Complete Summary

GUIDELINE TITLE

Acute pancreatitis.

BIBLIOGRAPHIC SOURCE(S)

Ros PR, Bree RL, Foley WD, Gay SB, Glick SN, Heiken JP, Huprich JE, Levine MS, Rosen MP, Shuman WP, Greene FL, Rockey DC, Expert Panel on Gastrointestinal Imaging. Acute pancreatitis. [online publication]. Reston (VA): American College of Radiology (ACR); 2006. 5 p. [37 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: American College of Radiology (ACR), Expert Panel on Gastrointestinal Imaging. Acute pancreatitis. Reston (VA): American College of Radiology (ACR); 2001. 5 p. (ACR appropriateness criteria).

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

COMPLETE SUMMARY CONTENT

SCOPE
METHODOLOGY - including Rating Scheme and Cost Analysis
RECOMMENDATIONS
EVIDENCE SUPPORTING THE RECOMMENDATIONS
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS
QUALIFYING STATEMENTS
IMPLEMENTATION OF THE GUIDELINE
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES
IDENTIFYING INFORMATION AND AVAILABILITY
DISCLAIMER

SCOPE

DISEASE/CONDITION(S)

Acute pancreatitis

GUIDELINE CATEGORY

Diagnosis
Evaluation

CLINICAL SPECIALTY

Emergency Medicine
Family Practice
Gastroenterology
Internal Medicine
Radiology
Surgery

INTENDED USERS

Health Plans
Hospitals
Managed Care Organizations
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of initial radiologic examinations for patients with suspected or known acute pancreatitis

TARGET POPULATION

Patients with suspected or known acute pancreatitis

INTERVENTIONS AND PRACTICES CONSIDERED

1. Ultrasound (US)
2. Computed tomography (CT)
3. Magnetic resonance imaging (MRI), with contrast
4. Magnetic resonance cholangiopancreatography (MRCP)
5. Endoscopic US

MAJOR OUTCOMES CONSIDERED

Utility of radiologic examinations in differential diagnosis

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of recent peer-reviewed medical journals, and the major applicable articles were identified and collected.

NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not stated

METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed to reach agreement in the formulation of the appropriateness criteria. The American College of Radiology (ACR) Appropriateness Criteria panels use a modified Delphi technique to arrive at consensus. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by the participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1-9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty percent agreement is considered a consensus. This modified Delphi technique enables individual, unbiased expression, is economical, easy to understand, and relatively simple to conduct.

If consensus cannot be reached by the Delphi technique, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible. If "No consensus" appears in the rating column, reasons for this decision are added to the comment sections.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria®

Clinical Condition: Acute Pancreatitis

Variant 1: Etiology unknown, first episode of pancreatitis.

Radiologic Exam Procedure	Appropriateness Rating	Comments
US, abdomen	8	
CT, abdomen	6	With or without contrast
MRI, abdomen, with contrast	6	
MRI, abdomen, MRCP	6	
US, abdomen, endoscopic	5	
Appropriateness Criteria Scale		

Radiologic Exam Procedure	Appropriateness Rating	Comments
1 2 3 4 5 6 7 8 9 1 = Least appropriate 9 = Most appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 2: Severe abdominal pain, elevated amylase lipase, no fever or evidence of fluid loss at admission; clinical score pending.

Radiologic Exam Procedure	Appropriateness Rating	Comments
US, abdomen	8	
CT, abdomen	7	With or without contrast
MRI, abdomen, MRCP	7	
MRI, abdomen, with contrast	6	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1 = Least appropriate 9 = Most appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 3: Severe abdominal pain, elevated amylase lipase, 48 hours later assuming no improvement or degradation (assume no prior imaging).

Radiologic Exam Procedure	Appropriateness Rating	Comments
CT, abdomen	8	With or without contrast
US, abdomen	7	
MRI, abdomen, with contrast	7	
MRI, abdomen, MRCP	7	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1 = Least appropriate 9 = Most appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 4: Severe abdominal pain, elevated amylase lipase, fever and elevated white blood cell count.

