American College of Radiology
ACR Appropriateness Criteria®
Chronic Pancreatitis

Variant: 1 Adult. Suspected chronic pancreatitis or complications associated with chronic pancreatitis. Initial imaging

Procedure	Appropriateness Category	Relative Radiation Level
MRI abdomen without and with IV contrast with MRCP	Usually Appropriate	O
CT abdomen and pelvis with IV contrast	Usually Appropriate	☢☢☢
CT abdomen and pelvis without and with IV contrast	Usually Appropriate	☢☢☢☢
US abdomen endoscopic	May Be Appropriate	O
MRI abdomen without IV contrast with MRCP	May Be Appropriate	O
US abdomen	Usually Not Appropriate	O
CT abdomen and pelvis without IV contrast	Usually Not Appropriate	☢☢☢

Variant: 2 Adult. Chronic pancreatitis. Suspect superimposed acute pancreatitis. Initial Imaging

Procedure	Appropriateness Category	Relative Radiation Level
CT abdomen and pelvis with IV contrast	Usually Appropriate	☢☢☢
MRI abdomen without and with IV contrast with MRCP	May Be Appropriate	O
MRI abdomen without IV contrast with MRCP	May Be Appropriate	O
CT abdomen and pelvis without and with IV contrast	May Be Appropriate (Disagreement)	☢☢☢☢
US abdomen	Usually Not Appropriate	O
US abdomen endoscopic	Usually Not Appropriate	O
CT abdomen and pelvis without IV contrast	Usually Not Appropriate	☢☢☢

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Summary of Literature Review

Introduction/Background

Chronic pancreatitis (CP) is a progressive fibroinflammatory disorder of the pancreas characterized by fibrosis, loss of acinar cells, and eventual loss of pancreatic function. Repeated episodes of pancreatic inflammation, especially in patients with risk factors, can lead to irreversible destruction and manifest as abdominal pain with complications arising from endocrine and exocrine insufficiency. CP can be a debilitating condition, with an incidence of 5 to 12 per 100,000 in industrialized nations [1]. In the United States, CP significantly impacts the health care system, resulting in approximately 86,000 admissions annually [2]. Although no curative treatment is available, early diagnosis is key, because timely intervention may improve patient care and reduce costs [2, 3].

Risk factors for developing CP have been categorized by 2 commonly used systems. This includes the TIGAR-O system, which classifies risk factors into toxic-metabolic (T), idiopathic (I), genetic (G), autoimmune (A), recurrent and severe acute pancreatitis (R), or obstructive (O) [4]. Similarly, the M-ANNHEIM system categorizes these multiple risk factors (M) into alcohol (A), nicotine consumption (N), nutritional factors (N), hereditary (H), efferent pancreatic duct factors (E), immunological etiologies (I), and other rare miscellaneous and metabolic etiologies (M) [5]. Among these processes, alcohol and smoking are the most common contributors, accounting for 40% and 25%, respectively [6]. CP resulting from acute pancreatitis (AP) is a less common etiology compared with alcohol and smoking [7]. However, approximately 10% of patients with a single episode of AP and 36% of patients with recurrent AP progress to CP [7]. The disease course and complications can vary greatly depending on the underlying etiology [8]. Although many underlying causes of CP are indistinguishable on imaging, some, such as autoimmune pancreatitis and recurrent AP, have more classic radiologic features [6].

The diagnosis of CP is challenging, relying on a combination of clinical presentation, risk factors, laboratory values, and imaging findings. Patients have variable presentations including abdominal pain, steatorrhea, new-onset diabetes, and malnutrition. These symptoms can significantly reduce quality of life and increase mortality [9]. A small subset of patients may be asymptomatic. Only a limited correlation exists between the severity of pain and the morphological changes identified on imaging [10]. Unlike in AP, no single laboratory test is highly specific for diagnosing CP [1]. Certain laboratory values, such as fecal elastase-1, may be abnormal in CP patients but require a high degree of pancreatic destruction [1, 11]. Advanced CP may be associated with low amylase and lipase levels, although these can remain normal, limiting their diagnostic utility [1, 12].

