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Description and Application of the Guidelines

The AIM Clinical Appropriateness Guidelines (hereinafter "the AIM Clinical Appropriateness Guidelines" or the "Guidelines") are designed to assist providers in making the most appropriate treatment decision for a specific clinical condition for an individual. As used by AIM, the Guidelines establish objective and evidence-based criteria for medical necessity determinations where possible. In the process, multiple functions are accomplished:

- To establish criteria for when services are medically necessary
- To assist the practitioner as an educational tool
- To encourage standardization of medical practice patterns
- To curtail the performance of inappropriate and/or duplicate services
- To advocate for patient safety concerns
- To enhance the quality of health care
- To promote the most efficient and cost-effective use of services

The AIM guideline development process complies with applicable accreditation standards, including the requirement that the Guidelines be developed with involvement from appropriate providers with current clinical expertise relevant to the Guidelines under review and be based on the most up-to-date clinical principles and best practices. Relevant citations are included in the References section attached to each Guideline. AIM reviews all of its Guidelines at least annually.

AIM makes its Guidelines publicly available on its website twenty-four hours a day, seven days a week. Copies of the AIM Clinical Appropriateness Guidelines are also available upon oral or written request. Although the Guidelines are publicly-available, AIM considers the Guidelines to be important, proprietary information of AIM, which cannot be sold, assigned, leased, licensed, reproduced or distributed without the written consent of AIM.

AIM applies objective and evidence-based criteria, and takes individual circumstances and the local delivery system into account when determining the medical appropriateness of health care services. The AIM Guidelines are just guidelines for the provision of specialty health services. These criteria are designed to guide both providers and reviewers to the most appropriate services based on a patient's unique circumstances. In all cases, clinical judgment consistent with the standards of good medical practice should be used when applying the Guidelines. Guideline determinations are made based on the information provided at the time of the request. It is expected that medical necessity decisions may change as new information is provided or based on unique aspects of the patient's condition. The treating clinician has final authority and responsibility for treatment decisions regarding the care of the patient and for justifying and demonstrating the existence of medical necessity for the requested service. The Guidelines are not a substitute for the experience and judgment of a physician or other health care professionals. Any clinician seeking to apply or consult the Guidelines is expected to use independent medical judgment in the context of individual clinical circumstances to determine any patient's care or treatment.

The Guidelines do not address coverage, benefit or other plan specific issues. Applicable federal and state coverage mandates take precedence over these clinical guidelines. If requested by a health plan, AIM will review requests based on health plan medical policy/guidelines in lieu of the AIM Guidelines.

The Guidelines may also be used by the health plan or by AIM for purposes of provider education, or to review the medical necessity of services by any provider who has been notified of the need for medical necessity review, due to billing practices or claims that are not consistent with other providers in terms of frequency or some other manner.

General Clinical Guideline

Clinical Appropriateness Framework

Critical to any finding of clinical appropriateness under the guidelines for a specific diagnostic or therapeutic intervention are the following elements:

- Prior to any intervention, it is essential that the clinician confirm the diagnosis or establish its pretest likelihood based on a complete evaluation of the patient. This includes a history and physical examination and, where applicable, a review of relevant laboratory studies, diagnostic testing, and response to prior therapeutic intervention.
- The anticipated benefit of the recommended intervention should outweigh any potential harms that may result (net benefit).
- Current literature and/or standards of medical practice should support that the recommended intervention offers the greatest net benefit among competing alternatives.
- Based on the clinical evaluation, current literature, and standards of medical practice, there exists a reasonable likelihood that the intervention will change management and/or lead to an improved outcome for the patient.

If these elements are not established with respect to a given request, the determination of appropriateness will most likely require a peer-to-peer conversation to understand the individual and unique facts that would supersede the requirements set forth above. During the peer-to-peer conversation, factors such as patient acuity and setting of service may also be taken into account.

Simultaneous Ordering of Multiple Diagnostic or Therapeutic Interventions

Requests for multiple diagnostic or therapeutic interventions at the same time will often require a peer-to-peer conversation to understand the individual circumstances that support the medical necessity of performing all interventions simultaneously. This is based on the fact that appropriateness of additional intervention is often dependent on the outcome of the initial intervention.

Additionally, either of the following may apply:

Current literature and/or standards of medical practice support that one of the requested diagnostic or therapeutic interventions is more appropriate in the clinical situation presented; or

One of the diagnostic or therapeutic interventions requested is more likely to improve patient outcomes based on current literature and/or standards of medical practice.

Repeat Diagnostic Intervention

In general, repeated testing of the same anatomic location for the same indication should be limited to evaluation following an intervention, or when there is a change in clinical status such that additional testing is required to determine next steps in management. At times, it may be necessary to repeat a test using different techniques or protocols to clarify a finding or result of the original study.

Repeated testing for the same indication using the same or similar technology may be subject to additional review or require peer-to-peer conversation in the following scenarios:

- Repeated diagnostic testing at the same facility due to technical issues

Repeated diagnostic testing requested at a different facility due to provider preference or quality concerns

Repeated diagnostic testing of the same anatomic area based on persistent symptoms with no clinical change, treatment, or intervention since the previous study

Repeated diagnostic testing of the same anatomic area by different providers for the same member over a short period of time

Repeat Therapeutic Intervention

In general, repeated therapeutic intervention in the same anatomic area is considered appropriate when the prior intervention proved effective or beneficial and the expected duration of relief has lapsed. A repeat intervention requested prior to the expected duration of relief is not appropriate unless it can be confirmed that the prior intervention was never administered.

History

Status	Date	Action
Revised	03/09/2019	Retitled Pretest Requirements to “Clinical Appropriateness Framework” to summarize the components of a decision to pursue diagnostic testing. To expand applicability beyond diagnostic imaging, retitled Ordering of Multiple Studies to “Simultaneous Ordering of Multiple Diagnostic or Therapeutic Interventions” and replaced imaging-specific terms with “diagnostic or therapeutic intervention.” Repeated Imaging split into two subsections, “repeat diagnostic intervention” and “repeat therapeutic intervention.”
Reviewed	07/11/2018	Last Independent Multispecialty Physician Panel review
Revised	07/26/2016	Independent Multispecialty Physician Panel revised
Created	03/30/2005	Original effective date

Imaging of the Abdomen and Pelvis

General Information/Overview

Scope

These guidelines address advanced imaging of the abdomen and pelvis in both adult and pediatric populations. For interpretation of the Guidelines, and where not otherwise noted, “adult” refers to persons age 19 and older, and “pediatric” refers to persons age 18 and younger. Where separate indications exist, they are specified as **Adult** or **Pediatric**. Where not specified, indications and prerequisite information apply to persons of all ages.

See the Coding section for a list of modalities included in these guidelines.

Technology Considerations

Ultrasound is the initial imaging modality of choice for many conditions of the abdomen and pelvis, including hepatobiliary, urinary tract, and gynecologic conditions. While ultrasound is operator dependent and image quality may be impacted by obesity and bowel gas, accuracy, availability and absence of ionizing radiation make it an ideal choice for initial evaluation of several intra-abdominal conditions, especially in the right upper quadrant and in the pelvis and especially in pediatric patients and pregnant women.

Computed tomography (CT) is often utilized for imaging the abdomen and pelvis. It provides excellent 3-dimensional resolution and can be performed relatively quickly, reducing the potential for motion artifact. A major drawback of CT is the dose of ionizing radiation required for image acquisition, which is of particular concern in younger patients and those who require multiple scans over time.

