaneously in this setting and may be approved)[56, 59]60, 63]
- ~~Pancreatitis by history (greater than 4 weeks), (including pancreatic pseudocyst) with continued abdominal pain suspicious for worsening, or re-exacerbation. (MRCP and CT may be ordered simultaneously in this setting and may be approved)[56, 59]~~
- ~~Evaluation of suspected congenital anomaly of the pancreaticobiliary tract, e.g., aberrant ducts, pancreas divisum or related complications[60]~~
- ~~For confirmation of choledochal cyst after ultrasound has been done[61]~~Pancreatitis by history (greater than 4 weeks), (including pancreatic pseudocyst) with continued abdominal pain suspicious for worsening, or re-exacerbation. (MRCP and CT/MRI may be ordered simultaneously in this setting and may be approved)[60, 63]
- Evaluation of suspected congenital anomaly of the pancreaticobiliary tract, e.g., aberrant ducts, pancreas divisum or related complications[64]
- For confirmation of choledochal cyst after ultrasound has been done[65]
- For long-term postoperative surveillance for patients with history of choledochal cyst
- For post-surgical biliary anatomy and complications when ERCP is not possible or contraindicated
- For the assessment of benign or malignant biliary strictures
- Evaluation of persistent symptoms when abnormalities are identified on other imaging (e.g., ultrasound, CT, or MRI)
- Evaluation of abnormality related to the pancreatic or biliary tree based on symptoms or laboratory findings and initial imaging has been performed or is contraindicated (e.g., renal failure prevents contrast CT or body habitus limits US)
- Evaluation of pancreatobiliary disease in pregnant patients after ultrasound has been done
- Prior to liver transplantation (Abdomen MRI or Abdomen CT also approvable), may repeat studies immediately prior to transplantation with known HCC, PSC, or cholangiocarcinoma

INDICATIONS RELEVANT TO ABDOMEN MRI OR MRCP

Pre-operative evaluation

- For abdominal surgery or procedure

Post-operative/procedural evaluation

- Follow-up of known or suspected post-operative complication involving only the abdomen
- A follow-up study to help evaluate a patient's progress after treatment, procedure, intervention, or surgery. Documentation requires a medical reason that clearly indicates why additional imaging is needed

If both Abdomen and Pelvis MRI are indicated and the Pelvis MRI has already been approved, then the Abdomen MRI may be approved.

BACKGROUND

***Abdominal Magnetic Resonance Imaging (MRI)** is a proven and useful tool for the diagnosis, evaluation, assessment of severity, and follow-up of diseases of the abdomen and avoids exposing the patient to ionizing radiation. MRI may be the best imaging procedure for patients with allergy to radiographic contrast material or renal failure. It may also be the procedure of choice for suspected lesions that require a technique to detect subtle soft -tissue contrast and provide a three-dimensional depiction of a lesion. Abdominal MRI studies are usually targeted for further evaluation of indeterminate or questionable findings, identified on more standard imaging exams such as ultrasound (US) and CT.

Magnetic Resonance Enterography is an excellent study for assessing submucosal pathology in inflammatory bowel disease. It generates highly reproducible images of the large and small bowel with excellent sensitivity and specificity. It can determine the presence and extent of transmural inflammation, fibrotic disease, and other intra-abdominal complications. It is also useful in assessment of bowel obstruction, abscess formation, tethering and fistula and is less dependent on bowel distention than CT enterography.[17][12] MRE is similar overall to CTE and useful (reduce radiation burden) when multiple studies are likely.[64][2]

Magnetic Resonance Cholangiopancreatography (MRCP) is a non-invasive radiologic technique for imaging the biliary and pancreatic ducts in the clinical setting of cholestatic liver function tests, right upper quadrant pain, recurrent pancreatitis, and assessing postoperative complications. MRCP is reliable for the diagnosis of pancreatic ductal abnormalities, e.g., pancreas divisum. It is also used to diagnose bile duct stones and assess the level of biliary obstruction. MRCP is especially useful as an alternative to ERCP (Endoscopic retrograde cholangiopancreatography), when a noninvasive exam is desired or when there is a very small likelihood that the patient will need therapeutic intervention afforded by ERCP. MRCP is unwarranted in patients with known pathology requiring ERCP-mediated intervention. Due to the variable accuracy of ultrasound in detecting choledocholithiasis, preoperative MRCP prior to cholecystectomy has been advocated particularly in the setting of acute cholecystitis, near normal common bile duct diameter (where ultrasound is less accurate) and elevated liver functions, especially alanine amino transaminase (ALT).[63][66] Secretin-enhanced MR