Most patients with CP experience at least one episode of acute inflammation (ACP), defined by Bouça-Machado et al [12] as “acute worsening of the inflammatory process associated with CP, resulting in a deterioration of the patient's clinical condition, typically resulting in increased pancreatic pain” About half of patients with CP have recurrent episodes with alcohol being the most common trigger [7, 13-16]. ACP is generally milder than AP due to fibrosis confining inflammation and limiting necrosis [15, 17, 18]. ACP can be diagnosed when amylase and lipase levels rise 3 times above baseline especially in patients with recurrent episodes [12]; however laboratory values are less reliable than in AP due to background acinar destruction in CP [19]. For further details on imaging assessment of AP, refer to the ACR Appropriateness Criteria® topic on "Acute Pancreatitis" [20].

Imaging plays an important role in the initial evaluation of CP, offering evidence to support a clinical diagnosis and characterizing the extent of damage. Advanced parenchymal and ductal changes can be identified noninvasively by CT, MRI, and ultrasound (US). EndoscopicUS(EUS) and endoscopic retrograde cholangiopancreatography (ERCP) can also detect these abnormalities, with the added benefit of biopsy or intervention if needed. In ACP, imaging may be used to confirm the diagnosis and evaluate complications such as necrosis, fluid collections, or vascular involvement. CP is also an independent risk factor for pancreatic ductal adenocarcinoma (PDAC). Noninvasive imaging can sometimes show overlapping features between CP and PDAC or intraductal papillary mucinous neoplasm, which may lead to surgical intervention such as pancreaticoduodenectomy [21, 22]. Further details on imaging assessment of PDAC are discussed in the ACR Appropriateness Criteria® topic on "Staging of Pancreatic Ductal Adenocarcinoma"

[23].

Pathological confirmation of CP is usually not required for diagnosis, although it may be necessary in differentiating a focal form of CP from other disease processes such as PDAC [24]. Additionally, pancreatic biopsy can result in sampling error due to the patchy distribution and evolution of CP [8].

Special Imaging Considerations

A conventional abdominal radiograph, not included as a standalone procedure in the variants below, has limited value in diagnosing CP because it is unable to assess pancreatic parenchyma and ducts. Although radiographs may reveal diffuse pancreatic calcifications, which are specific for CP, these findings typically occur in advanced stages, and other important features of CP may be missed. In specific settings, abdominal radiographs can help guide management for symptomatic intraductal stones based on location and size. Stones visible on conventional radiographs, especially those located in the head or neck of the duct, may be suitable for extracorporeal shock wave lithotripsy, whereas stones in the body and tail may require surgical intervention [25].

ERCP can be both diagnostic and therapeutic, with a high sensitivity and specificity for CP [26, 27]. Due to its invasive technique and risk of complications, including post–ERCP pancreatitis, it is no longer used as a diagnostic tool for CP [28]. Furthermore, ERCP assesses main and side branch duct abnormalities but does not identify underlying structural changes in the parenchyma. Currently, the role of ERCP is limited to therapeutic intervention in managing symptomatic patients with CP. Therapeutic applications include stone extraction, pancreatic duct stricture dilation and stent placement, managing biliary strictures, and pancreatitis-related fluid collection drainage [27, 29, 30].

Secretin-stimulated MR cholangiopancreatography (s-MRCP) enhances both structural and functional evaluation of the pancreas by using a synthetic secretin analog to stimulate pancreatic fluid secretion, improving visualization of the main duct and side branches [31-33]. It is particularly useful in early or mild CP in which subtle duct changes may not be readily apparent on more conventional diagnostic examinations including standard MRCP. S-MRCP has been shown to increase diagnostic certainty in this subset of patients by revealing restricted main duct compliance, side branch ectasia, subtle duct strictures, and diminished pancreatic exocrine function based on duodenal filling [32-34]. However, its clinical use is limited by factors such as longer scan times, need for supplemental medication administration, lack of standardized protocols, and susceptibility to image degradation from ascites or patient motion [31, 33]. As a result, s-MRCP is not routinely used at many centers in the United States and will be included within the overall category of MRCP within the listed procedures.

