Complete Summary

GUIDELINE TITLE

Acute abdominal pain and fever or suspected abdominal abscess.

BIBLIOGRAPHIC SOURCE(S)

Rosen MP, Bree RL, Foley WD, Gay SB, Glick SN, Heiken JP, Huprich JE, Levine MS, Ros PR, Shuman WP, Greene FL, Rockey DC, Expert Panel on Gastrointestinal Imaging. Acute abdominal pain and fever or suspected abdominal abscess. [online publication]. Reston (VA): American College of Radiology (ACR); 2006. 7 p. [56 references]

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: Saini S, Ralls PW, Balfe DM, Bree RL, DiSantis DJ, Glick SN, Levine MS, Megibow AJ, Shuman WP, Greene FL, Laine LA, Lillemoe K, Brown M, Berland L. Suspected abdominal abscess. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215(Suppl):173-9.

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
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SCOPE

DISEASE/CONDITION(S)

- Acute abdominal pain and fever

- Abdominal abscess

Note: This guideline is arbitrarily limited to illnesses affecting the region between the diaphragm and the upper pelvis and excludes both renal and flank pathology.

GUIDELINE CATEGORY

Diagnosis
Evaluation

CLINICAL SPECIALTY

Emergency Medicine
Family Practice
Gastroenterology
Internal Medicine
Radiology

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 acute abdominal pain and fever and/or suspected abdominal abscess

TARGET POPULATION

Patients, including pregnant and human immunodeficiency virus-positive patients, with acute abdominal pain and fever or suspected abdominal abscess

Note: Pediatric patients are not considered.

INTERVENTIONS AND PRACTICES CONSIDERED

1. Computed tomography (CT), abdomen and pelvis
    - With contrast
    - Without contrast
2. Ultrasound (US), abdomen
3. X-ray
    - Abdomen
    - Upper gastrointestinal (GI) with small bowel follow through (SBFT)
    - Contrast enema, water soluble
4. Nuclear medicine (NUC)
    - Gallium scan
    - White blood cell (WBC) scan

5. Magnetic resonance imaging (MRI), abdomen and pelvis
    - Without contrast
    - With contrast
6. Invasive (INV)
    - Angiography

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 for reaching 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 Abdominal Pain and Fever or Suspected Abdominal Abscess

Variant 1: Postoperative patient with fever.

Radiologic Exam Procedure	Appropriateness Rating	Comments
CT, abdomen and pelvis, with contrast	8	
CT, abdomen and pelvis, without contrast	7	
US, abdomen	6	
MRI, abdomen and pelvis, with contrast	6	
X-ray, abdomen	5	
MRI, abdomen and pelvis, without contrast	5	
X-ray, contrast enema, water soluble	4	
NUC, gallium scan	4	
X-ray, upper GI with small bowel follow through (SBFT)	3	
NUC, WBC scan	3	
INV, angiography	2	
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 2: Postoperative patient with persistent fever and no abscess seen on CT scan within the last 7 days.

Radiologic Exam Procedure	Appropriateness Rating	Comments
CT, abdomen and	8	

Radiologic Exam Procedure	Appropriateness Rating	Comments
pelvis, with contrast		
CT, abdomen and pelvis, without contrast	6	
US, abdomen	6	
NUC, WBC scan	6	
X-ray, abdomen	5	
X-ray, upper GI with small bowel follow through (SBFT)	5	
NUC, gallium scan	5	
MRI, abdomen and pelvis, without contrast	5	
MRI, abdomen and pelvis, with contrast	5	
X-ray, contrast enema, water soluble	4	
INV, angiography	2	
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: Patient presenting with fever, non-localizing abdominal pain, and no recent operations.

Radiologic Exam Procedure	Appropriateness Rating	Comments
CT, abdomen and pelvis, with contrast	8	
CT, abdomen and pelvis, without contrast	6	

Radiologic Exam Procedure	Appropriateness Rating	Comments
US, abdomen	6	
X-ray, abdomen	6	
X-ray, upper GI with small bowel follow through (SBFT)	5	
X-ray, contrast enema, water soluble	5	
NUC, gallium scan	5	
NUC, WBC scan	5	
MRI, abdomen and pelvis, without contrast	5	
MRI, abdomen and pelvis, with contrast	5	
INV, angiography	2	
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: Pregnant patient.