Cholangiopancreatography has been recently developed to improve the diagnostic quality of MRCP images.[64][7]

In diagnosing acute pancreatitis, MRI and MRCP are not as practical as CT. The latter can be performed more quickly and provide better images due to less motion artifact (if patient cannot cooperate with instructions for MRI) in acutely ill patients.[56] ~~In selected patients, however, such as those who cannot receive iodinated contrast for CT, MRI/MRCP may be considered or used in a complementary fashion to CT.~~[60] **In selected patients, however, such as those who cannot receive iodinated contrast for CT, MRI/MRCP may be considered or used in a complementary fashion to CT.** Complications of chronic pancreatitis using MRCP are well-imaged in cooperative patients.

Cross-sectional imaging (liver ultrasound with Doppler, CT, or MRI) should be completed no more than a month prior to the transjugular intrahepatic portosystemic shunt (TIPS) to assess for vascular patency and look for hepatic masses or other problems that could complicate the procedure.

Post procedure, an ultrasound of the liver is performed a day after to assess shunt patency. Hepatic encephalopathy (HE) is the most common complication and usually occurs 2-3 weeks after insertion of TIPS. Unique complications may include intravascular hemolysis and infection of the shunt. Other complications, which may require cross-sectional imaging, can include capsule puncture, intraperitoneal bleed, hepatic infarction, fistula, hematobilia, thrombosis of stent, occlusion, or stent migration.

Follow-up and maintenance imaging, if complications are suspected, include Doppler ultrasound to assess shunt velocity. If asymptomatic, a sonogram is performed at 4 weeks post placement, then every 6 months to a year. The gold standard for shunt patency is portal venography, usually reserved if concern for shunt occlusion.

OVERVIEW

MRI of the liver – The liver is a common site of metastatic spread. Patients with a history of known or suspected malignancy, especially tumors from the colon, lung, pancreas, and stomach, are at risk for developing hepatocellular carcinoma. Patients with chronic liver disease are also at risk for developing liver cancer and undergo periodic liver screening for focal liver lesion detection, usually with ultrasonography (US). ~~Extra-cellular gadolinium-chelate contrast-enhanced MRI is used for evaluating patients with an abnormal US. Patients with hepatic metastases being considered for metastasectomy undergo contrast-enhanced MRI using tissue-specific contrast agents.~~**Liver-specific contrast agents (gadobenate dimeglumine (Gd-BOPTA, MultiHance) and gadoxetate disodium (Eovist) are taken up by functionally intact hepatocytes, allowing increased visualization of both tumors and liver metastases. As metastatic liver lesions do not take up these contrast agents, a dedicated liver MRI can help identify tumors as it allows more contrast differentiation between the tumor and normal liver tissue. In patients undergoing PET scans for active malignancies and there are either known liver metastases in need of restaging OR indeterminate liver lesions on other imaging (such as PET or**

CT), a dedicated liver MRI is considered complimentary NOT overlapping and can be approved in addition to PET if the patient otherwise meets criteria for PET approval (see PET Guideline for further guidance).