Radiologic Exam Procedure	Appropriateness Rating	Comments
CT, abdomen	9	With or without contrast
US, abdomen	7	
MRI, abdomen, with contrast	7	
MRI, abdomen, MRCP	7	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1 = Least appropriate 9 = Most appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

Variant 5: Severe abdominal pain, elevated amylase lipase, hemoconcentration, oliguria, tachycardia.

Radiologic Exam Procedure	Appropriateness Rating	Comments
CT, abdomen	9	With or without contrast
US, abdomen	7	
MRI, abdomen, with contrast	7	
MRI, abdomen, MRCP	7	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1 = Least appropriate 9 = Most appropriate		

Note: Abbreviations used in the tables are listed at the end of the "Major Recommendations" field.

This document focuses on the diagnosis and initial evaluation of patients with suspected or known acute pancreatitis. It does not address interventional procedures or documentation of complications such as abscess, pseudocyst, or pseudoaneurysm.

Interstitial edematous pancreatitis and necrotizing pancreatitis are the most frequent clinical manifestations of acute pancreatitis. Fluid collections associated with acute pancreatitis usually resolve spontaneously. Pancreatic pseudocysts are fluid collections that persist for 6 weeks or more. Pancreatic abscess is usually a complication of necrotizing pancreatitis, typically developing after 3 to 5 weeks. Determinants of the natural course of acute pancreatitis are pancreatic parenchymal necrosis, extrapancreatic retroperitoneal fatty tissue necrosis, biologically active compounds in pancreatic ascites, and infection of necrosis. Early in the course of acute pancreatitis, multiple organ failure is the consequence of various inflammatory mediators that are released from the inflammatory process and from activated leukocytes attracted by pancreatic injury. Late in the course, starting the second week, local and systemic septic complications are dominant. Around 80% of deaths in acute pancreatitis are caused by septic complications.

The infection of pancreatic necrosis occurs in 8%-12% of acute pancreatitis patients and in 30 to 40% of patients with necrotizing pancreatitis. Pancreatic inflammation may result in enlargement of the gland, peripancreatic inflammation with or without fluid, solitary or loculated fluid collections, necrosis of pancreatic parenchyma, and subsequent infection in any of the above sites of inflammation. Distant organ complications can lead to organ failure, protracted course, and death. Prediction of which patients will develop these complications is achieved through clinical scoring systems and imaging findings. Choice of scoring system is beyond the scope of these recommendations.

Acute pancreatitis is suspected in patients presenting with epigastric upper abdominal pain that is acute in onset, rapidly increasing in severity, and persistent without relief. The intensity of the pain almost always results in the patient seeking medical attention. Differential diagnosis includes mesenteric ischemia, perforated ulcer, intestinal obstruction, biliary colic, and myocardial infarction. Serum amylase and/or lipase levels can be considered diagnostic when the reported value(s) is $\geq$3 times normal. Lipase levels are more specific for acute pancreatitis, as hyperamylasemia may be present in a variety of conditions. Of note is that serum enzyme levels do not correlate with the severity of the disease. Consequently, clinical scoring systems and imaging tests have been advocated to classify individual patients. Furthermore, the diagnosis may be overlooked in the absence of typical enzyme elevation. In some patients, acute pancreatitis may be present in the absence of enzyme abnormalities.

Imaging tests available for the diagnosis of acute pancreatitis include transabdominal US, endoscopic ultrasound (EUS), CT scanning, MRI, and MRCP. Imaging tests are performed for various reasons, including detection of gallstones, detection of biliary obstruction, diagnosis of pancreatitis when the clinical situation is unclear, identification of patients with high-risk pancreatitis, and detection of complications of pancreatitis.