CT may be performed with or without contrast; contrast provides additional detail to delineate vascular and gastrointestinal structures and is recommended in certain settings, such as infection, tumor, hemorrhage and visceral lesions. However, contrast increases scan acquisition time, and confers risk in cases of impaired renal function, pregnancy, metformin use, radioactive iodine treatment for thyroid disease, or previous reactions to contrast agents. Noncontrast CT may often suffice in some situations, and is preferred when evaluating for intra-abdominal hemorrhage and/or calcification.

Magnetic resonance imaging (MRI) requires a longer time for image acquisition and is more prone to motion artifact than CT. However, MRI does not expose patients to ionizing radiation and has better contrast resolution than CT. MRI may be a useful substitute in cases where contrast CT is contraindicated. It is often preferred in pediatric patients due to the absence of radiation; however, sedation may be required in younger patients in order to obtain adequate images.

MRI may be performed with or without contrast. Use of contrast is recommended for imaging of vascular structures or solid organs. The most commonly used agent for contrast MRI is gadolinium, but iron oxide and iron platinum contrast agents are also available. Administration of gadolinium has been associated with a rare but serious condition known as nephrogenic systemic fibrosis, and should be avoided in persons with advanced renal disease. Gadolinium contrast has also recently been shown to accumulate within the brain parenchyma, a finding of uncertain clinical significance.There are a number of alternative contrast agents which have been developed for specialized use including gadoxetic acid (hepatobiliary imaging), gadofosveset (a blood pool agent), and gadobutrol (an extracellular fluid agent).

The use of contrast is at the discretion of the ordering provider and/or the radiologist performing the imaging study, and should be tailored to the individual circumstances of each case.

Magnetic resonance cholangiopancreatography (MRCP) is a noninvasive alternative to endoscopic retrograde cholangiopancreatography (ERCP). MRCP avoids the risks associated with anesthesia and does not expose patients to ionizing radiation. It is able to detect extraductal abnormalities and can

provide better visualization of structures proximal to a ductal obstruction. However, it is prone to motion artifact, may be less able to detect subtle abnormalities, and—unlike ERCP—has no therapeutic capabilities.

Dynamic pelvic MRI yields a 3-dimensional image used to evaluate the pelvic floor and rectal function by imaging pelvic muscles at rest and while contracted. **Magnetic resonance defecography** is a form of dynamic MRI used for evaluation of pelvic organ and muscle function through imaging stages of defecation. Dynamic pelvic MRI may be indicated in cases of pelvic organ prolapse, pelvic pain, and fecal and urinary incontinence.

Multiparametric MRI uses multiple pulse sequences to image tissue. Its primary use in clinical medicine is for diagnosis and follow up of prostate cancer.

CT enterography and **MR enterography** are noninvasive, cross-sectional imaging modalities protocolled to optimize visualization of the small intestine. CT enterography provides images of the entire small intestine without interference from overlapping loops, and detects both extraluminal and luminal disease. MR enterography also provides high-contrast resolution; it can detect abscesses and fistulas, and can distinguish fibrotic from inflammatory structures. In general, CT enterography is preferred for extraluminal pathology, whereas MR enterography is preferred for organ-specific and disease-specific (such as Crohn's disease) evaluation.

Imaging of the urinary tract often begins with **kidney, ureter, and bladder (KUB) radiography**. This type of radiograph is particularly useful in acute care settings for evaluation of diffuse pain, or pain suggestive of renal or urinary tract disease. **Ultrasound** is also useful for initial evaluation and avoids the risks associated with radiation exposure. Both ultrasound and KUB radiography may be used for follow-up of nephrolithiasis in select patients.

CT abdomen/pelvis stone protocol (CT KUB), a noncontrast CT scan that images the kidney, ureters, and bladder, is commonly used for visualizing the urinary tract. Indications for CT KUB include urolithiasis/nephrolithiasis, renal parenchymal calcifications, and exclusion of hemorrhagic changes. **Low-dose CT** can also be used to scan for urinary tract stones with a lowered effective radiation dose. Compared to standard CT, low-dose CT still has excellent sensitivity, but image resolution can suffer, especially in the case of urinary tract stones under 3 mm in size.

CT urography (**CTU**, also referred to as **CT IVP** or **CT IVU**) is a more complex variant of CT that is used to evaluate the urinary tract. While CT KUB is simply a noncontrast CT scan, CT urogram includes an initial noncontrast CT scan followed by contrast-enhanced nephrographic phase and excretory phase imaging. CT urogram combines conventional CT with thin-section axial CT images taken during the excretory phase. Historically, CT was combined with excretory urography (EU) for CT urogram, but this method is no longer standard. CT urogram can be used to evaluate various tumor types, papillary necrosis, and renal inflammatory disease, among other conditions.

Definitions

Phases of the care continuum are broadly defined as follows:

- **Screening** – testing in the absence of signs or symptoms of disease
- **Diagnosis** – testing based on a reasonable suspicion of a particular condition or disorder, usually due to the presence of signs or symptoms
- **Management** – testing to direct therapy of an established condition, which may include preoperative or postoperative imaging, or imaging performed to evaluate the response to nonsurgical intervention
- **Surveillance** – periodic assessment following completion of therapy, or for monitoring known disease that is stable or asymptomatic

Statistical terminology[1]

- **Confidence interval (CI) –** range of values which is likely to contain the cited statistic. For example, 92% sensitivity (95% CI, 89%-95%) means that, while the sensitivity was calculated at 92% on the current study, there is a 95% chance that, if a study were to be repeated, the sensitivity on the repeat study would be in the range of 89%-95%.
- **Diagnostic accuracy –** ability of a test to discriminate between the target condition and health. Diagnostic accuracy is quantified using sensitivity and specificity, predictive values, and likelihood ratios.
- **Hazard ratio –** odds that an individual in the group with the higher hazard reaches the outcome first. Hazard ratio is analogous to odds ratio and is reported most commonly in time-to-event analysis or survival analysis. A hazard ratio of 1 means that the hazard rates of the 2 groups are equivalent. A hazard ratio of greater than 1 or less than 1 means that there are differences in the hazard rates between the 2 groups.
- **Likelihood ratio –** ratio of an expected test result (positive or negative) in patients *with* the disease to an expected test result (positive or negative) in patients *without* the disease. Positive likelihood ratios, especially those greater than 10, help rule in a disease (i.e., they substantially raise the post-test probability of the disease, and hence make it very likely and the test very useful in identifying the disease). Negative likelihood ratios, especially those less than 0.1, help rule out a disease (i.e., they substantially decrease the post-test probability of disease, and hence make it very unlikely and the test very useful in excluding the disease).
- **Odds ratio –** odds that an outcome will occur given a particular exposure, compared to the odds of the outcome occurring in the absence of that exposure. An odds ratio of 1 means that the exposure does not affect the odds of the outcome. An odds ratio greater than 1 means that the exposure is associated with higher odds of the outcome. An odds ratio less than 1 means that the exposure is associated with lower odds of the outcome.
- **Predictive value –** likelihood that a given test result correlates with the presence or absence of disease. Positive predictive value is defined as the number of true positives divided by the number of test positives. Negative predictive value is defined as the number of true negatives divided by the number of test negative patients. Predictive value is dependent on the prevalence of the condition.
- **Pretest probability –** probability that a given patient has a disease prior to testing. May be divided into very low (less than 5%), low (less than 20%), moderate (20%-75%), and high (greater than 75%) although these numbers may vary by condition.
- **Relative risk –** probability of an outcome when an exposure is present relative to the probability of the outcome occurring when the exposure is absent. Relative risk is analogous to odds ratio; however, relative risk is calculated by using percentages instead of odds. A relative risk of 1 means that there is no difference in risk between the 2 groups. A relative risk of greater than 1 means that the outcome is more likely to happen in the exposed group compared to the control group. A relative risk less than 1 means that the outcome is less likely to happen in the exposed group compared to the control group.
- **Sensitivity –** conditional probability that the test is positive, given that the patient has the disease. Defined as the true positive rate (number of true positives divided by the number of patients with disease). Excellent or high sensitivity is usually greater than 90%.
- **Specificity –** conditional probability that the test is negative, given that the patient does not have the disease. Defined as the true negative rate (number of true negatives divided by the number of patients without the disease). Excellent or high specificity is usually greater than 90%.