Screening for Hepatocellular carcinoma (HCC) – AASLD (American Association for the Study of Liver Diseases) recommends screening for HCC with ultrasound every 6 months for patients with hepatitis C and B.[12] The literature differs on the role of AFP (alpha fetoprotein) in the screening of HCC. Some authors argue against its use altogether due to its lack of sensitivity and specificity in detecting HCC

Screening for Hepatocellular carcinoma (HCC) – AASLD (American Association for the Study of Liver Diseases) recommends screening for HCC with ultrasound every 6 months for patients with hepatitis C and B.[37] Advanced imaging is recommended when the AFP is rising, regardless of ultrasound results. The main risk factors for HCC are cirrhosis and Hepatitis B. Additional populations for which there is a benefit to surveillance for HCC include: Asian males Hepatitis B carriers ≥ 40 y, Asian female Hepatitis B carriers ≥50 y, Hepatitis B carriers with + family history of HCC and African and/or North American blacks with hepatitis B.[12, 14][10, 68]

and instead recommend ultrasound alone for screening. According to Marquardt, the AASLD and EASLD (European Association for the Study of the Liver) "do not endorse its [AFP] use in clinical routine, neither alone nor in combination with ultrasound". This approach is supported by reports of patients with chronic viral hepatitis and elevated AFP but normal livers on imaging. AFP elevation in these cases is due to hepatic inflammation and viral replication,[65] not neoplasm. Others advocate for combined ultrasound and AFP for screening[66, 67] citing increased sensitivity compared to ultrasound alone in detecting early-stage HCC particularly in cirrhotic patients. In a meta-analysis by Tzartzeva, et al of thirty-two studies (13,367 patients with cirrhosis) ultrasound with AFP had a 63% sensitivity of detecting early-stage HCC compared to 45% for ultrasound alone. In the final analysis, no literature supports the use of AFP alone in the screening of HCC.[67]

MRI or MRCP for surveillance of cholangiocarcinoma in patients with PSC, other risk factors – Cholangiocarcinoma, a cancer with an increase in incidence globally, is very aggressive with 95% of patients dying within 5 years. Because of the superior sensitivity of MRI compared with ultrasound to detect cholangiocarcinoma, it is preferred for imaging surveillance. In a large study of PSC patients, regular surveillance was associated with a higher 5-year survival.[18][13]

The strongest risk factors for both intrahepatic (iCCA) and extrahepatic (eCCA) cholangiocarcinoma are choledochal cysts; cirrhosis is a stronger risk factor for iCCA (i.e., iCCA>eCCA); and choledocholithiasis is a stronger risk factor for eCCA (i.e., eCCA>iCCA).[6][8][9]

MRI of the adrenal glands – The adrenal glands are susceptible for metastases from various tumors, especially of lung or breast. Adrenal lesions may also represent primary tumors of the adrenal cortex of medulla, both benign and malignant. MRI may be done to distinguish between benign and malignant lesions. Metastases are predominantly hypointense on T1-weighted images and hyperintense on T2-weighted images. Benign lesions, which have high lipid content, exhibit a drop in signal intensity on opposed phase chemical shift imaging.

~~In general, masses found < 1 cm do not need to be pursued. If an adrenal mass has diagnostic features of a benign mass, such as a myelolipoma (presence of macroscopic fat), cyst, or hemorrhage (masses without enhancement, defined as change in pre- and postcontrast imaging of <10 HU), no additional workup or follow-up imaging is needed. If the mass has a density of 10 HU on unenhanced CT or signal loss compared with the spleen between in- and opposed-phase images of a chemical-shift MRI (CS-MRI) examination, these features are almost always diagnostic of a lipid-rich adenoma, regardless of size. If no benign imaging features but stable for a year or longer, it is very likely benign and needs no further imaging. The role of adrenal mass biopsy is reserved predominantly to confirm a suspected adrenal metastasis; this procedure has been shown to be safe with a low morbidity.~~

~~If there are signs or symptoms of pheochromocytoma, plasma-free metanephrine and normetanephrine levels or urinary fractionated metanephrines should be obtained prior to biopsy. Imaging is recommended with CT (MRI as second option) once biochemical evidence confirmed. Otherwise, endocrine workup of an incidental adrenal mass is controversial. Current guidelines from the American Association of Clinical Endocrinologists and the American Association of Endocrine Surgeons recommend an initial biochemical evaluation of all adrenal incidentalomas to exclude pheochromocytoma, subclinical Cushing's syndrome, and hyperaldosteronism.~~