Initial Imaging Definition

Initial imaging is defined as imaging at the beginning of the care episode for the medical condition defined by the variant. More than one procedure can be considered usually appropriate in the initial imaging evaluation when:

- There are procedures that are equivalent alternatives (ie, only one procedure will be ordered to provide the clinical information to effectively manage the patient's care)

OR

- There are complementary procedures (ie, more than one procedure is ordered as a set or simultaneously wherein each procedure provides unique clinical information to effectively manage the patient's care).

Discussion of Procedures by Variant

Variant 1:Adult. Suspected chronic pancreatitis or complications associated with chronic pancreatitis. Initial imaging

In patients with suspected CP, imaging can confirm the diagnosis by detecting characteristic morphologic changes, which include parenchymal atrophy and fibrosis, parenchymal and intraductal calcifications, and pancreatic duct abnormalities. Imaging can also assess the severity of these abnormalities and identify potential underlying etiologies or complications. With this information, clinicians can initiate targeted medical management and dietary modifications to help prevent or delay disease progression, identify candidates for intervention, and improve quality of life.

Variant 1:Adult. Suspected chronic pancreatitis or complications associated with chronic pancreatitis. Initial imaging
A. CT abdomen and pelvis with IV contrast

A biphasic pancreas protocol CT abdomen and pelvis with intravenous (IV) contrast, typically acquired in pancreatic parenchymal phase for optimal parenchymal enhancement and portal venous phase with thin axial reconstructions with slices of 3 mm or less, is frequently used as an initial diagnostic tool. It provides a noninvasive, comprehensive evaluation of the pancreas, detects complications, and allows assessment of alternative diagnoses [27]. A meta-analysis reported a sensitivity and specificity of 75% and 91% for CT in diagnosing CP, comparable to MRI and EUS [26].

CT effectively detects advanced CP by identifying parenchymal and intraductal calcifications, which are the most reliable imaging findings [50, 51]. Coarse and more numerous calcifications indicate a moderate to severe disease and may appear earlier in alcohol-related CP [32, 38, 51-53]. The portal venous phase has moderate sensitivity and nearly 100% specificity for coarse calcifications [8, 54]. Other common CT findings in CP include parenchymal atrophy, ductal dilation, and abnormal side-branch dilation. Ductal irregularity, indicative of periductal fibrosis, is more apparent in moderate to severe cases [50, 55]. In some cases of CP (e.g., autoimmune pancreatitis), the pancreas may enlarge or demonstrate peripancreatic fat stranding, which can make diagnosis challenging. The Cambridge classification system, originally designed for ERCP-based ductal assessment, has been adapted for CT to incorporate ductal and parenchymal findings [50]. However, due to variability in measurement, no standardized scoring system has been widely adopted [35, 56].

CT is also valuable in identifying CP-related complications such as pancreatitis-related fluid collections, pancreaticobiliary strictures, obstructing intraductal stones, duodenal obstruction, pseudoaneurysms, and splanchnic vein thrombosis [32, 57]. Additionally, it can detect alternative intraabdominal pathology with similar clinical presentation [32]. Patients with CP have an increased risk of PDAC, which shares overlapping CT features [58]. CT differentiates mass-forming CP from

PDAC in 77% of cases, with findings such as penetrating duct sign favoring CP and displacement of parenchymal calcifications favoring PDAC [37]. In patients with refractory CP, CT also plays an important role in presurgical planning by detecting pancreatic anatomy, evaluating the extent of disease, and assessing vascular involvement, which helps guide decisions around resectability and surgical approach. These capabilities make CT a widely used initial imaging modality for CP evaluation.

Emerging CT techniques, including dual-energy CT, CT perfusion, and CT volumetry, may assist in diagnosis and grading severity, although further validation and standardization are needed before routine use [59, 60].

