Complete Summary

GUIDELINE TITLE

ACR Appropriateness Criteria™ for suspected liver metastases.

BIBLIOGRAPHIC SOURCE(S)

Bree RL, Greene FL, Ralls PW, Balfe DM, DiSantis DJ, Glick SN, Kidd R, Levine MS, Megibow AJ, Mezwa DG, Saini S, Shuman WP, Laine LA, Lillemoe K. Suspected liver metastases. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215(Suppl):213-24. [13 references]

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Liver metastases

GUIDELINE CATEGORY

Diagnosis

CLINICAL SPECIALTY

Gastroenterology
Oncology
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 suspected of liver metastases

TARGET POPULATION

Patients with suspected liver metastases

INTERVENTIONS AND PRACTICES CONSIDERED

1. Computed tomography
    - Axial computed tomography with dynamic bolus in portal venous phase (>35 gm of iodine)
    - Helical computed tomography in hepatic arterial phase (HAP) and portal venous phase
    - Helical computed tomography without contrast followed by HAP and portal venous phase
    - Computed tomography without contrast
    - Computed tomography arterial portography or computed tomography angiography (CTA)
2. Magnetic resonance imaging
    - Spin-echo magnetic resonance imaging then gradient-echo magnetic resonance imaging with extracellular contrast media (e.g., gadolinium chelates)
    - Spin-echo magnetic resonance imaging without contrast
    - Magnetic resonance imaging with reticulo-endothelial contrast (e.g., iron-oxide)
3. Ultrasound
    - Abdominal ultrasound
    - Abdominal ultrasound with color Doppler Intraoperative/laparoscopic ultrasound
4. Nuclear imaging
    - Radionuclide liver scan with reticulo-endothelial agent
    - Immunoscintigraphy
    - Positron emission tomography
    - Radionuclide liver scan with blood pool agent
    - Somatostatin receptor imaging
5. Hepatic angiography with or without computed tomography arterial portography or CTA
6. Image-guided biopsy

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: Suspected Liver Metastases

Variant 1: Initial diagnostic test following detection of primary tumor.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Computed Tomography		
Axial computed tomography with dynamic bolus in portal venous phase (>35 gm of iodine)	8	

Helical computed tomography in hepatic arterial phase (HAP) and portal venous phase (PVP)	8	
Helical computed tomography without contrast followed by hepatic arterial phase (HAP) and portal venous phase (PVP)	6	
Computed tomography without contrast	4	
Computed tomography arterial portography or computed tomography angiography (CTA)	2	
Magnetic Resonance Imaging		
Spin-echo magnetic resonance imaging then gradient-echo magnetic resonance imaging with extracellular contrast media (e.g., gadolinium chelates)	6	
Spin-echo magnetic resonance imaging without contrast	5	
Magnetic resonance imaging with reticulo-endothelial contrast (e.g., iron-oxide)	5	
Ultrasound		
Abdominal ultrasound	4	
Abdominal ultrasound with color Doppler	4	
Intraoperative/laparoscopic ultrasound	2	
Nuclear Imaging		
Radionuclide liver scan with reticulo-endothelial agent	4	
Immunoscintigraphy	3	
Positron emission tomography	3	
Radionuclide liver scan with blood pool agent	2	
Somatostatin receptor imaging	2	

Hepatic angiography with or without computed tomography arterial portography or computed tomography angiography (CTA)	2	

Appropriateness Criteria Scale

1 2 3 4 5 6 7 8 9

1=Least appropriate 9=Most appropriate

Variant 2: Surveillance following treatment of primary tumor.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Computed Tomography		
Axial computed tomography with dynamic bolus in portal venous phase (>35 gm of iodine)	8	
Helical computed tomography without contrast followed by hepatic arterial phase (HAP) and portal venous phase (PVP)	8	
Helical computed tomography in hepatic arterial phase (HAP) and portal venous phase (PVP)	8	
Computed tomography without contrast	4	
Computed tomography arterial portography or computed tomography angiography (CTA)	2	
Magnetic Resonance Imaging		
Spin-echo magnetic resonance imaging then gradient-echo magnetic resonance imaging with extracellular contrast media (e.g., gadolinium chelates)	6	
Spin-echo magnetic resonance imaging without contrast	5	
Magnetic resonance imaging with reticulo-endothelial contrast (e.g., iron-oxide)	5	

Ultrasound		
Abdominal ultrasound	4	
Abdominal ultrasound with color Doppler	4	
Intraoperative/laparoscopic ultrasound	2	
Nuclear Imaging		
Radionuclide liver scan with reticulo-endothelial agent	4	
Immunoscintigraphy	4	
Somatostatin receptor imaging	4	
Positron emission tomography	3	
Radionuclide liver scan with blood pool agent	2	
Hepatic angiography with or without computed tomography arterial portography or computed tomography angiography (CTA)	2	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 3: Abnormal surveillance computed tomography in portal venous phase (PVP): high suspicion of malignancy.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Image-guided biopsy	8	
Magnetic Resonance Imaging		
Spin-echo magnetic resonance imaging without contrast	8	
Spin-echo magnetic resonance imaging then gradient-echo magnetic resonance imaging with extracellular contrast media (e.g., gadolinium chelates)	8	