Adrenal incidentaloma – Adrenal masses detected on imaging for another reason (i.e., incidental finding) are becoming increasingly common. If there is no prior personal history of malignancy and no features concerning for malignancy on imaging, these patients should undergo hormonal (functional) evaluation and periodic imaging. If the mass is < 4 cm on imaging and has benign characteristic (homogenous, regular borders, HU < 10) a hormonal evaluation should be done. If that evaluation is negative, adrenal protocol/follow-up imaging can be performed at 6 months then annually for 1-2 years.[70] Repeat functional studies are recommended annually (or sooner if symptoms) for 5 years. If the mass exhibits growth or becomes hormonally active, then surgery is recommended.[71, 72] Additional imaging beyond 2 years is reasonable if there has been growth and the mass is not resected; if stable, no further imaging is warranted unless the annual hormonal evaluation is positive. Masses ≥ 4cm generally are resected after hormonal evaluation is completed, additional imaging can be approved when needed for further characterization for surgical planning. If the decision is made not to resect the mass, then FU imaging in 6-12 months is reasonable.

Biochemically active tumors (adrenal and neuroendocrine): Laboratory evaluation prior to imaging - When neuroendocrine and hormonally active tumors are suspected, the required laboratory evaluation prior to advanced imaging is dependent on the tumor type that is suspected. The following list describes suspected syndrome/tumor and typical laboratory evaluation in parenthesis:

GI Carcinoid (24-hour urine or plasma 5-HIAA), Lung/Thymus Carcinoid (24-hour urine or plasma 5-HIAA AND one of the following: overnight dexamethasone suppression test, 2-3 midnight salivary cortisols, 24-hour urinary free cortisol), PPoma (serum pancreatic polypeptide), Insulinoma (serum insulin, pro-insulin and C-peptide all drawn during a period of hypoglycemia (i.e. 72 hour fast)),

VIPoma (serum VIP), glucagonoma (serum glucagon), gastrinoma (serum gastrin), somatostatinoma (serum somatostatin), pheochromocytoma/paraganglioma (plasma free or 24-hour urine fractionated metanephrines and normetanephrines +/- serum or urine catecholamines), pituitary tumor (serum IGF-1, prolactin, LH/FSH, alpha subunits, TSH and ONE of the following: overnight dexamethasone suppression test, 2-3 midnight salivary cortisols, 24-hour urinary free cortisol), primary hyperaldosteronism (suppressed renin/renin activity in association with elevated plasma aldosterone (>10 ng/dL) and confirmatory testing if positive), adrenocortical carcinoma (testosterone, DHEA-S AND complete evaluation for hypercortisolemia or primary aldosteronism)[72]

If Cushing's (hypercortisolemia) is suspected, typical labs include a plasma ACTH AND one or more of the following: overnight dexamethasone suppression test, 2-3 midnight salivary cortisols, OR 24-hour urinary free cortisol. The results of the suppression test then indicate whether brain imaging is needed (pituitary source) OR chest and abdominal imaging is needed (CXR + Adrenal CT/MRI). ACTH > 20 after suppression > 20 is suggestive of Cushing's Disease and Pituitary MRI +/- CXR is indicated. ACTH after suppression < 5 is suggestive of Cushing's Syndrome and CXR + Adrenal CT/MRI is indicated[73]. If indeterminate, a CRH or desmopressin test is then done. If there is no ACTH suppression with CRH/desmopressin, then adrenal imaging is indicated.[74]

Genetic syndromes and adrenal tumors – Adrenal cortical carcinoma (ACC) diagnosed during childhood is known to be commonly associated with hereditary syndromes, including Beckwith-Wiedemann (BWS) and Li-Fraumeni syndrome (LFS). In adults, ACC may be associated with Multiple Endocrine Neoplasia 1 (MEN1), familial adenomatous polyposis coli and neurofibromatosis type 1 (NF1); however, there are currently no surveillance imaging recommendations.~~[69]~~[75]