Clinical Indications

The following section includes indications for which advanced imaging of the abdomen and pelvis is considered medically necessary, along with prerequisite information and supporting evidence where available. Indications, diagnoses, or imaging modalities not specifically addressed are considered not medically necessary.

It is recognized that imaging often detects abnormalities unrelated to the condition being evaluated. Such findings must be considered within the context of the clinical situation when determining whether additional imaging is required.

General Abdominal and Pelvic Indications

Congenital and developmental conditions

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment.

IMAGING STUDY

ADULT

- CT or MRI abdomen and/or pelvis

PEDIATRIC

- Ultrasound required for initial evaluation of hepatobiliary and genitourinary anomalies
- Ultrasound recommended for initial evaluation of pancreatic anomalies
- CT or MRI abdomen and/or pelvis when additional imaging is needed to guide treatment
- MRI preferred for evaluation of uterine anomalies
- MRCP preferred for evaluation of biliary and pancreatic duct anomalies

Note: The following conditions do not require advanced imaging:

- *Accessory spleen*
- *Biliary atresia*
- *Hirschsprung's disease*
- *Jejunal or ileal stenosis*
- *Meckel's diverticulum*
- *Pyloric stenosis*
- *Small left colon*

Infectious and inflammatory conditions – not otherwise referenced

Advanced imaging is considered medically necessary when the results of imaging will impact management.

IMAGING STUDY

- CT or MRI abdomen and/or pelvis

Trauma

Advanced imaging is considered medically necessary when the results of imaging will impact management.

IMAGING STUDY

- CT abdomen and/or pelvis
- MRI when CT contraindicated

Tumor or neoplasm – not otherwise referenced

For management of documented malignancy, see Oncologic Imaging guidelines.

Advanced imaging is considered medically necessary in **EITHER** of the following scenarios:

- Evaluation of palpable abdominal or pelvic masses of indeterminate origin
- Characterization of indeterminate lesions arising in the solid abdominal viscera and surrounding anatomic structures

IMAGING STUDY

ADULT

- Ultrasound required for initial evaluation of a palpable pelvic mass in women
- CT abdomen and/or pelvis for all other scenarios, or following nondiagnostic pelvic ultrasound
- MRI abdomen for further characterization of abdominal mass seen on prior imaging, including CT scan

PEDIATRIC

- Ultrasound required for initial evaluation of a palpable pelvic mass
- Ultrasound recommended for initial evaluation of an abdominal mass
- CT or MRI abdomen and/or pelvis for initial evaluation of a palpable abdominal mass, or following nondiagnostic ultrasound

Female Reproductive System and Obstetrics

Adenomyosis

Advanced imaging is considered medically necessary following pelvic ultrasound, when further imaging is required to direct management.

IMAGING STUDY

- MRI pelvis

Rationale

There is wide clinical agreement and support from multiple clinical guidelines for ultrasound as the initial imaging modality for evaluation of structural pathology within the reproductive organs of the female pelvis[2-5] with advanced imaging reserved in select cases as an add-on test to further characterize abnormalities on ultrasound or when ultrasound is nondiagnostic. MRI is the advanced imaging modality of choice due to its superior soft tissue contrast.[4,6]

Adnexal mass

Advanced imaging is considered medically necessary following pelvic ultrasound when further imaging is required to direct management.

IMAGING STUDY

- MRI pelvis

Rationale

There is wide clinical agreement and support from multiple clinical guidelines for ultrasound as the initial imaging modality for evaluation of structural pathology within the reproductive organs of the female pelvis[2-5] with advanced imaging reserved in select cases as an add-on test to further characterize abnormalities on ultrasound or when ultrasound is nondiagnostic. MRI is the advanced imaging modality of choice due to its superior soft tissue contrast.[4,6]

Endometriosis

Advanced imaging is considered medically necessary following pelvic ultrasound, when further imaging is required to direct management.

IMAGING STUDY

- MRI pelvis

Rationale

There is wide clinical agreement and support from multiple clinical guidelines for ultrasound as the initial imaging modality for evaluation of structural pathology within the reproductive organs of the female pelvis[2-5] with advanced imaging reserved in select cases as an add-on test to further characterize abnormalities on ultrasound or when ultrasound is nondiagnostic. MRI is the advanced imaging modality of choice due to its superior soft tissue contrast.[4,6]

A review of 49 studies involving 4807 women was performed to determine whether imaging tests could be used as a replacement for diagnostic surgery or as a triage test to assist in decision making regarding diagnostic surgery. The evaluated modalities included ultrasound, MRI, and CT. While none of the imaging modalities met criteria to replace surgery in making the diagnosis of endometriosis, transvaginal ultrasound did approach the criteria for a triage test for pelvic endometriosis in general. Transvaginal ultrasound met the criteria for a triage test for endometrioma, as well as for deeply infiltrating endometriosis involving the uterosacral ligaments, rectovaginal septum, vaginal wall, pouch of Douglas, and rectosigmoid.[7]

Obstetric indications

Advanced imaging is considered medically necessary for diagnosis and management of **ANY** of the following:

- Fetal anomalies
- Assessment prior to fetal intervention
- Placental complications
- Complications related to monochorionic twins
- Pelvimetry
- Other obstetrical complications

IMAGING STUDY

- Ultrasound is required for initial evaluation of fetal and placental conditions
- Fetal MRI for indications involving the fetus or placenta, following nondiagnostic ultrasound
- MRI pelvis for pelvimetry or other obstetrical complications

Uterine artery embolization procedures

Advanced imaging is considered medically necessary for evaluation related to a uterine artery embolization procedure when the results of imaging will impact management.

IMAGING STUDY

- MRI pelvis

Gastrointestinal Conditions

Appendicitis

Advanced imaging is considered medically necessary in **EITHER** of the following scenarios:

- Diagnosis of suspected appendicitis
- Perioperative management

IMAGING STUDY

- Nonpregnant adults
  - CT abdomen and pelvis
- Pregnant women
  - Ultrasound required for initial evaluation
  - MRI abdomen and pelvis when ultrasound is nondiagnostic
  - CT abdomen and pelvis when ultrasound is nondiagnostic and MRI is contraindicated or unavailable
- Pediatric patients
  - Ultrasound recommended for initial evaluation
  - CT or MRI abdomen and/or pelvis when ultrasound is unavailable or is expected to be limited due to body habitus

Rationale

The incidence of acute appendicitis is estimated at 3.4 million cases per year in the U.S. Typical signs and symptoms, including right lower quadrant pain, fever, anorexia, nausea, and vomiting, should lead to surgical consultation. When the diagnosis cannot be made on clinical exam alone, imaging modalities including ultrasound, CT, and MRI may be indicated. Alternative modalities may be considered in pediatric patients and pregnant women due to long-term concerns related to ionizing radiation.[8]

A meta-analysis of 29 studies evaluating the relative accuracies of ultrasound, CT, and MRI for clinically suspected acute appendicitis in children indicated high diagnostic accuracy for all 3 modalities and no statistically significant difference between them.[9]