Radiologic Exam Procedure	Appropriateness Rating	Comments
US, abdomen	8	
MRI, abdomen and pelvis, without contrast	7	
MRI, abdomen and pelvis, with contrast	7	
CT, abdomen and pelvis, with contrast	5	Only after other studies without ionizing radiation have been utilized.
CT, abdomen and pelvis, without	5	

Radiologic Exam Procedure	Appropriateness Rating	Comments
contrast		
X-ray, abdomen	4	
X-ray, upper GI with small bowel follow through (SBFT)	2	
X-ray, contrast enema, water soluble	2	
NUC, gallium scan	2	
NUC, WBC scan	2	
INV, angiography	2	
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.

Acute abdominal pain with fever raises clinical suspicion of an intra-abdominal abscess or other condition that may need immediate surgical or medical attention. Infection or other inflammatory conditions are the usual cause. In these circumstances, emergency imaging is often employed, in conjunction with other clinical information, to make a quick and accurate diagnosis. This is crucial, as proper diagnosis facilitates expeditious and appropriate therapy, thus improving patient outcome. This discussion is arbitrarily limited to illnesses affecting the region between the diaphragm and the upper pelvis and excludes both renal and flank pathology. Pediatric patients are not considered.

The range of pathology that can produce abdominal pain and fever with or without abscess is very broad. It includes pneumonia, hepatobiliary disease, complicated pancreatic processes, gastrointestinal perforation or inflammation, bowel obstruction or infarction, abscesses anywhere in the abdomen, and tumor—among others. Of all patients who present to an emergency room with abdominal pain, about one-third never have a diagnosis established, one-third have appendicitis, and one-third have some other documented pathology. In the "other" category, the most common causes include (in order of frequency): acute cholecystitis, small bowel obstruction, pancreatitis, renal colic, perforated peptic ulcer, cancer, and diverticulitis. When fever is also present, the need for quick, definitive diagnosis is considerably heightened.

A variety of clinical presentations occur in patients with acute abdominal pain accompanied by fever. This review concentrates on the evaluation of patients with acute diffuse abdominal pain, human immunodeficiency virus (HIV)-positive patients with acute abdominal pain and patients with suspected abdominal

abscess. Other Appropriateness Criteria® topics address acute right upper quadrant pain, acute right lower quadrant pain, and acute left lower quadrant pain. Imaging evaluation varies slightly among patients with different clinical presentations. In general, CT is the most important modality in evaluating patients with abdominal pain, more so in those with fever. Two reports have found CT superior to clinical evaluation for finding the cause of abdominal pain. CT was correct in 90%-95% of cases, while clinical evaluation was correct in 60%-76% of cases. Additionally, the use of CT in patients with acute abdominal pain increases the emergency department clinician's level of certainty and reduces hospital admissions by 24%. The presence of a white blood count (WBC) >11.5 has been correlated with a positive abdominal CT, and the combination of WBC >11.5, male sex, and age less than 25 years has been shown to correlate with a diagnosis of appendicitis. Abdominal CT without the use of oral or intravenous (IV) contrast has been advocated as an alternative to abdominal radiographs for evaluating appendicitis; however, the use of contrast agents greatly increases the spectrum of detectable pathology.

Acute diffuse abdominal pain with fever can be caused by conditions that ordinarily instigate more localized pain. These conditions include complicated appendicitis, complicated acute calculous or acalculous cholecystitis, bile duct obstruction with infectious cholangitis, hepatitis, hepatic abscess, pancreatitis with or without infection, pyelonephritis or renal infarction, renal stones, omental infarction, epiploic appendagitis, mesenteric adenitis, and diverticulitis. Other conditions that typically present with diffuse abdominal pain and fever include bowel obstruction, bowel ischemia or infarction, gut perforation from ulcer or tumor, diffuse colitis, typhlitis and other gastrointestinal infections, small bowel inflammatory disease, abdominal abscess, intraperitoneal or retroperitoneal hemorrhage, and diffuse malignancy. Less common cases of abdominal pain include tuberculous peritonitis.