~~**MRI of the pancreas** –** Pancreatic cancer is thought to have a familial or hereditary component in approximately 10% of cases. Surveillance of individuals with genetic predisposition for pancreatic adenocarcinoma should include known mutation carriers from hereditary syndromes, such as Peutz-Jeghers (10-30% lifetime risk), hereditary pancreatitis (which is associated with genes *PRSS1* and *SPINK1*), familial atypical multiple melanoma and mole syndrome (10-30% risk) or for members of familial pancreatic cancer with a first-degree family member with pancreatic cancer. In patients who are mutation carriers in *BRCA2* (5-10% lifetime risk), *PALB2* (5-10% lifetime risk), and Lynch syndrome (5-10%) families. Surveillance for patients with *BRCA1* (2% lifetime risk) and *ATM* serine/threonine kinase (1-5% lifetime risk) is limited to those with first- or second-degree relatives with pancreatic cancer. NCCN also recommends screening for individuals with a known pathogenic/likely pathogenic germline variant in a pancreatic susceptibility gene, including *CDKN2A, MLH1, MLH2, MSH6, PMS2, EPCAM* (mismatch repair genes associated with Lynch syndrome), *ATM, PALB2, STK11, TP-53* and a family history (first- or second-degree relative) from the same side of the family; or a family history of exocrine pancreatic cancer in ≥2 first-degree relatives from the same side of the family or ≥3 first- and second-degree relatives from the same side of the family (and at least one is a first-degree relative).[3, 70, 71]~~

~~Patients with a family history of pancreatic cancer affecting two first-degree relatives meet criteria for familial pancreatic cancer and are candidates for genetic testing. It should be noted that 90% of families meeting criteria for familial pancreatic cancer will not have a pathogenic mutation.[72]~~

~~**Surveillance of Pancreatic Cysts –** Some pancreatic cysts have the potential for malignant transformation to invasive ductal adenocarcinoma; hence the need for intervention vs surveillance. The data, however, is unclear as to the risk of cancer. Cyst surveillance can be offered to patients with asymptomatic cysts presumed to be IPMNs or MCNs. Pancreatic cystic Neoplasms (PCN) make up about 2-45% of the general population.~~

High risk characteristics for mucinous pancreatic cysts include all of the following: Symptoms, Jaundice secondary to the cyst, acute pancreatitis secondary to the cyst, elevated serum CA 19-9 and no benign cause present, an enhancing mural nodule or solid component within the cyst or pancreas, main pancreatic duct of > 5mm, change in duct caliber with upstream atrophy, size over 3 cm, high grade dysplasia or cancer on cytology. These patients should undergo EUS + -FNA or be referred to a multidisciplinary group for further recommendations.[~~24~~76]

~~**MRI and insulinoma –** Insulinomas are rare pancreatic tumors. Localization of the tumor by ultrasound or CT are the preferred initial options once a diagnosis has been made, followed by endoscopic ultrasound or arterial stimulation with hepatic venous sampling. Whipples triad includes symptoms of hypoglycemia, low blood glucose relieved by ingestion of glucose, and benign 90%. Work-up prior to imaging should include a 72-hour fast with serial glucose and insulin levels over this period until the patient becomes symptomatic. An insulin/glucose ratio of greater than 0.3 has been found in virtually all patients with insulinoma or other islet cell tumors.[28]~~

MRI and elevated Liver Function Tests – For elevated bilirubin or serum transaminases with or without bilirubin elevation, US is the initial recommended test to assess for duct dilatation which might lead to ERCP or MRCP, vs other causes which might necessitate further lab testing or liver biopsy.[7~~3~~7]

MRI of the kidney – MRI in renal imaging has been used to differentiate benign lesions versus malignant lesions in patients unable to undergo CT scanning with contrast media or in cases where the CT findings were questionable. Initial evaluation of renal lesions is often undertaken with ultrasound. MRI can have additional diagnostic value in the evaluation of lesions with minimal amounts of fat or with intracellular fat. MRI may have a higher accuracy than CT in the evaluation of early lymph node spread. Although MRI of the kidney has not yet found broad clinical application, it may have an increasing role in the management of patients with renal disease.