A systematic review and meta-analysis found that, with an experienced sonographer, point of care ultrasound is appropriate as the initial imaging test in the evaluation of suspected acute appendicitis in patients of any age.[10]

In a prospective cohort study of patients age 4 to 30 years to determine predictors for nondiagnostic ultrasound in clinically suspected acute appendicitis, body mass index greater than 85th percentile (odds ratio 4.9 [95% CI, 2.0-12.2]) and older age (odds ratio 1.1 [95% CI, 1.02-1.20]) were found to be statistically significant predictors of nondiagnostic ultrasound. Thus, in younger patients and those not classified as overweight, ultrasound is an appropriate initial study, while other modalities should be considered in older and overweight patients.[11] In pediatric patients with a nondiagnostic ultrasound and clinically suspected appendicitis, MRI was found to have a sensitivity of 90% and specificity of 97.1%, while CT had a sensitivity of 88% and specificity of 98.6%, indicating comparable diagnostic utility of CT and MRI as secondary imaging modalities following ultrasound.[12]

The American College of Radiology indicates that ultrasound is the preferred initial imaging modality in pediatric patients due to lack of ionizing radiation and an accuracy approaching that of CT. In pregnant women, ultrasound is also preferred for initial imaging evaluation, with MRI used as a secondary test when ultrasound is nondiagnostic.[13]

Bowel obstruction

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment.

IMAGING STUDY

- Radiographs required for initial evaluation in pediatric patients
- CT abdomen and/or pelvis when additional imaging is needed to guide treatment

- MRI abdomen and pelvis in pediatric patients only

Rationale

Abdominal radiography has moderate accuracy (approximately 83%) for the diagnosis of small bowel obstruction and is a useful initial test, especially in radiation-sensitive patients.[14] CT abdomen and pelvis is a more accurate exam that is less reader-dependent and can provide incremental information over radiographs in differentiating grade, severity, and etiology of small bowel obstructions that may lead to changes in management.[15] In children and younger patients with known or suspected small bowel obstructions or repetitive episodes of obstruction, MRI is indicated as the first-line imaging modality.[16,17]

Constipation (Pediatric only)

Advanced imaging is considered medically necessary for evaluation of symptoms persisting 2 or more weeks when **ANY** of the following are present:

- Failure of medical management
- Failure to thrive
- Fever
- Vomiting
- Following barium enema or anal manometry when there is suspicion for **ANY** of the following:
  - Anal stenosis
  - Impaction in patients younger than 1 year of age
  - Tight empty rectum

IMAGING STUDY

- Radiographs required for initial evaluation
- CT or MRI abdomen and/or pelvis

Rationale

Constipation is a common problem in children and largely a clinical diagnosis. While a commonly performed practice, there is conflicting evidence that abdominal radiography substantially aids the diagnosis of constipation with at best small likelihood ratios (1-1.2) based on well designed studies.[18] Constipation can have both functional and organic causes. When constipation is associated with red flag features such as failure to thrive, unexplained weight loss, or vomiting, referral to a pediatric gastroenterologist should be considered and additional testing with colonoscopy and/or advanced imaging may be appropriate.[19,20]

Diverticulitis

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact management.

IMAGING STUDY

- CT abdomen and/or pelvis

Rationale

CT abdomen and pelvis with intravenous contrast should be used to assess for diverticulitis based on recommendations from multiple high quality clinical guidelines. There is a lack of clinical data to support the use of MRI as a first-line modality in the diagnosis of diverticulitis.[21]

Enteritis and colitis

Includes neutropenic colitis and radiation enteritis, and excludes inflammatory bowel disease.

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact management.

IMAGING STUDY

- CT abdomen and/or pelvis

Foreign body (Pediatric only)

Advanced imaging is considered medically necessary following nondiagnostic radiograph and high clinical suspicion of ingested foreign body.

IMAGING STUDY

- CT abdomen and/or pelvis
- MRI when CT contraindicated

Gastrointestinal bleeding (Pediatric only)

Advanced imaging is considered medically necessary following nondiagnostic endoscopy, colonoscopy, or upper/lower gastrointestinal series when the results of imaging are essential to establish a diagnosis and/or direct management.

IMAGING STUDY

- CT abdomen and/or pelvis
- MRI when CT contraindicated

Henoch-Schonlein purpura (Pediatric only)

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact management.

IMAGING STUDY

- CT abdomen and/or pelvis

Inflammatory bowel disease

Advanced imaging is considered medically necessary in **EITHER** of the following scenarios:

- Diagnosis of suspected Crohn's disease following nondiagnostic upper and lower endoscopy
- Management of new or worsening symptoms to confirm exacerbation or evaluate for complications, including stricture, abscess, or fistula

IMAGING STUDY

- CT or MRI abdomen and/or pelvis

Rationale

MRI, CT, and ultrasound may be indicated as an adjunct to endoscopy for diagnosis of colonic inflammatory bowel disease, which remains the gold standard for diagnosis. MRI and CT have higher sensitivity for examining locations difficult to access by ultrasound.[22]

Small bowel follow through and enteroclysis have high accuracy for mucosal abnormality and are widely available. They are less able to detect extramural complications and are contraindicated in high-grade obstruction and perforation. Radiation exposure is a major limitation. Ultrasound, CT, and MRI have a high and comparable diagnostic accuracy at the initial presentation of terminal ileal Crohn's disease. Small bowel follow through and enteroclysis have an acceptable accuracy for mucosal disease but are less accurate for mural disease and extramural complications.[22]

Intussusception (Pediatric only)

Advanced imaging is considered medically necessary in **EITHER** of the following scenarios:

- Following nondiagnostic ultrasound
- Following intussusception reduction

IMAGING STUDY

- CT abdomen and/or pelvis
- MRI when CT contraindicated

Ischemic bowel

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment.

IMAGING STUDY

- CT abdomen and/or pelvis
- MRI when CT contraindicated

Note: Radiographs are preferred for necrotizing enterocolitis.

Rationale

CT with intravenous and oral contrast is indicated for suspected colonic ischemia to assess the distribution and phase of colitis. The diagnosis of colon ischemia can be suggested based on CT findings, such as bowel wall thickening, edema, or thumbprinting.[23]

Hepatobiliary Conditions

Ascites

Advanced imaging is considered medically necessary for diagnosis and surveillance following nondiagnostic ultrasound.

IMAGING STUDY

- CT abdomen and pelvis
- MRI for pediatric patients only

Biliary tract dilatation or obstruction

Advanced imaging is considered medically necessary in patients with unexplained biliary tract dilation, biochemical evidence of biliary obstruction, and/or unexplained right upper quadrant pain when the results of imaging are essential to establish a diagnosis and/or direct management.

IMAGING STUDY

- MRCP

Cholecystitis

Advanced imaging is considered medically necessary in the following scenario:

- Suspected complications of acute cholecystitis including perforation, abscess, gangrenous or hemorrhagic cholecystitis, gallstone ileus, and Mirizzi's syndrome

IMAGING STUDY

- Ultrasound required for initial evaluation in pediatric patients
- CT abdomen

- MRI abdomen for pediatric patients only when ultrasound is nondiagnostic

Note: Advanced imaging not recommended for evaluation of acute uncomplicated cholecystitis.