Despite its advantages, CT with IV contrast has limitations in detecting early CP. Punctate calcifications may be missed, and, compared with MRI/MRCP and EUS, CT is less sensitive for early ductal irregularity and subtle parenchymal changes [6, 61]. Thus, in patients with high clinical suspicion and negative or inconclusive CT findings, further imaging may be necessary [6, 14, 32, 35].

Variant 1:Adult. Suspected chronic pancreatitis or complications associated with chronic pancreatitis. Initial imaging
B. CT abdomen and pelvis without and with IV contrast

In the context of CP, CT without and with IV contrast typically refers to a triphasic pancreas protocol CT. This protocol includes noncontrast, pancreatic parenchymal, and portal venous phases performed with thinner slices than used in a standard single-phase CT. Although portal venous phase alone has a moderate sensitivity and very high specificity for detecting coarse calcifications [8, 54], the noncontrast phase can improve the detection of punctate calcifications that might be obscured by contrast; however, its routine use remains controversial [32, 50, 51]. The noncontrast phase may also aid in the general assessment of fibrosis, classifying it as absent, equivocal, or present; however, it is not sensitive for grading fibrosis severity [55]. CT without and with IV contrast can be useful for evaluating CP complications, such as suspected acute hemorrhage from a pseudoaneurysm or hemorrhage within a pancreatitis-related fluid collection. There is no clear consensus on the optimal CT protocol for CP or the added value of the noncontrast phase. Some groups, such as the Consortium for the Study of Chronic Pancreatitis, Diabetes, and Pancreatic Cancer, recommend CT without and with IV contrast [50], whereas others, such as the Working Group for the International (IAP–APA–JPS–EPC) Consensus Guidelines for Chronic Pancreatitis, support CT with IV contrast [32].

CT without and with IV contrast can also help differentiate diffuse or mass-forming CP from other diseases, such as PDAC, particularly when calcifications are present [38, 62]. Additionally, CT can identify other intraabdominal pathologies with similar symptoms [32]; however, there is no relevant literature on whether routine addition of a noncontrast phase has significant benefit in this situation.

Variant 1:Adult. Suspected chronic pancreatitis or complications associated with chronic pancreatitis. Initial imaging
C. CT abdomen and pelvis without IV contrast

There is no relevant literature to support routine use of noncontrast CT abdomen and pelvis in the initial diagnosis of CP. Although it can detect parenchymal and intraductal calcifications, which are helpful when present, it cannot reliably assess subtle pancreatic ductal or parenchymal changes

seen in early disease.

In symptomatic patients undergoing preprocedural imaging, such as before ERCP or extracorporeal shock wave lithotripsy, noncontrast CT provides adequate information on the location and size of intraductal stones [77]. It is also useful in postprocedural imaging to assess stone clearance [77].

Variant 1:Adult. Suspected chronic pancreatitis or complications associated with chronic pancreatitis. Initial imaging
D. MRI abdomen without and with IV contrast with MRCP

MRI abdomen without and with IV contrast, combined with standard MRCP, has a high pooled sensitivity (81%) and specificity (96%) for diagnosing CP [26]. MRI with MRCP can identify both parenchymal and ductal features of CP, including precontrast T1 signal loss, delayed enhancement, duct dilation, and irregularity. Due to its noninvasiveness and high soft tissue resolution, MRI with MRCP is the preferred modality for assessing pancreatic duct abnormalities and can detect filling defects and irregularities with moderate to high accuracy [27]. Many practice guidelines recommend MRI with MRCP when CT findings are normal or inconclusive in patients with suspected CP [6, 14, 32, 35]. In recent years, MRI combined with MRCP has been increasingly used as the initial study for early CP due to its ability to detect subtle pancreatic parenchymal and ductal changes [36].

In addition to detecting pancreatic duct irregularity and dilation, MRCP is valuable for evaluating anatomic variants, such as pancreatic divisum, and CP-associated common bile duct stricture. MRI with MRCP can also identify other pancreaticobiliary pathology that may explain clinical symptoms. Due to its noninvasive nature, MRCP is now preferred over ERCP for evaluating the pancreatic duct. Compared with CT, MRI with MRCP is often more sensitive in differentiating mass-forming CP from PDAC, particularly using the duct-penetrating sign, which is specific for CP [37, 38]. MRI with MRCP is also useful in cases of duct dilation without a discrete mass on CT, owing to its superior soft tissue resolution [37].