~~Recommendations for follow up of a complex cystic renal mass are made using Bosniak criteria[74]:~~
Recommendations for follow up of a complex cystic renal mass are made using Bosniak criteria[78]:

- Bosniak I (water density 0-20 HU); no further follow-up

- Bosniak II (one or a few thin septations, small or fine calcifications, hyperdense cysts up to 3 cm); no further follow-up
- Bosniak IIF felt to be benign but too complex to be diagnosed with certainty; image at 6 and 12 months, then annually for 5 years if no progression
- Bosniak III thick-walled cystic lesions with wall or septal enhancement; resection favored vs conservative management and RFA in select cases~~30~~24
- Bosniak IV malignant cystic renal mass with enhancing soft tissue components; resection favored; malignant until proven otherwise

MRI of the spleen – Among some radiologists, the spleen is considered a 'forgotten organ' although it is included and demonstrated on every abdominal CT and MRI. Malignant tumors of the spleen are rare; malignant lymphomas are the most common and are usually a manifestation of generalized lymphoma. Splenic metastases are predominantly hypointense on T1-weighted images and hyperintense on T2-weighted images, and MRI is used for the detection of necrotic or hemorrhagic metastases.

MRI for the evaluation of vascular abnormalities such as renal artery stenosis and celiac/superior mesenteric artery stenosis (in chronic mesenteric ischemia) – Doppler Ultrasound, MRA, or CTA should be considered as the preferred imaging modalities.

Imaging of hernias – Most hernias are diagnosed clinically with imaging recommended for the diagnosis of occult hernias or in the evaluation of hernia complications, such as bowel obstruction or strangulation. To detect occult hernias, ultrasound is a first-line study with a sensitivity of 86% and specificity of 77%, compared to 80% sensitivity and 65% specificity for CT.~~38~~35 According to Miller, et al "Magnetic resonance imaging is generally not considered a first- or even second-line evaluation modality for hernias…."~~37~~34 Based on this analysis, MRI is recommended only when ultrasound and CT have been performed and fail to make a diagnosis.

Fever of Unknown Origin

Initial work up prior to CT would include a comprehensive history, repeated physical exam, complete blood count with differential, three sets of blood cultures, chest x-ray, complete metabolic panel, urinalysis, ESR, ANA, RA, CMV IgM antibodies, virus detection in blood, heterophile antibody test, tuberculin test, and HIV antibody test.[65] Lastly, with a negative CXR, only when initial workup and abdomen/pelvis CT/MR fail to identify the cause for fever can Chest CT be approved. If CXR suggests a malignancy and/or source of fever, then Chest CT would be approved.

Suspected paraneoplastic syndromes with no established cancer diagnosis: laboratory evaluation and imaging

The laboratory evaluation for paraneoplastic syndrome is complex. If the appropriate lab test results are suspicious for malignancy, imaging is indicated.

For SIADH (hyponatremia + increased urine osmolality), there is a high association with small cell lung cancer, therefore imaging typically starts with chest CT. If other symptoms suggest a different diagnosis other than small cell lung cancer, different imaging studies may be reasonable.

For hypercalcemia (high serum calcium, low-normal PTH, high PTHrP) it is reasonable to start with bone imaging followed by a more directed evaluation such as mammogram, chest, abdomen, and pelvis imaging as appropriate.

For Cushing syndrome (hypokalemia, normal-high midnight serum ACTH NOT suppressed with dexamethasone) abdominal and chest imaging is reasonable. If dexamethasone suppression test DOES suppress ACTH, pituitary MRI is reasonable.

For hypoglycemia, labs drawn during a period of hypoglycemia (glucose < 55, typically a 72 hour fast) (insulin level, C-peptide, and IGF-2:IGF-1 ratio) should be done to evaluate for an insulinoma. An elevated insulin level, elevated C-peptide and/or normal IGF-2:IGF-1 ratio warrant CT or MRI abdomen to look for insulinoma. A low insulin, low C-peptide and/or elevated IGF-2:IGF-1 ratio warrant chest and abdominal imaging.