Rationale

Right upper quadrant ultrasound is indicated in patients with jaundice to evaluate for common bile duct dilation, presence of stones, and to direct any additional testing. If a patient has jaundice with a suspected mechanical cause, right upper quadrant pain, or a history of stones, MRI abdomen with and without intravenous contrast and MRCP is second line.[27] One study found that patients who receive initial CT for suspected cholecystitis are 11 times more likely to undergo a second examination than patients who receive initial ultrasound.[28]

CT can accurately visualize gallbladder distention and wall thickening and identify complications of acute cholecystitis such as gallbladder wall emphysema, abscess formation, and perforation.[29]

Choledocholithiasis

Advanced imaging is considered medically necessary when the diagnosis is suspected following cholecystectomy.

IMAGING STUDY

- MRCP

Rationale

Endoscopic ultrasound (EUS) is the gold standard, but MRCP has comparable diagnostic accuracy and is noninvasive. For intermediate pretest probability for choledocholithiasis (10%-50%), the summary sensitivity of EUS is 0.95 compared with 0.93 for MRCP, while summary specificity is 0.97 for EUS compared with 0.96 for MRCP.[24,25] Diagnostic ERCP has largely been replaced by EUS or MRCP, as the risk of post-ERCP pancreatitis is greater in a patient with normal caliber bile duct and normal bilirubin (odds ratio 3.4 for post-ERCP pancreatitis).[26]

Diffuse liver disease

Includes chronic hepatitis, cirrhosis, glycogen storage diseases, hemochromatosis, and Wilson's disease

Advanced imaging is considered medically necessary in **ANY** of the following scenarios:

- Evaluation of suspected liver disease based on clinical findings or abnormal liver function tests when ultrasound is nondiagnostic and further evaluation is required
- Suspected hepatocellular carcinoma in persons with known cirrhosis
- Evaluation for iron overload in hemochromatosis when chelation therapy or phlebotomy is being considered

IMAGING STUDY

- CT abdomen for **ANY** of the following:
  - Suspected liver disease
  - Suspected hepatocellular carcinoma
  - Iron overload in hemochromatosis when MRI contraindicated
- MRI abdomen for evaluation of hemochromatosis

Rationale

There are many potential causes of diffuse liver damage, including autoimmune disease, infection, hereditary conditions, and toxic or metabolic factors. A common presentation is asymptomatic transaminase elevation detected on routine laboratory testing. Advanced liver disease may manifest as jaundice or aberrations in the synthetic function of the liver.

When imaging is required, ultrasound is the initial study of choice for evaluation of both the liver parenchyma and biliary tree. In a study comparing ultrasonography of alcoholic liver disease to histological correlation, ultrasound had a

sensitivity of 95% and specificity of 94%.[30] Another study comparing histologic findings with ultrasonography for assessment of diffuse parenchymal disease found a sensitivity and specificity of 89% and 93%, respectively.[31]

Limited data is available comparing accuracy of available cross-sectional imaging modalities. A small trial comparing the ability of ultrasound, CT, and MRI to determine diffuse liver steatosis demonstrated that opposed-phase MRI had the highest correlation with histopathology, compared to T2-weighted MRI with and without fat saturation, CT, and ultrasound for quantification of diffuse liver fat.[32] In a multicenter collaborative study evaluating the accuracy, sensitivity, and specificity of these imaging modalities for detecting liver cirrhosis, CT and MRI were not statistically better than ultrasound in receiver operating characteristic analysis.[33]

Focal liver lesion

ADULT

Advanced imaging is considered medically necessary in **ANY** of the following scenarios:

- Indeterminate lesions (not biopsied and not fully characterized by prior imaging)
  - Initial evaluation of an indeterminate lesion identified on prior imaging when **ANY** of the following high-risk features are present:
    - Size > 1 cm in diameter
    - Multiple lesions
    - Known malignancy
    - Known cirrhosis
    - Chronic hepatitis
    - Sclerosing cholangitis
    - Primary biliary cirrhosis
    - Hemochromatosis
    - Hemosiderosis
    - Oral contraceptive use
    - Anabolic steroid use
  - Follow up or surveillance at 3 to 6 months when any of the above risk factors are present, or when the lesion is enhancing, poorly defined, or increasing in size
- Benign lesions (biopsy-proven or fully characterized by imaging)
  - Evaluation of symptoms suggesting a change in size or character
  - Periodic surveillance of known hepatic adenoma

IMAGING STUDY

- CT or MRI abdomen

PEDIATRIC

Advanced imaging is considered medically necessary in **EITHER** of the following scenarios:

- Suspected malignancy
- Diagnosis or management of a benign neoplasm

IMAGING STUDY

- Ultrasound required for evaluation of a benign neoplasm
- CT or MRI abdomen when ultrasound is nondiagnostic or when malignancy is suspected

Note: A simple liver cyst with benign characteristics on ultrasound may not require advanced imaging or surveillance.

Rationale

Common benign liver lesions, such as cysts and hemangiomas, usually have a characteristic appearance on ultrasound; this often eliminates the need for additional evaluation.[34] In the setting of classic imaging findings and low risk for hepatic malignancy, ultrasonography is often sufficient.[34] Otherwise, further evaluation with MRI should be considered.[35,36]

Cavernous hemangiomas are common; autopsy studies have shown that they occur in up to 7% of the population.[37,38] Hemangiomas appear as a homogenous hyperechoic mass, usually < 3 cm in diameter with acoustic enhancement and sharp margins. Simple cysts are also very common in the liver, occurring in about 5% of individuals. Cysts typically show through transmission with no internal echoes and a sharp distant border with edge shadowing on liver ultrasound.[37]

Small hepatic lesions (< 1 cm) are difficult to characterize and biopsy, but have a high probability of being benign (> 80% even in patients with known malignancy),[34,39] thus close clinical follow up and monitoring for progression may be the most appropriate next step.[40] In an otherwise healthy patient, an incidentally discovered focal liver lesion has an estimated probability of greater than 95% of being benign.[41]

Multiple clinical guidelines recommend further characterization of liver lesions in high-risk patients, as well as those measuring greater than 1 cm in diameter, but there is no consensus on the most appropriate follow-up interval.[42,43] High-risk individuals include those with a known primary malignancy with a propensity to metastasize to the liver. Other hepatic risk factors include cirrhosis, chronic hepatitis, sclerosing cholangitis, hemochromatosis, hemosiderosis, oral contraceptive use, and anabolic steroid use.[40]

In terms of appropriate follow up, the American Association for the Study of Liver Diseases, as part of the The American Board of Internal Medicine initiative, recommends that clinicians not perform CT or MRI routinely to monitor benign focal liver lesions unless there is a major change in clinical findings or symptoms.[39]

Hepatomegaly

Advanced imaging is considered medically necessary for clinically suspected or worsening hepatic enlargement when the results of imaging will impact management.

IMAGING STUDY

ADULT

- Ultrasound should be considered for initial evaluation
- CT abdomen
- MRI abdomen only when CT contraindicated

PEDIATRIC

- Ultrasound required for initial evaluation
- CT or MRI abdomen when ultrasound is nondiagnostic

Jaundice

Advanced imaging is considered medically necessary for evaluation of unexplained icterus and abnormal liver function testing following nondiagnostic ultrasound.

IMAGING STUDY

- CT abdomen
- MRI abdomen for pediatric patients only

Rationale

Right upper quadrant ultrasound is the first-line modality in patients with jaundice to evaluate for common bile duct dilation, presence of stones, and to direct any additional testing. If patient has jaundice with a suspected mechanical

cause, right upper quadrant pain, or a history of stones, MRI abdomen with and without intravenous contrast and MRCP is second line.[27]

Primary sclerosing cholangitis

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment decisions.