The Cambridge classification system, originally developed for duct evaluation with ERCP, has been adapted to MRCP using modified criteria. However, its routine use in this setting remains controversial, because studies show variable agreement between MRCP and ERCP [26, 39, 40]. This discrepancy is partly due to the difficulty of detecting mild changes in CP, such as subtle side-branch ectasia, mild strictures, and minimal duct irregularities, which are more easily seen by ERCP. Because the Cambridge classification focuses solely on ductal findings, alternative systems such as M-ANNHEIM and Magnetic Resonance Imaging as a Non-Invasive Method for the Assessment of Pancreatic Fibrosis (MINIMAP) study have been proposed to incorporate parenchymal findings as well [5, 41]. However, these newer classification systems have not been universally accepted for diagnosing and grading CP.

In select cases of early or mild CP, particularly when ductal findings are subtle or absent on standard imaging, s-MRCP may provide added diagnostic value by improving visualization of duct compliance, side branch ectasia, and duodenal filling. This technique is discussed in more detail in the Special Imaging Considerations section.

Recent quantitative advancements, such as T1 mapping to estimate tissue-specific T1 relaxation times and MR elastography to measure parenchymal stiffness, show promise in detecting early CP

[9, 42-44]. Because parenchymal changes often precede ductal changes in CP, T1-weighted imaging has demonstrated a high sensitivity and specificity for detecting parenchymal abnormalities in early stages and may serve as an imaging biomarker for assessing disease severity [45-47]. Additionally, diffusion-weighted imaging may help identify early parenchymal changes by showing a lower apparent diffusion coefficient in the pancreas, although conflicting data exists and further validation is needed [38, 48, 49]. Overall, these quantitative methods require further refinement and reproducibility before routine clinical application.

Limitations of MRI and MRCP include motion-related artifacts, susceptibility artifacts in the presence of metallic stents, and longer scan times. MRI also has a lower sensitivity for detecting calcifications, although larger intraductal calcifications may appear as filling defects on fluid-sensitive sequences such as MRCP.

Variant 1:Adult. Suspected chronic pancreatitis or complications associated with chronic pancreatitis. Initial imaging
E. MRI abdomen without IV contrast with MRCP

There is no relevant literature assessing MRI abdomen without IV contrast, combined with MRCP, in this context. Noncontrast MRI abdomen with MRCP can assess parenchymal changes on unenhanced T1-weighted sequence and evaluate main and branch duct abnormalities. It can also recognize anatomic variants and certain complications, such as biliary strictures. However, the absence of contrast limits the assessment of parenchymal enhancement patterns, certain CP-related complications, and malignancy detection.

Variant 1:Adult. Suspected chronic pancreatitis or complications associated with chronic pancreatitis. Initial imaging
F. US abdomen

Grayscale transabdominal US has traditionally been the first-line imaging modality for abdominal pain due to its noninvasive nature and portability. US is effective in detecting calcifications, the most reliable feature of CP, particularly when they are >5 mm and located in the pancreatic head [34, 74]. Other US features suggestive of CP include an irregular and dilated main pancreatic duct, hyperechoic duct walls, and a lobulated appearance with stranding [25]. Transabdominal US can also assess complications such as pancreatitis-related fluid collections, biliary duct dilation, and venous thrombosis. However, with a low sensitivity of 67%, especially in early disease when parenchymal changes are nonspecific and calcifications may be absent, US is generally unreliable for definitive diagnosis [6, 26]. In these cases, the pancreas may appear normal or show decreased echogenicity, and echotexture changes typical of early CP can also be seen in older adults and individuals with longstanding diabetes.

