Complete Summary

GUIDELINE TITLE

ACR Appropriateness Criteria™ for imaging evaluation of patients with acute abdominal pain and fever.

BIBLIOGRAPHIC SOURCE(S)

American College of Radiology (ACR), Expert Panel on Gastrointestinal Imaging. Imaging evaluation of patients with acute abdominal pain and fever. Reston (VA): American College of Radiology (ACR); 2001. 4 p. (ACR appropriateness criteria). [28 references]

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SCOPE

DISEASE/CONDITION(S)

Acute abdominal pain (limited to the region between the diaphragm and the upper pelvis) and fever

GUIDELINE CATEGORY

Diagnosis

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 acute abdominal pain and fever

TARGET POPULATION

- Patients with acute diffuse abdominal pain and fever
- Human immunodeficiency virus (HIV)-positive patients with acute abdominal pain and fever

Note: These guidelines are not intended for use in pediatric patients or in patients whose abdominal pain is caused by renal or flank pathology.

INTERVENTIONS AND PRACTICES CONSIDERED

1. Plain films
2. Computed tomography (CT) with oral and intravenous (IV) contrast
3. Computed tomography with oral, rectal, and intravenous contrast
4. Computed tomography without oral or intravenous contrast
5. Ultrasound
6. Biliary ultrasound
7. Barium enema
8. Upper gastrointestinal (GI) series with small bowel follow through (SBTF)
9. Radionuclide scan technetium-99m-hexamethyl propylene amine oxime (Tc-99m-HMPAO) leukocytes

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, primarily using the National Library of Medicine´s MEDLINE database. The developer identified and collected the major applicable articles.

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

Expert Consensus (Delphi Method)
Weighting According to a Rating Scheme (Scheme Not Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

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. 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 (80) percent agreement is considered a consensus. If consensus cannot be reached by this method, 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.

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 and the Chair of the ACR Board of Chancellors.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria™

Clinical Condition: Acute Abdominal Pain and Fever

Variant 1: Acute diffuse abdominal pain and fever.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Plain films	8	
CT with oral and IV contrast	8	Rectal contrast may be a useful addition in certain circumstances.
CT without oral or IV contrast	6	
Ultrasound	6	
Radionuclide scan Tc 99m-HMPAO leukocytes	4	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 2: Acute abdominal pain and fever in the HIV-positive patient.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Plain films	8	
CT with oral, rectal, and IV contrast	8	
Biliary ultrasound	8	
Barium enema	6	Can be useful to look at colonic mucosal pattern.
Upper GI series with small-bowel follow through (SBFT)	6	Can be useful to look at small bowel mucosal pattern.
Radionuclide scan Tc 99m-HMPAO leukocytes	4	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Abbreviations: CT, computed tomography; IV, intravenous; Tc 99m-HMPAO, technetium-99m-hexamethyl propylene amine oxime

Summary

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, and acute abdominal pain in the HIV-positive patient. Other Appropriateness Criteria topics address Evaluation of Patients with Acute Right Upper Quadrant Pain (1999), Evaluation of Acute Right Lower Quadrant Pain (1999), and Evaluation of Acute Left Lower Quadrant Pain (1999). Imaging evaluation varies slightly among patients with different clinical presentations. In general, computed tomography (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. Computed tomography 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%. Abdominal CT without the use of oral or IV contrast has been advocated as an alternative to plain films of the abdomen or for evaluating of 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.

Again, plain films 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 ultrasound 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 ultrasound are partially offset by its lack of ionizing radiation, particularly in younger patients. 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 2000 patients.

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 plain films. Computed tomography also has the ability to identify and localize the cause of obstruction in 73%-95% of cases. Additionally, CT 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 plain film plus ultrasound (sensitivity 28%). In gut perforation, while plain films 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. Computed tomography is the procedure of choice for the diagnosis of abscess, regardless of cause, and for showing the location and full extent. Similarly, CT is required to show the extent of any related fistulas or sinus tracts. Pseudomembranous colitis may have fever without abscess; CT findings are present in the colon in 88% of cases. While technetium-99m-hexamethyl propylene amine oxime (Tc 99m HMPAO) white cell-labeled scanning has a high sensitivity for inflammatory bowel disease (91%-98%) and may have some role in 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 human immunodeficiency virus (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 gastrointestinal (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.

Computed tomography with oral, intravenous (IV), and (frequently) rectal contrast is almost always the procedure of choice in an 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, ultrasound of the biliary tree and gallbladder may be useful in evaluating of HIV-related cholangiopathy. If CT is performed, plain films have little incremental value. The use of radionuclide scanning in this subgroup has not been reported.

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

POTENTIAL HARMS

With CT of the abdomen and pelvis in a young adult, there is a small risk of the radiation causing a fatal cancer.

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.
- These guidelines are not intended for use in pediatric patients or in patients whose abdominal pain is caused by renal or flank pathology.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

American College of Radiology (ACR), Expert Panel on Gastrointestinal Imaging. Imaging evaluation of patients with acute abdominal pain and fever. Reston (VA): American College of Radiology (ACR); 2001. 4 p. (ACR appropriateness criteria). [28 references]

ADAPTATION

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

DATE RELEASED

1998 (revised 2001)

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

ACR Appropriateness Criteria™ Committee, Expert Panel on Gastrointestinal Imaging

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: William P. Shuman, MD; Philip W. Ralls, MD; Robert L. Bree, MD; Seth N. Glick, MD; Jay P. Heiken, MD; James E. Huprich, MD; Marc S. Levine, MD; Michelle L. Robbin, MD; Pablo R. Ros, MD, MPH; Frederick Leslie Greene, MD; Loren A. Laine, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline. It updates a previous version: ACR Appropriateness Criteria™ for imaging evaluation of patients with acute abdominal pain and fever. Radiology 2000 Jun;215(Suppl):209-12.

The ACR Appropriateness Criteria™ are reviewed every five years, if not sooner, depending on the introduction of new and highly significant scientific evidence. The next review date for this topic is 2006.

GUIDELINE AVAILABILITY

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

- American College of Radiology ACR Appropriateness Criteria™ introduction. Reston (VA): American College of Radiology; 6 p. Available in Portable Document Format (PDF) from the 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.

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