IMAGING STUDY

- MRCP

Osseous Conditions

Avascular necrosis

Advanced imaging is considered medically necessary in **EITHER** of the following scenarios:

- Diagnosis following negative or inconclusive radiographs
- Preoperative planning for osteonecrosis with femoral head collapse

IMAGING STUDY

- MRI pelvis
- CT pelvis when MRI or bone scan not available or contraindicated

Axial spondyloarthropathy

Advanced imaging is considered medically necessary in **ANY** of the following scenarios:

- Diagnosis of nonradiographic spondyloarthropathy (nrSpA) when **BOTH** of the following are present:
  - Radiographs which are negative or equivocal for sacroiliitis (Grade 0-2)
  - Inflammatory back pain which has been present for at least 3 months. Inflammatory back pain is defined as back pain with at least **FOUR (4)** of the following features:
    - Patient is younger than age 40
    - Insidious (gradual) onset
    - Improvement with exercise
    - No improvement with rest
    - Pain at night that improves on getting up
- Baseline imaging prior to therapy when the diagnosis is based on radiographic findings
- Reevaluation in patients who have received at least 3 months of tumor necrosis factor inhibitors without clinical improvement

IMAGING STUDY

- MRI pelvis

Rationale

Axial spondyloarthritis includes a group of rare (estimated 0.25% to 1% prevalence) disorders that may be HLA-B27 positive and that manifest with inflammatory changes around the enthesis. Spondyloarthritis includes ankylosing

spondylitis, reactive arthritis, psoriatic arthritis, arthropathy associated with inflammatory bowel disease, and undifferentiated spondyloarthritis.

The Assessment of SpondyloArthritis International Society (ASAS) has developed and validated criteria for spondyloarthritis, as well as for their subsets: axial spondyloarthritis and peripheral spondyloarthritis.[44] While sacroiliitis is the most common MRI manifestation of axial spondyloarthropathy, bone marrow edema can be seen in the vertebrae as well and characteristic patterns have been described.[45]

There is consensus among guidelines that radiography of the pelvis and/or spine is the preferred imaging modality for initial evaluation of spondyloarthritis. Radiographs of the whole spine are recommended as the first-line imaging modality.[46] Plain film x-ray of the sacroiliac joints should be considered for suspected axial spondyloarthritis, unless the person is likely to have an immature skeleton.[47] In patients with ankylosing spondylitis (not nonradiographic axial spondyloarthritis), initial conventional radiography of the lumbar and cervical spine is recommended to detect syndesmophytes, which are predictive of development of new syndesmophytes.[48]

The ASAS criteria for axial spondyloarthritis have a high diagnostic accuracy, sensitivity 82% and specificity 88% based on a systematic review of 9 papers and 5739 patients.[44] Patients that do not meet the ASAS criteria are a low pretest probability group unlikely to have axial spondyloarthropathy. The ASAS criteria for axial spondyloarthritis include age < 45 years, back pain of at least 3 months duration, sacroiliitis on imaging (either definitive changes on radiography or evidence from MRI) and one characteristic feature, and HLA-B27 positive; or at least 2 characteristic clinical features, which include arthritis, uveitis, dactylitis, psoriasis, Crohn's disease, positive nonsteroidal anti-inflammatory drug response, family history, and positive HLA-B27.

Diagnostic criteria for ASAS are based on MRI of the sacroiliac joints, not the spine. MRI of the spine has a low yield in patients with a negative sacroiliac joint MRI and should not be routinely performed. A retrospective study of 1191 patients under age 45 with chronic lower back pain found sacroiliitis in approximately 7% of patients. Less than 2% of patients with a negative sacroiliac joint MRI had a positive spine MRI, and spine MRI changed management in only 0.16% of cases.[49] MRI can demonstrate edema of the vertebral body corners (also known as corner inflammatory lesions) and bone marrow edema. A positive MRI spine is defined as 3 or more lesions present on 2 or more slices, but this definition is used primarily for research purposes.[49]

Consensus among guidelines is that MRI should be obtained in patients with persistent clinical suspicion when radiography is negative or indeterminate. When a diagnosis of axial spondyloarthritis cannot be confirmed and clinical suspicion remains high, a follow up MRI should be considered.[48] When radiographs are negative and there is suspicion of spondyloarthritis, MRI is mandatory to look for early inflammatory lesions.[46] Plain film x-rays, ultrasound, and/or MRI should be considered for other peripheral and axial symptomatic sites.[47]

A negative/indeterminate radiograph does not satisfy the New York Criteria for Ankylosing Spondylitis (bilateral grade 2–4 or unilateral grade 3–4 sacroiliitis [evidence of erosions, sclerosis, joint space widening, narrowing or ankyloses]) and does not otherwise explain the back pain.

MRI of the sacroiliac joints and/or spine may be used to assess and monitor disease activity in axial spondyloarthritis, providing additional information on top of clinical and biochemical assessments. The decision on when to repeat MRI depends on the clinical circumstances. In general, short tau inversion recovery sequences are sufficient to detect inflammation and the use of contrast medium is not needed.[48]

Developmental hip dysplasia (Pediatric only)

Advanced imaging is considered medically necessary for preoperative planning.

IMAGING STUDY

- CT pelvis

Osseous tumor

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment decisions.

IMAGING STUDY

- CT pelvis
- MRI pelvis for pediatric patients only

Note: MRI or radionuclide bone scintigraphy (bone scan) may be more appropriate for detection of skeletal metastases and primary bone tumors.

Osteoid osteoma

Advanced imaging is considered medically necessary following negative or inconclusive hip radiographs.

IMAGING STUDY

- CT pelvis

Osteomyelitis

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment decisions.

IMAGING STUDY

- MRI pelvis
- CT pelvis when MRI or bone scan not available or contraindicated

Rationale

Though radiographs often do not show abnormalities associated with osteomyelitis in the first 2 weeks of the infection, they can detect other pathology that may contribute to the patient's symptoms. The information provided by radiographs generally complements that provided by other modalities, so radiographs should be performed even when other imaging is planned.

Radiographs are the appropriate initial imaging study in osteomyelitis because they can demonstrate findings suggestive of the diagnosis, but can also exclude or provide information to suggest other diagnoses. The sensitivity of radiography is reportedly 43%-75% and the specificity is 75%-83%. Abnormal radiographs are helpful, but diagnosis cannot be excluded solely on the basis of negative radiographs. Although sensitivity and specificity of CT are not well established, sensitivity of CT is known to be lower than sensitivity of MRI. For this reason, the utility of CT is limited to specific situations. For example, CT can be used to detect bony sequestra, and has an important role in determining operative therapy.[50]

Overall, CT has a limited role in the diagnosis of osteomyelitis, and should be used only when imaging is being done to assess the extent of bone destruction, to direct a biopsy, or when MRI is contraindicated. For early detection of osteomyelitis, MRI is superior to other imaging modalities. The sensitivity and specificity for MRI are 78%-90% and 60%-90%, respectively. This compares to sensitivity and specificity of 67% and 50% for CT, and 14%-54% and 68%-70% for radiography.[51]

The American College of Radiology Appropriateness Criteria indicates that for initial imaging evaluation of suspected osteomyelitis, radiographs are rated as "usually appropriate." CT, MRI, and ultrasound are all rated as "usually not appropriate," regardless of whether the studies are to be performed with intravenous contrast. For evaluation of suspected osteomyelitis following radiographs, MRI without and with intravenous contrast is preferred, although radiographs and MRI are both indicated and complementary. MRI without contrast is generally appropriate if contrast is contraindicated, and CT with intravenous contrast is generally appropriate if MRI is contraindicated.[52]

Pelvic fracture

Includes sacral insufficiency fracture, stress fracture, and traumatic fracture

Advanced imaging is considered medically necessary in **EITHER** of the following scenarios:

- Diagnosis or management of sacral insufficiency fracture
- Diagnosis or management of stress fracture or traumatic fracture following nondiagnostic pelvic or sacral radiographs

IMAGING STUDY

- Radiographs required prior to advanced imaging for fracture indications other than sacral insufficiency fracture
- CT or MRI pelvis following inconclusive radiographs or initial evaluation of sacral insufficiency fracture

Sacroiliitis

Advanced imaging is considered medically necessary following pelvic or sacral radiographs when further clarification is required to direct treatment.