Again, radiographs may provide useful information about bowel gas pattern or free air, but they offer no incremental information if CT is performed. Sonography may be useful in selected conditions, including cholecystitis, cholangitis, liver abscess, diverticulitis, appendicitis, and small bowel inflammation, where it may be used to assess activity of Crohn's disease. While US may be able to detect portions of an abscess or malignancy (such as lymphoma), it is blind to many areas of the abdomen, particularly in the presence of increased bowel gas or free air. The shortcomings of US are partially offset by its lack of ionizing radiation, particularly in younger patients. In women with pelvic inflammatory disease (PID), pelvic US can be especially useful in identifying the presence of a tubo-ovarian abscess (TOA). With CT of the abdomen and pelvis in a young adult, there is a small risk of the radiation causing a fatal cancer, which some believe may be as high as one in 2,000 patients. MRI offers imaging without ionizing radiation and has been shown to provide clinically useful information for rapid diagnosis of the following gynecological emergencies: ovarian hemorrhage, ectopic pregnancy, tumor rupture, torsion, hemorrhage, infarction, and pelvic inflammatory disease.

In patients with high-grade bowel obstruction, CT sensitivity varies from 86%-100%, with slightly lower sensitivity reported for low-grade obstruction. In this regard, CT considerably outperforms the combination of clinical evaluation and radiographs. CT also has the ability to identify and localize the cause of obstruction in 73%-95% of cases. Additionally, it can identify closed-loop

obstruction (sensitivity 79%) and associated strangulation (sensitivity 67%). For intestinal ischemia, reported sensitivity of CT varies from 65%-86% based on findings of vessel thrombosis, intramural or portal gas, and lack of bowel wall enhancement. For intestinal infarction, CT (sensitivity 82%) considerably outperforms radiography plus US (sensitivity 28%). In gut perforation, while radiographs are sensitive to small volumes of free air, CT is more sensitive to even smaller volumes and can detect additional loculated air or air in the mesenteric root. Other CT findings include extravasation of oral contrast, mesenteric edema, or phlegmonous mass adjacent to a site of perforation.

In patients with Crohn's disease or inflammatory colitis, the presence of fever raises the question of associated abscess or phlegmon, although CT is the procedure of choice for the diagnosis of abscess, regardless of cause. The accuracy of US in detecting abscess formation among patients with known Crohn's disease has been reported to be to 86.9% compared to 91.8% for CT. In addition, CT can show the extent of any related fistulas or sinus tracts. However, the diagnostic accuracy of US and barium studies in detecting internal fistulas has been reported to be similar: 85.2% for US and 84.8% for barium studies. Pseudomembranous colitis may have fever without abscess; CT findings are present in the colon in 88% of cases. While technetium-99m labeled hexamethylpropyleneamine oxime (Tc 99m HMPAO) white cell-labeled scanning has a high sensitivity for inflammatory bowel disease (91%-98%) and may have some role in diagnosing appendicitis in older patients, it does not do as well as CT in detecting the complications of abscess and fistula. Rarely, diffuse tumors such as lymphomas or metastases may present with abdominal pain and fever; again, CT is the procedure of choice due to its ability to assess well all node groups and organs.

Acute Abdominal Pain with Fever in the HIV-Positive Patient

Common causes of acute diffuse abdominal pain with fever in the HIV-positive patient are more diverse than they are in other patients. In addition to more usual conditions, typhlitis, intramural gut hemorrhage, and small bowel or colonic perforation with associated abscess may occur. The liver and biliary tree may be involved with HIV-related cholangiopathy, hepatic abscesses, or hepatic bacillary angiomatosis, a peliosis-like condition. The spleen is subject to focal infarction or abscess. Gut mucosal disease may include GI tuberculosis, ulcerating colitis cytomegalovirus (CMV), clostridium difficile, histoplasmosis, candida, mycobacterium avium complex (MAC)-related enteritis, and opportunistic bowel infection (cryptosporidiosis, giardia, Isospora, and strongyloides). Tumors with adenopathy and bowel involvement include Kaposi's sarcoma and lymphoma of gut, either of which may lead to bowel obstruction, pneumatosis intestinalis, perforation, or intussusception.

CT with oral, IV, and (frequently) rectal contrast is almost always the procedure of choice in a HIV-positive patient with acute abdominal pain and fever. Supplemental barium studies of the mucosa of the stomach, small bowel, and colon may add additional information to that obtained from CT, particularly when mucosal lesions are small and fine. If there is any chance of gut perforation, barium should not be used. Occasionally, US of the biliary tree and gallbladder may be useful in evaluating HIV-related cholangiopathy. If CT is performed,

radiographs have little incremental value. The use of radionuclide scanning in this subgroup has not been reported.