Many guidelines do not recommend transabdominal US for initial diagnosis, because the pancreatic tail is not usually seen on US, and other parts of the pancreas may be obscured by bowel gas, body composition, and other patient factors that degrade image quality [6, 32]. Certain institutions with skilled operators may use transabdominal US more judiciously as a first-line modality, particularly when more advanced stage is suspected [8, 32].

Advancements in US includes elastography, which assesses pancreatic stiffness as a marker to measure fibrosis and may offer potential for earlier CP diagnosis [75]. Contrast-enhanced US has also been explored in CP, although its primary role is in evaluating PDAC rather than diagnosing CP [76].

Variant 1:Adult. Suspected chronic pancreatitis or complications associated with chronic pancreatitis. Initial imaging
G. US abdomen endoscopic

EUS has a high pooled sensitivity and specificity of 81% and 90%, respectively, for diagnosing CP [26]. It also demonstrates the highest accuracy and strong agreement with ERCP [26]. EUS effectively identifies parenchymal and ductal changes using criteria that correlate well with histology [36, 63]. This is particularly valuable in patients with noncalcific CP [64]. Although EUS correlates well with histology in advanced CP, it is less reliable in early CP due to interobserver and intraobserver variability [6, 36, 65]. Moreover, EUS findings cannot reliably distinguish between CP and benign asymptomatic fibrosis or other morphological changes seen with normal aging, obesity, and diabetes [32]; thus, EUS findings should be interpreted in the appropriate clinical context [1, 66].

Several classification systems have been developed to standardize CP diagnosis using EUS, the most widely used being the Rosemont criteria. This system, based on expert opinion, categorizes major and minor criteria for CP using parenchymal and ductal findings [67]. Similar to CT and transabdominal US, the presence of calcifications is the most reliable feature for CP on EUS [68]. Other features include a lobulated appearance, hyperechoic foci or strands, pancreatitis-related fluid collections, an irregular and dilated main duct, dilated side branches, and a hyperechoic duct wall.

A major advantage of EUS is its ability to obtain tissue samples of the pancreas if required in certain situations, including equivocal imaging findings for CP or suspected PDAC. However, sampling error can lead to false-negative biopsies, and the procedure carries a risk of pancreatitis, limiting routine use for CP diagnosis [8, 69]. Additionally, EUS offers therapeutic benefits including drainage of pancreatitis-related fluid collections and pancreatic duct decompression or stent placement.

Similar to transabdominal US, EUS elastography can assess pancreatic stiffness and may improve the accuracy of detecting subtle parenchymal fibrosis. It strongly correlates with pancreatic function as assessed by endoscopic pancreatic function tests, although further validation is needed [70, 71]. In contrast to transabdominal US, EUS is less affected by patient motion and bowel gas due to its endoscopic approach.

Due to its relatively invasive nature and operator dependence, EUS is typically reserved for cases in which there is ongoing suspicion for CP after normal or inconclusive CT and MRI [6, 14, 36, 72]. There has also been support for a complementary role between MRCP and EUS in the setting of suspected early CP because parenchymal and side branch findings are often apparent earlier than main duct dilation [73].

Variant 2:Adult. Chronic pancreatitis. Suspect superimposed acute pancreatitis. Initial Imaging

In patients with an established diagnosis of chronic pancreatitis and suspected superimposed AP, imaging can be performed to assess acute worsening of inflammatory changes in the pancreas and to identify associated complications. Because ACP can further complicate the clinical course of CP, timely diagnosis helps avoid delaying treatment, guide early intervention, and improve patient

recovery.

Variant 2:Adult. Chronic pancreatitis. Suspect superimposed acute pancreatitis. Initial Imaging
A. CT abdomen and pelvis with IV contrast

CT abdomen and pelvis with IV contrast is the preferred imaging modality for patients with an established CP diagnosis who present with acute pain suspicious for ACP [12]. CT offers a comprehensive evaluation and rapid image acquisition, making it particularly valuable in emergency department settings for patients presenting with acute pain. Findings on contrast-enhanced CT can include acute pancreatic enlargement with edema, peripancreatic fat stranding, free fluid, and complications such as parenchymal necrosis, new or enlarging fluid collections, and vascular compromise [34]. ACP is generally milder than AP, and fluid collections are more common, often from enlargement of preexisting collections in CP during acute flares [12]. Furthermore, CT can help exclude complications of CP and identify alternative causes of pain. Compared with a baseline study, cross-sectional imaging may be necessary to differentiate new inflammation from preexisting chronic inflammation.