IMAGING STUDY

- CT or MRI pelvis

Septic arthritis

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment decisions.

IMAGING STUDY

- MRI pelvis
- CT pelvis when MRI or bone scan not available or contraindicated

Pancreatic Indications

Pancreatic mass

Advanced imaging is considered medically necessary when the results of imaging are essential to establish a diagnosis and/or direct management.

IMAGING STUDY

- CT abdomen with pancreatic protocol
- MRI abdomen

Pancreatic pseudocyst

Advanced imaging is considered medically necessary in persons with a history of pancreatitis or pancreatic trauma.

IMAGING STUDY

ADULT

- CT abdomen
- MRI abdomen only when CT contraindicated
- MRCP to determine the relationship between the cyst and pancreatic duct

PEDIATRIC

- Ultrasound required for initial evaluation
- CT or MRI abdomen when ultrasound is nondiagnostic
- MRCP to determine the relationship between the cyst and pancreatic duct

Note: Ultrasound is recommended for surveillance of known pseudocyst requiring serial evaluation.

Pancreatitis

Advanced imaging is considered medically necessary in **EITHER** of the following scenarios:

- Evaluation of suspected complications due to acute pancreatitis (see pancreatic pseudocyst)

- Recurrent acute pancreatitis of uncertain etiology, defined as more than 2 attacks of acute pancreatitis without evidence for chronic pancreatitis

Note: Patients with mild acute or uncomplicated pancreatitis usually do not require cross-sectional imaging, aside from ultrasound for identification of gallstones and/or biliary ductal calculi.

IMAGING STUDY

- CT abdomen
- MRI abdomen for pediatric patients only (for adults when CT contraindicated)
- MRCP for recurrent acute pancreatitis to evaluate suspected pancreatic duct anomalies

Rationale

Biochemical testing is more sensitive than CT and often sufficient to make the diagnosis of acute uncomplicated pancreatitis in both children and adults.[53,54] Therefore, CT is not indicated and should not be ordered routinely for patients with mild acute pancreatitis.[55]

CT should be performed selectively when a broad differential diagnosis that includes acute pancreatitis must be narrowed, especially when biochemical testing is negative or in patients with acute pancreatitis and a suspected local complication (e.g., peritonitis, signs of shock, suggestive ultrasound findings).[25] Triphasic CT is accurate for the detection of complications in acute pancreatitis including pseudocysts, pancreatic necrosis, portal vein thrombosis, and visceral artery pseudoaneurysms. MRI or MRCP may be indicated when a biliary cause for pancreatitis is suspected, especially for recurrent attacks.[56]

Renal & Urinary Tract Indications

Bladder or urethral diverticula

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment decisions.

IMAGING STUDY

- MRI pelvis

Hematuria

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment decisions.

IMAGING STUDY

- Ultrasound required for initial evaluation in pediatric patients.
- CT abdomen and/or pelvis following nondiagnostic ultrasound (pediatric) or for initial evaluation (adults)

Rationale

In patients presenting with macroscopic atraumatic hematuria, the incidence of urological malignancy is 0%-9.3% depending on patient population, with higher rates in male smokers over age 60. The primary goal of advanced imaging is to rule out genitourinary malignancy. A multiphasic study is recommended. Imaging can also detect nonmalignant etiologies for hematuria, including calculous disease (> 5%) and benign prostatic enlargement.[57]

The initial evaluation for asymptomatic microhematuria should include a radiologic evaluation. Multiphasic CT urography (without and with intravenous contrast), including sufficient phases to evaluate the renal parenchyma to rule out a renal mass and an excretory phase to evaluate the urothelium of the upper tracts, is the modality of choice because it has the

highest sensitivity and specificity for imaging the upper tracts.[57] CT changed management in 53% of patients with hematuria.[58]

Hydronephrosis

Advanced imaging is considered medically necessary to evaluate for obstruction following nondiagnostic ultrasound.

IMAGING STUDY

- CT abdomen and/or pelvis
- MRI abdomen and pelvis in pediatric patients only
- MRI abdomen and pelvis in adults only when CT contraindicated

Nephrocalcinosis

Advanced imaging is considered medically necessary following nondiagnostic ultrasound.

IMAGING STUDY

- CT abdomen

Polycystic kidney disease

Advanced imaging is considered medically necessary following nondiagnostic ultrasound

IMAGING STUDY

- CT or MRI abdomen

Pyelonephritis

Advanced imaging is considered medically necessary in **EITHER** of the following scenarios:

- Acute pyelonephritis in persons with diabetes, history of renal calculi or renal surgery
- Lack of clinical improvement following 72 hours of antibiotic therapy to evaluate for complications such as abscess or another surgical condition
- Diagnosis or management of xanthogranulomatous pyelonephritis

IMAGING STUDY

- CT abdomen
- MRI abdomen when CT contraindicated

Renal mass

Advanced imaging is considered medically necessary in **ANY** of the following scenarios:

- Suspected malignancy
- Characterization of an indeterminate renal mass identified on prior imaging
- Diagnosis and management of benign renal tumors including angiomyolipoma, multilocular cystic nephroma, and neuroblastomatosis

IMAGING STUDY

- Ultrasound required for initial evaluation of cystic lesions and for management of lesions known to be benign
- CT or MRI abdomen when malignancy is suspected or following nondiagnostic ultrasound

Note: Simple cysts with benign characteristics on ultrasound do not require advanced imaging or surveillance.

Rationale

When evaluating an incidental renal lesion, previous imaging results should be obtained if available to assess lesion stability.

For an incidental cystic renal mass detected on CT, the Bosniak classification system is a well-validated tool for management. Renal cysts classified Bosniak category 1 or 2 require no follow up; however, Bosniak subcategory 2F cysts should have a follow-up CT or MRI at 6 months, 12 months, and then yearly for 5 years in patients without limited life expectancy. Cysts categorized Bosniak 3 or 4 should be followed up at 6 to 12 months, then yearly for 5 years, in patients who are poor surgical candidates or who have limited life expectancy. For patients with a solid or Bosniak 3/4 complex cystic renal mass in whom the risk/benefit analysis for treatment is equivocal and who prefer active surveillance, physicians should repeat imaging in 3 to 6 months to assess for interval growth and may consider renal mass biopsy for additional risk stratification.[59]

For an incidental solid renal mass detected on CT, recommendations are based on lesion size. For lesions < 1 cm, CT or MRI should be performed at 3 to 6 months, then 12 months, then yearly—or at shorter intervals if the mass is enlarging. For lesions 1-3 cm or > 3 cm, follow up should be an option for patients with limited life expectancy or comorbidities.[42]

Urinary tract calculi

ADULT

Advanced imaging is considered medically necessary in **ANY** of the following scenarios:

- Initial evaluation of suspected calculus in patients with no history of nephrolithiasis
- Suspected recurrence when **ANY** of the following apply:
  - History of radiolucent calculus
  - History of radiopaque calculus and atypical presentation
  - History of radiopaque calculus and typical presentation, following nondiagnostic ultrasound
- Management and follow up of known calculi when **ANY** of the following apply:
  - Planned percutaneous nephrolithotomy, ureteroscopy, or shock wave lithotripsy, when CT has not been performed within the preceding 30 days
  - Symptomatic patients with known radiolucent calculi
  - Symptomatic patients with radiopaque calculi, following nondiagnostic KUB or ultrasound
  - Asymptomatic patients with known radiolucent calculi and persistent hydronephrosis on ultrasound following shock wave lithotripsy or ureteroscopic stone extraction
- Pregnancy
  - Diagnosis or management following nondiagnostic ultrasound or KUB

PEDIATRIC

Advanced imaging is considered medically necessary following nondiagnostic ultrasound or kidney, ureter, and bladder radiograph.