Suspected Abdominal Abscess

Patients suspected of having abdominal abscesses may present in a number of ways: with fever, with diffuse or localized abdominal pain, or with a history of a condition that may predispose to abdominal abscesses, such as recent surgery and inflammatory bowel disease, pancreatitis, etc. Imaging studies that have been used to detect abdominal abscesses include radiographs (supine and upright, and occasionally decubitus views); nuclear medicine studies such as gallium, indium, or technetium tagged leukocytes studies; US; CT; and more recently MRI. Unfortunately, much of the literature for radiography, gallium and indium leukocytes scintigraphy, and CT scanning is more than a decade old. The current literature has recently focused on the role of CT in percutaneous drainage of abdominal abscesses. The implication is that CT scan is already the primary means of making the diagnosis of abdominal abscess. The implication is that CT scan is already the primary means of making the diagnosis of abdominal abscess.

CT scanning has been shown to be the first and best test for diagnosing of intra-abdominal abscess in patients who have recently had abdominal surgery, and in patients with localizing signs for abscess. Among intensive care unit (ICU) patients with sepsis of unknown origin, CT of the torso revealed the source of sepsis in 5 of 38 patients, and CT of the abdomen and pelvis revealed the source of sepsis in 7 of 45 patients. The CT scan can be very helpful in determining whether a patient with pancreatitis has developed a pancreatic abscess and can occasionally be useful in detecting abscess formation in patients with diverticulitis or Crohn's disease. However, the sensitivity of detecting abscesses in this latter group of patients is reduced compared with the other categories mentioned above. Although CT scans can be quite accurate in detecting abnormalities of the psoas, the differentiation of psoas abscesses from other psoas lesions is difficult when only imaging criteria are used.

US is often useful in specific cases, but when compared with CT scanning, the results are usually of lower sensitivity and specificity. This is especially true in bacterial infections of the kidney. Gallium scanning and indium and technetium leukocyte scanning are often useful when CT scan is negative or equivocal. Nuclear scintigraphy affords the possibility of whole-body imaging and the detection of sites of infection beyond the abdominal region. The literature on technetium-labeled leukocytes suggests a very high sensitivity and specificity for abdominal abscesses as well, although there are no adequate recent comparisons with CT. Although gallium is excreted in the GI tract, making it a poor choice for primary imaging of abdominal abscesses among patients with persistent fever following colorectal surgery, the diagnostic accuracy for GA-67 in detecting occult abscesses has been reported to be as high as 91.2% (compared to diagnostic accuracy of 97.1% for CT among the same patients). One study suggests that MRI is an accurate examination for detecting abdominal abscesses.

There is little current information on radiography's role in detecting abdominal abscesses. Some reports suggest that radiographs may be useful, but this is far from proven.

Patients without previous surgery or with a low clinical suspicion of abscess are effectively evaluated with CT, and may also be studied with indium- or technetium-labeled leukocytes to search for infection or inflammation.

Abbreviations

- CT, computed tomography
- GI, gastrointestinal
- INV, invasive
- MRI, magnetic resonance imaging
- NUC, nuclear medicine
- US, ultrasound
- WBC, white blood cell

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 acute abdominal pain and fever or suspected abdominal abscess

POTENTIAL HARMS

With computed tomography (CT) of the abdomen and pelvis in a young adult, there is a small risk of the radiation causing a fatal cancer, which some believe may be as high as one in 2,000 patients.

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)

Rosen MP, Bree RL, Foley WD, Gay SB, Glick SN, Heiken JP, Huprich JE, Levine MS, Ros PR, Shuman WP, Greene FL, Rockey DC, Expert Panel on Gastrointestinal Imaging. Acute abdominal pain and fever or suspected abdominal abscess. [online publication]. Reston (VA): American College of Radiology (ACR); 2006. 7 p. [56 references]

ADAPTATION

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

DATE RELEASED

1996 (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: Max Paul Rosen, 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; Pablo R. Ros, 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: Saini S, Ralls PW, Balfe DM, Bree RL, DiSantis DJ, Glick SN, Levine MS, Megibow AJ, Shuman WP, Greene FL, Laine LA, Lillemoe K, Brown M, Berland L. Suspected abdominal abscess. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215(Suppl):173-9.

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 NGC summary was updated by ECRI on August 17, 2006.

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