Variant 2:Adult. Chronic pancreatitis. Suspect superimposed acute pancreatitis. Initial Imaging
B. CT abdomen and pelvis without and with IV contrast

There is no relevant literature to support the use of CT abdomen and pelvis without and with IV contrast for diagnosing ACP. In certain situations, such as sequelae of hemorrhagic pancreatitis, obtaining a noncontrast phase in addition to a contrast-enhanced phase may be helpful.

Variant 2:Adult. Chronic pancreatitis. Suspect superimposed acute pancreatitis. Initial Imaging
C. CT abdomen and pelvis without IV contrast

There is no relevant literature to support the use of noncontrast CT for diagnosing superimposed ACP. There is well-established literature describing the limited use of noncontrast CT in AP, which may also be applicable to ACP. This includes the ability of noncontrast CT to demonstrate peripancreatic stranding and fluid collections seen in acute inflammation; however, contrast is generally needed to identify necrosis, thoroughly assess for complications, and distinguish ACP from alternate diagnoses [81].

Variant 2:Adult. Chronic pancreatitis. Suspect superimposed acute pancreatitis. Initial Imaging
D. MRI abdomen without and with IV contrast with MRCP

MRI abdomen without and with IV contrast, combined with MRCP, is comparable to CT in diagnosing and assessing the severity of ACP and its complications [12]. Similar to AP, patients with ACP demonstrate increased signal intensity on fluid-sensitive MR sequences including T2-weighted images and MRCP. MRI with MRCP also offers the advantage of evaluating underlying pancreaticobiliary strictures commonly associated with CP [78]. Additionally, MRI provides a better assessment of complex fluid collections compared with contrast-enhanced CT. For younger patients or those with recurrent episodes requiring frequent imaging [12], MRI without and with IV contrast with MRCP may be an alternative option to CT. Limitations of MRI with MRCP include a longer scan time and increased sensitivity to motion compared with CT, both of which can be

challenging in the acute setting.

Variant 2:Adult. Chronic pancreatitis. Suspect superimposed acute pancreatitis. Initial Imaging
E. MRI abdomen without IV contrast with MRCP

There is no relevant literature to support the use of MRI abdomen without IV contrast combined with MRCP for diagnosing ACP. This examination may be appropriate in select cases such as to evaluate anatomic variants, assess suspected pancreaticobiliary strictures, or serve as a problem-solving tool in stable patients.

Variant 2:Adult. Chronic pancreatitis. Suspect superimposed acute pancreatitis. Initial Imaging
F. US abdomen

There is no relevant literature to support the use of transabdominal US for diagnosing ACP. This contrasts with AP in which US is commonly used to identify gallstones, a leading cause of AP but not ACP, which is more commonly related to alcohol, drug use, and pancreatic duct obstruction [12]. The usefulness of US in diagnosing ACP is further restricted by its operator-dependence, reduced ability to assess the extent of disease, and interference from bowel gas due to localized ileus, commonly seen with acute inflammation [79].

Variant 2:Adult. Chronic pancreatitis. Suspect superimposed acute pancreatitis. Initial Imaging
G. US abdomen endoscopic

There is no relevant literature to support the use of EUS for diagnosing ACP. Patients who require endoscopic procedures, such as drainage of pancreatitis-related fluid collections, may benefit from EUS in the acute setting [80].

Summary of Highlights

This is a summary of the key recommendations from the variant tables. Refer to the complete narrative document for more information.