When a paraneoplastic neurologic syndrome is suspected, nuclear and cytoplasmic antibody panels are often ordered to further identify specific tumor types. Results are needed prior to imaging. Because these tests are highly specific, if an antibody highly associated with a specific cancer is positive, then further imaging for that cancer is reasonable. For example, anti-Hu has a high association with SCLC and chest CT would be reasonable. Anti-MA2 has a high association with testicular cancer and testicular ultrasound would be a reasonable next step.

Weight loss definitions and initial evaluation – Unintentional weight loss is considered clinically significant if the amount of weight lost over 12 months is ≥ 5%. Older age and higher percentage of weight loss correlates with higher likelihood of malignancy. A targeted evaluation is recommended when there are signs or symptoms suggestive of a specific source. For example, when there is clinically significant weight loss with abdominal pain that prompts an evaluation for an abdominal source of the weight loss; CXR and labs such as TSH would not be needed prior to abdominal imaging. Conversely a smoker with a cough and weight loss would not start with abdominal imaging, a chest x-ray (CXR) would be the first test to start with. When there is no suspected diagnosis, initial evaluation includes CXR, age-appropriate cancer screening (such as colonoscopy and mammography) and labs (including CBC, CMP, HbA1C, TSH, stool hemoccult, ESR/CRP, HIV, Hepatitis C). If this initial evaluation fails to identify a cause of weight loss, then the patient is monitored and if progressive weight loss is seen on subsequent visits/weights, then CT Abdomen/Pelvis is reasonable (MRI if there is a contraindication to CT such as contrast allergy or impaired renal function). Lastly, with a negative CXR, only when initial workup and abdomen/pelvis CT/MR fail to identify the cause for weight loss can Chest CT be approved. If CXR suggests a malignancy and/or source of weight loss, then Chest CT would be approved.

Ultrasound – Ultrasound is the initial imaging technique used for screening suspected biliary or pancreatic disease, but it has limited ability to characterize abnormalities in the biliary and pancreatic ducts.

Endoscopic retrograde cholangiopancreatography (ERCP) – ERCP can combine diagnosis with therapeutic intervention, e.g., removal of stones, but it is an invasive procedure that carries significant risk of complications, e.g., pancreatitis. ERCP is also technically challenging in patients with post-surgical biliary and/or surgical anastomoses.

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POLICY HISTORY

Date	Summary
May 2023	• Adrenal: additional guidance provided for imaging intervals and background given for functional tumors • Liver: clarified guidance for HCC surveillance imaging, follow up of specific conditions such as hepatic steatosis and focal nodular hyperplasia • IBD: clarified indications • Pancreas: updated pancreatic cystic lesion guidance, specified guidance for increased lifetime risk for pancreatic cancer and pancreatitis • Renal: specified guidance for increased lifetime risk of renal cancer • Aneurysm: specified guidance on initial imaging and screening intervals with emphasis on requiring ultrasound on initial imaging and indications for advanced imaging, specified guidance on post-repair imaging • Transplant: added section • Other: specified guidance for weight loss, paraneoplastic syndrome, edema; added indications for cancer predisposition syndromes • Aligned sections across body imaging guidelines • General Information moved to beginning of guideline with added statement on clinical indications not addressed in this guideline • Added statement regarding further evaluation of indeterminate findings on prior imaging

March 2022	• Clarified coding note regarding MRE, MRU, MRCP, and MRI
	• Added Initial staging of known cancer
	• Under evaluation of suspicious known mass/tumor, added one follow-up surveillance MR to ensure to suspicious change occurring in tumor in pelvis with no further surveillance MR unless tumor(s) is/are highly suspicious or change was found on last exam or last follow-up imaging
	• Follow-up of known cancer
	  ○ Clarified surveillance imaging per NCCN recommendations
	  ○ Added For abnormal incidental abdominal lymph nodes with follow-up is recommended based on prior imaging (initial 3-month follow-up)
	• Clarified elastography in chronic liver disease to stage hepatic fibrosis
	• Added Gaucher disease to Liver and Spleen sections
	• Added Polycystic Kidney Disease to Renal section
	• Clarified suspected incarceration or strangulation based on physical exam in Suspected Hernia section
	• In Other indications for abdominal MRI, changed wording (replaced 'and' with 'or' and deleted "if CXR labs and an ultrasound of the abdomen and