US to detect gallbladder stones should be performed in every patient with acute pancreatitis, even alcoholics. US is also effective in diagnosing biliary obstruction, which, when present, often prompts endoscopic retrograde cholangiopancreatography (ERCP) to relieve the cause of obstruction. US is less successful in diagnosing choledocholithiasis and has limited applications in the early staging of the disease. Visualization of the pancreas is often impaired because of overlying bowel gas, and the detection of intraparenchymal and

retroperitoneal fluid collections correlates poorly with pancreatic necrosis. US with color Doppler is useful to detect venous complications of acute pancreatitis. In patients with suspected acute gallstone pancreatitis or with repeating acute pancreatitis, ERCP is used to reach a definite diagnosis and to investigate the etiology. EUS is useful, when needed clinically, to detect common duct stones when initial studies are negative. It can often determine an etiology (usually biliary) in patients initially diagnosed with idiopathic acute pancreatitis.

CT is an insensitive detector of biliary calculi, but is superb in delineating the pancreas and acute pancreatitis-associated abnormalities. CT scanning provides clear images of the pancreas and adjacent structures and allows for the differentiation of acute pancreatitis from other abdominal diseases. CT findings helpful for diagnosing acute pancreatitis include pancreatic enlargement, peripancreatic inflammatory changes, fluid collections, and uneven density of pancreatic parenchyma.

MRI demonstrates pancreatic enlargement and the inflammatory changes around the pancreas. It has the advantage of no x-ray exposure. Nevertheless, it takes a much longer time to scan the pancreas in comparison with CT. MRCP has a high accuracy in detecting bile duct stones.

Physiologically based scoring systems such as the APACHE II and Ranson's criteria are designed to identify early prognostic signs that predict severity of clinical course in an individual patient. In 1985, one study showed that although clinical scoring systems were highly correlated with increasing CT severity, disease severity was sometimes underestimated by clinical scoring alone. The key criterion for identifying patients at higher risk for fatal pancreatitis is the presence of pancreatic necrosis. The scoring system was revised in 1990 to account for the significance of pancreatic necrosis, and the CT severity index was created. The utility of the Ranson's criteria compared with that of the CT severity index (the Balthazar CT severity index) for predicting the necessity for admission to an intensive care unit in patients with acute pancreatitis was analyzed in a recent study. The Balthazar CT severity index correlated highly with the overall occurrence of complications ($r^2=0.96$), the occurrence of sepsis ($r^2=0.99$), and death ($r^2=0.99$), and it was a better prognostic indicator than the Ranson criteria for complications and mortality. A modified CT severity index, which simplifies the evaluation of pancreatic necrosis, inflammatory changes, and extrapancreatic complications, has also been proposed. There are isolated reports of clinical scoring systems yielding equivalent or superior results to imaging tests. However, it also should be remembered that most clinical systems require a second assessment within 48 hours to monitor progression or stability, as opposed to relatively instantaneous evaluation at imaging.

Contrast CT and/or gadolinium enhanced MRI can both be used to assess pancreatic necrosis and evaluate peripancreatic inflammation and fluid collections. MRI is particularly useful in patients who cannot receive iodinated contrast material due to prior adverse contrast reaction or renal insufficiency. Furthermore, the integrity of the pancreatic duct can be assessed by means of MRCP in an MRI study; this is important, since in previous studies pancreatic duct rupture was reported in about 30% patients with acute pancreatitis. In both CT and MRI studies of the pancreas, pancreatic necrosis can be diagnosed when segments of pancreatic parenchyma do not enhance on images obtained following intravenous

contrast administration. These unenhanced areas have been proved to represent necrotic regions when correlated with findings at pancreatic debridement. While some have suggested that the site of necrosis within the pancreas may further predict outcome, others have found no such correlation. The presence of peripancreatic fluid collections is usually associated with severe disease. Echo-enhanced US has been recently reported as a new initial imaging approach; it can be used as an alternative in patients in whom both CT and MRI are contraindicated.