IMAGING STUDY

- Radiograph or ultrasound required in pregnant women and pediatric patients
- CT abdomen and/or pelvis

Rationale

INITIAL EVALUATION

CT is preferred by the majority of the evidence based guidelines although initial ultrasound evaluation is also appropriate. Ultrasound has been shown to have lower sensitivity but comparable specificity to CT in detecting ureteral

stones. It is safe, reproducible, and inexpensive, and can detect upper urinary tract dilatation.[60-62] CT detects important incidental findings in patients over 80 years of age in 28.9% of cases.[63] CT should be avoided for patients presenting to the emergency department with symptoms consistent with uncomplicated renal colic who are younger than 50 years of age, otherwise healthy, and with known histories of kidney stones or ureterolithiasis.[64]

MANAGEMENT

In a randomized controlled trial, 2500 nonobese adult patients with suspected nephrolithiasis (without a solitary kidney or dialysis dependence) presenting in the emergency department were randomized to initial ultrasound vs CT. No difference was found between the 2 groups in the rates of clinically significant alternative diagnoses, hospitalizations, return emergency department visits, or diagnostic accuracy.[65]

Miscellaneous Conditions

Adrenal hemorrhage

Advanced imaging is considered medically necessary following nondiagnostic ultrasound or history of trauma.

IMAGING STUDY

- CT or MRI abdomen

Adrenal mass

Advanced imaging is considered medically necessary in **EITHER** of the following scenarios:

- Evaluation of biochemical evidence suggestive of an adrenal neoplasm
- Characterization of an indeterminate adrenal mass identified on prior imaging

IMAGING STUDY

- Ultrasound required for initial evaluation in neonates
- CT or MRI abdomen

Rationale

Incidental adrenal masses, or adrenal incidentalomas, are frequently encountered and represent a diagnostic challenge. All patients found to have an adrenal incidentaloma should undergo clinical, biochemical, and imaging examinations to determine the presence/absence of symptoms and signs caused by an excess of adrenal hormones and to determine whether the tumor is malignant. The main purpose of imaging studies in adrenal incidentaloma is to biopsy malignant tumors early enough for a curative surgical resection to be possible.[66,67]

For evaluation of a 1-4 cm incidentally discovered adrenal mass with no history of cancer, a follow up CT or MRI at 12 months is recommended.[42] Markers suggestive of malignancy include size > 4 cm, irregular margins, nonhomogeneous content, nonuniform enhancement, surrounding tissue invasion or metastasis, attenuation coefficient of 10 Hounsfield units or greater on noncontrast CT scan, low washout rate on delayed view of contrast CT, and abnormal increase in metabolites of steroids.[68] No follow up is recommended for lesions with benign features.[66,69] A recent systematic review of 3 studies and 153 patients found the CT < 10 Hounsfield units criterion to be 100% sensitive (95% CI, 91%-100%) and 72% specific (95% CI, 60%-82%).[69] Among more than 2300 patients included in published follow-up studies, there is no report of adrenal malignancy in adrenal incidentalomas displaying typical features of adrenocortical adenomas on initial imaging studies.[69]

Follow-up imaging studies to detect malignancy are recommended 3 to 6 months after the initial study and continuing for 1 to 2 years. Adrenalectomy should be considered if the mass enlarges by 1 cm or more and/or changes its appearance during observation.[66]

Hemoperitoneum

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment.

IMAGING STUDY

- CT abdomen and/or pelvis

Hernia

Includes femoral, internal, inguinal, Spigelian, ventral, and incisional hernia

Advanced imaging is considered medically necessary in **EITHER** of the following scenarios:

- Suspected complications
- Presurgical planning

IMAGING STUDY

- Ultrasound required for initial evaluation in pediatric patients
- CT abdomen and/or pelvis
- MRI abdomen and/or pelvis for pediatric patients only (adults when CT contraindicated)

Rationale

CT detects occult hernias in approximately 11% of cases and assists in the differential diagnosis of hernia vs other abdominal wall mass. It is useful in surgical planning to define the abdominal wall anatomy in nonmidline hernias such as those on the flanks, suprapubic or subxiphoid regions, and to identify posterior abdominal wall defects.[70]

MRI is favored for groin hernias when ultrasound is nondiagnostic. Sensitivity and specificity for MRI are 94.5% and 96.3%, respectively, vs 83% and 67%-83%, respectively, for CT.[71]

Lymphadenopathy

Advanced imaging is considered medically necessary for detection and periodic follow up when the results of imaging will impact treatment decisions.

IMAGING STUDY

- CT abdomen and/or pelvis
- MRI abdomen and/or pelvis when CT is nondiagnostic

Note: MRI may be useful to differentiate enlarged lymph nodes from vascular structures following unenhanced CT scan

Pelvic floor disorders associated with urinary or bowel incontinence

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment decisions.

IMAGING STUDY

- MRI pelvis
- Dynamic MRI may be of benefit in some clinical scenarios

Prostate cancer

Advanced imaging is considered medically necessary for evaluation of suspected prostate cancer in men with a rising prostate-specific antigen and negative transrectal ultrasound biopsy.

IMAGING STUDY

- Multiparametric MRI pelvis

Retroperitoneal conditions

Advanced imaging is considered medically necessary for diagnosis and management of **ANY** of the following retroperitoneal conditions:

- Fibrosis
- Inflammation
- Bleeding
- Mass

IMAGING STUDY

- CT abdomen and/or pelvis
- MRI abdomen and/or pelvis for pediatric patients only (adults when CT contraindicated)

Splenic hematoma

Advanced imaging is considered medically necessary for diagnosis and management when the results of imaging will impact treatment.

IMAGING STUDY

- CT abdomen
- MRI abdomen for pediatric patients only (adults when CT contraindicated)

Splenomegaly

Advanced imaging is considered medically necessary for clinically suspected or worsening splenic enlargement when the results of imaging will impact management.

IMAGING STUDY

- Ultrasound required for initial evaluation in pediatric patients
- CT abdomen following nondiagnostic ultrasound (pediatric) or initial evaluation (adult)
- MRI abdomen for pediatric patients only (adults when CT contraindicated)

Sports hernia (athletic pubalgia)

Advanced imaging is considered medically necessary when **ALL** of the following criteria are met:

- Pain is insidious, progressive, and worsens with Valsalva or movement
- No detectable inguinal or ventral hernia on exam
- Pain has persisted for least 6 weeks
- Radiographs are nondiagnostic
- Symptoms have not improved following at least 6 weeks of conservative therapy
- Patient is a surgical candidate

IMAGING STUDY

- MRI pelvis

Rationale

Athletic pubalgia is a term used to describe chronic groin pain which is of insidious onset and occurs with exertion. Though its incidence in female patients is increasing, the diagnosis predominantly occurs in males. It is uncertain