	pelvis have been completed") to state "For B symptoms of fevers more than 101 F, drenching night sweats, or unexplained weight loss of more than 10% of body weight over 6 months"
~~November 2021~~	~~Added +0698T~~
~~April 2021~~	~~Updated for concordance w/CTA abdomen/pelvis~~
~~May 2020~~	~~MRCP:~~ • ~~Added to confirm choledocholithiasis in the acute setting after ultrasound completed~~ • ~~Suspected acute pancreatitis with atypical presentation and other diagnosis possible~~ • ~~To confirm choledochal cyst or long-term post op surveillance~~ • ~~For assessment of suspected biliary strictures~~ • ~~For post op anatomy when ERCP cannot be done~~ ~~MRI:~~ • ~~Adrenal-added suspected adrenal secreting tumor after full work up~~ • ~~Surveillance for paraganglioma syndromes~~ • ~~Surveillance primary sclerosing cholangitis~~ • ~~Elastography to stage hepatic fibrosis~~ • ~~Beckwidth Wiedemann after abnormal ultrasound~~ • ~~Revised guidelines for follow up of pancreatic cystic lesions/intraductal papillary mucinous neoplasm~~ • ~~Revised based on NCCN 2019 guidelines for increased lifetime risk of developing pancreatic cancer~~ • ~~Added surveillance for MEN 1~~ • ~~Added for localization of an insulinoma once dx confirmed~~ • ~~Added surveillance for VHL, renal and Birt-Hogg syndrome~~ • ~~Added MRU for recurrent UTI's in females~~ • ~~Added a separate section on hernias~~ • ~~Improved info on inflammatory bowel disease, MRE~~ • ~~Added imaging for monitoring therapy in IBD~~ • ~~Under other indications added: to locate a pheochromocytoma when clear biochemical evidence; FUO: retroperitoneal fibrosis; added dermatomyositis; added May Thurner; added isolated right varicocele (only with additional signs and symptoms)~~ • ~~Comments with new section on surveillance of cholangiocarcinoma, genetic syndromes and adrenal tumors, Pancreatic cancer risk factors, surveillance of panc cysts, Insulioma work up, and CT and elevated LFT's.~~
~~May 2019~~	• ~~Created combo guideline by absorbing MRCP guideline within the Abdomen MRI~~

	~~• Added Note: "A single authorization for CPT code 74181, 74182, 74183, S8037 includes imaging of the biliary tree and liver. Multiple authorizations are not required. When a separate MRCP and MRI abdomen exam is requested, documentation requires a medical reason that clearly indicates why additional MRI imaging of the abdomen is needed".~~ ~~• Added indications for evaluation of an organ or abnormality seen on previous imaging; liver lesions; jaundice or abnormal liver function; follow up of suspected adenoma and focal nodular hyperplasia; surveillance of HCC in patients who have received liver-directed therapy/surgical resection/medical treatment or transplant; pancreatic cystic lesion; intraductal papillary mucinous neoplasm and mucinous cystic neoplasm; pancreatic cancer risk; known necrotizing pancreatitis; renal mass; and spleen~~ ~~• Changed size parameters for adrenal mass:~~ ~~○ Old: Suspected adrenal mass > 4 cm and there is a history of primary malignancy~~ ~~○ Revised: Suspected adrenal mass ≥ 1 cm with no history of malignancy; if mass ≥ 4 cm and no diagnosis of cancer, can approve for preoperative planning; for mass < 4 cm with history of malignancy~~ ~~• Added/modified Background information and updated references~~

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ADDITIONAL RESOURCES

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Reviewed / Approved by NIA Clinical Guideline Committee

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- ~~*It is an expectation that all patients receive care/services from a licensed clinician. All appropriate supporting documentation, including recent pertinent office visit notes, laboratory data, and results of any special testing must be provided. If applicable: All prior relevant imaging results and the reason that alternative imaging cannot be performed must be included in the documentation submitted.*~~

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