Controversy has emerged because of the observation that intravenous contrast impairs the microcirculation of the pancreas in rats with acute necrotizing pancreatitis and may increase the severity of the disease. These results could not be reproduced in the opossum. No prospective human trials have been published to date. Most experts believe the benefits of detecting necrosis outweigh any potential risk.

No objective clinical selection criteria exist that can determine which patients should have CT to assess the risk of severe pancreatitis. Imaging is clearly indicated when the cause of abdominal pain is unclear. In patients with known acute pancreatitis, however, CT is reserved for patients with clinical, biochemical, or physiologic indications of severe disease. There is no information suggesting that routine CT in patients with milder disease (low APACHE II or Ranson scores) would result in upstaging a significant number of patients.

Abbreviations

- CT, computed tomography
- MRI, magnetic resonance imaging
- MRCP, magnetic resonance cholangiopancreatography
- US, ultrasound

CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Selection of appropriate radiologic imaging procedures for evaluation of patients with suspected or known acute pancreatitis

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (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.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Ros PR, Bree RL, Foley WD, Gay SB, Glick SN, Heiken JP, Huprich JE, Levine MS, Rosen MP, Shuman WP, Greene FL, Rockey DC, Expert Panel on Gastrointestinal Imaging. Acute pancreatitis. [online publication]. Reston (VA): American College of Radiology (ACR); 2006. 5 p. [37 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

1998 (revised 2006)

GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria®.

GUIDELINE COMMITTEE

Committee on Appropriateness Criteria, Expert Panel on Gastrointestinal Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: Pablo R. Ros, MD, MPH; Robert L. Bree, MD, MHSA; W. Dennis Foley, MD; Spencer B. Gay, MD; Seth N. Glick, MD; Jay P. Heiken, MD; James E. Huprich, MD; Marc S. Levine, MD; Max Paul Rosen, MD, MPH; William P. Shuman, MD; Frederick L. Greene, MD; Don C. Rockey, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: American College of Radiology (ACR), Expert Panel on Gastrointestinal Imaging. Acute pancreatitis. Reston (VA): American College of Radiology (ACR); 2001. 5 p. (ACR appropriateness criteria).

The appropriateness criteria are reviewed annually and updated by the panels as needed, depending on introduction of new and highly significant scientific evidence.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

ACR Appropriateness Criteria® Anytime, Anywhere™ (PDA application). Available from the ACR Web site.

Print copies: Available from the American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- ACR Appropriateness Criteria®. Background and development. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in Portable Document Format (PDF) from the American College of Radiology (ACR) Web site.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on March 19, 2001. The information was verified by the guideline developer on March 29, 2001. This summary was updated by ECRI on July 31, 2002. The updated information was verified by the guideline developer on October 1, 2002. This summary was updated by ECRI on August 11, 2006.

COPYRIGHT STATEMENT

Instructions for downloading, use, and reproduction of the American College of Radiology (ACR) Appropriateness Criteria® may be found on the ACR Web site.

DISCLAIMER

NGC DISCLAIMER

The National Guideline Clearinghouse™ (NGC) does not develop, produce, approve, or endorse the guidelines represented on this site.

All guidelines summarized by NGC and hosted on our site are produced under the auspices of medical specialty societies, relevant professional associations, public

or private organizations, other government agencies, health care organizations or plans, and similar entities.

Guidelines represented on the NGC Web site are submitted by guideline developers, and are screened solely to determine that they meet the NGC Inclusion Criteria which may be found at http://www.guideline.gov/about/inclusion.aspx.

NGC, AHRQ, and its contractor ECRI make no warranties concerning the content or clinical efficacy or effectiveness of the clinical practice guidelines and related materials represented on this site. Moreover, the views and opinions of developers or authors of guidelines represented on this site do not necessarily state or reflect those of NGC, AHRQ, or its contractor ECRI, and inclusion or hosting of guidelines in NGC may not be used for advertising or commercial endorsement purposes.

Readers with questions regarding guideline content are directed to contact the guideline developer.

© 1998-2006 National Guideline Clearinghouse

Date Modified: 9/25/2006