- Variant 1: For initial evaluation of suspected CP or its complications, CT abdomen and pelvis with IV contrast is usually appropriate, detecting coarse calcifications (most reliable sign), ductal and parenchymal changes, and complications; however, it is less sensitive for early disease. CT abdomen and pelvis without and with IV contrast provides similar evaluation, with the noncontrast phase potentially aiding detection of small calcifications. MRI abdomen without and with contrast with MRCP is usually appropriate and is complementary to CT, offering high sensitivity and specificity, as well as detailed ductal and parenchymal evaluation, and is particularly valuable for detecting early disease. In certain situations, EUS may be used for its high diagnostic accuracy and ability to obtain tissue samples as well as perform therapeutic interventions.
- Variant 2: For suspected ACP, CT abdomen and pelvis with IV contrast is usually appropriate and preferred for the rapid evaluation of acute changes, complications, and alternative causes of pain. MRI abdomen without and with IV contrast with MRCP may be appropriate as an alternative or complementary tool in select cases such as requiring superior assessment of pancreaticobiliary strictures, better characterization of complex fluid collections, or repeated imaging but is limited by longer scan times and greater motion sensitivity in the acute

setting. CT abdomen and pelvis without and with IV contrast is not used routinely for ACP diagnosis; however, the addition of noncontrast phase may be indicated in select situations, such as suspected hemorrhage.

Supporting Documents

The evidence table, literature search, and appendix for this topic are available at https://acsearch.acr.org/list. The appendix includes the strength of evidence assessment and the final rating round tabulations for each recommendation.

For additional information on the Appropriateness Criteria methodology and other supporting documents, please go to the ACR website at https://www.acr.org/Clinical-Resources/Clinical-Tools-and-Reference/Appropriateness-Criteria.

Appropriateness Category Names and Definitions

Appropriateness Category Name	Appropriateness Rating	Appropriateness Category Definition
Usually Appropriate	7, 8, or 9	The imaging procedure or treatment is indicated in the specified clinical scenarios at a favorable risk-benefit ratio for patients.
May Be Appropriate	4, 5, or 6	The imaging procedure or treatment may be indicated in the specified clinical scenarios as an alternative to imaging procedures or treatments with a more favorable risk-benefit ratio, or the risk-benefit ratio for patients is equivocal.
May Be Appropriate (Disagreement)	5	The individual ratings are too dispersed from the panel median. The different label provides transparency regarding the panel's recommendation. "May be appropriate" is the rating category and a rating of 5 is assigned.
Usually Not Appropriate	1, 2, or 3	The imaging procedure or treatment is unlikely to be indicated in the specified clinical scenarios, or the risk-benefit ratio for patients is likely to be unfavorable.

Relative Radiation Level Information

Potential adverse health effects associated with radiation exposure are an important factor to consider when selecting the appropriate imaging procedure. Because there is a wide range of radiation exposures associated with different diagnostic procedures, a relative radiation level (RRL) indication has been included for each imaging examination. The RRLs are based on effective dose, which is a radiation dose quantity that is used to estimate population total radiation risk associated with an imaging procedure. Patients in the pediatric age group are at inherently higher risk from exposure, because of both organ sensitivity and longer life expectancy (relevant to the long latency that appears to accompany radiation exposure). For these reasons, the RRL dose estimate ranges for pediatric examinations are lower as compared with those specified for adults (see Table below). Additional information regarding radiation

dose assessment for imaging examinations can be found in the ACR Appropriateness Criteria® Radiation Dose Assessment Introduction document.

Relative Radiation Level Designations

Relative Radiation Level*	Adult Effective Dose Estimate Range	Pediatric Effective Dose Estimate Range
O	0 mSv	0 mSv
☢	<0.1 mSv	<0.03 mSv
☢☢	0.1-1 mSv	0.03-0.3 mSv
☢☢☢	1-10 mSv	0.3-3 mSv
☢☢☢☢	10-30 mSv	3-10 mSv
☢☢☢☢☢	30-100 mSv	10-30 mSv

*RRL assignments for some of the examinations cannot be made, because the actual patient doses in these procedures vary as a function of a number of factors (e.g., region of the body exposed to ionizing radiation, the imaging guidance that is used). The RRLs for these examinations are designated as "Varies."

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Disclaimer

investigational by the FDA have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

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