Magnetic resonance imaging with reticulo-endothelial contrast (e.g., iron-oxide)	5	
Computed Tomography		
Helical computed tomography without contrast followed by hepatic arterial phase (HAP) and portal venous phase (PVP)	5	Only if necessary to better characterize lesion.
Helical computed tomography in hepatic arterial phase (HAP) and portal venous phase (PVP)	4	
Computed tomography arterial portography or computed tomography angiography (CTA)	4	Probably indicated for preoperative planning for hepatic resection.
Computed tomography without contrast	2	
Ultrasound		
Abdominal ultrasound	4	
Abdominal ultrasound with color Doppler	4	
Intraoperative/laparoscopic ultrasound	4	Indicated if surgery performed.
Nuclear Imaging		
Radionuclide liver scan with reticulo-endothelial agent	4	
Radionuclide liver scan with blood pool agent	4	
Somatostatin receptor imaging	4	
Immunoscintigraphy	3	
Positron emission tomography	3	
Hepatic angiography with or without computed tomography arterial portography or computed tomography angiography (CTA)	3	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9		

1=Least appropriate 9=Most appropriate

Variant 4: Abnormal surveillance computed tomography in portal venous phase (PVP): high suspicion of benignancy.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Nuclear Imaging		
Radionuclide liver scan with blood pool agent	8	
Radionuclide liver scan with reticulo-endothelial agent	6	
Immunoscintigraphy	2	
Positron emission tomography	2	
Somatostatin receptor imaging	2	
Magnetic Resonance Imaging		
Spin-echo magnetic resonance imaging without contrast	6	
Spin-echo magnetic resonance imaging then gradient-echo magnetic resonance imaging with extracellular contrast media (e.g., gadolinium chelates)	6	
Magnetic resonance imaging with reticulo-endothelial contrast (e.g., iron-oxide)	4	
Computed Tomography		
Helical computed tomography without contrast followed by hepatic arterial phase (HAP) and portal venous phase (PVP)	6	
Helical computed tomography in hepatic arterial phase (HAP) and portal venous phase (PVP)	6	
Computed tomography without contrast	2	
Computed tomography arterial portography or computed tomography angiography (CTA)	2	

Ultrasound		
Abdominal ultrasound	6	
Abdominal ultrasound with color Doppler	5	
Intraoperative/laparoscopic ultrasound	2	
Image-guided biopsy	5	
Hepatic angiography with or without computed tomography arterial portography or computed tomography angiography (CTA)	2	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 5: Abnormal ultrasound: high suspicion of benignancy.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Computed Tomography		
Axial computed tomography with dynamic bolus in portal venous phase (>35 gm of iodine)	8	
Helical computed tomography without contrast followed by hepatic arterial phase (HAP) and portal venous phase (PVP)	8	
Helical computed tomography in hepatic arterial phase (HAP) and portal venous phase (PVP)	8	
Computed tomography without contrast	3	
Computed tomography arterial portography or computed tomography angiography (CTA)	2	
Magnetic Resonance Imaging		

Spin-echo magnetic resonance imaging then gradient-echo magnetic resonance imaging with extracellular contrast media (e.g., gadolinium chelates)	8	
Spin-echo magnetic resonance imaging without contrast	6	
Magnetic resonance imaging with reticulo-endothelial contrast (e.g., iron-oxide)	3	
Image-guided biopsy	6	
Nuclear Imaging		
Radionuclide liver scan with reticulo-endothelial agent	6	
Radionuclide liver scan with blood pool agent	6	
Immunoscintigraphy	2	
Positron emission tomography	2	
Somatostatin receptor imaging	2	
Intraoperative/laparoscopic ultrasound	2	
Hepatic angiography with or without computed tomography arterial portography or computed tomography angiography (CTA)	2	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 6: Abnormal ultrasound: high suspicion of malignancy.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Image-guided biopsy	8	
Magnetic Resonance Imaging		
Spin-echo magnetic resonance	8	

imaging without contrast		
Spin-echo magnetic resonance imaging then gradient-echo magnetic resonance imaging with extracellular contrast media (e.g., gadolinium chelates)	8	
Magnetic resonance imaging with reticulo-endothelial contrast (e.g., iron-oxide)	6	
Computed Tomography		
Axial computed tomography with dynamic bolus in portal venous phase (>35 gm of iodine)	8	
Helical computed tomography without contrast followed by hepatic arterial phase (HAP) and portal venous phase (PVP)	8	
Helical computed tomography in hepatic arterial phase (HAP) and portal venous phase	8	
Computed tomography without contrast	4	
Computed tomography arterial portography or computed tomography angiography (CTA)	2	
Intraoperative/laparoscopic ultrasound	5	Indicated if surgery performed.
Nuclear Imaging		
Immunoscintigraphy	4	
Positron emission tomography	4	
Somatostatin receptor imaging	4	
Radionuclide liver scan with reticulo-endothelial agent	3	
Radionuclide liver scan with blood pool agent	2	
Hepatic angiography with or without computed tomography arterial portography or computed tomography angiography (CTA)	2	

Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate

Variant 7: Abnormal spin-echo magnetic resonance imaging (MRI): high suspicion of malignancy.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Image-guided biopsy	8	
Magnetic Resonance Imaging		
Magnetic resonance imaging with reticulo-endothelial contrast (e.g., iron-oxide)	6	
Spin-echo magnetic resonance imaging then gradient-echo magnetic resonance imaging with extracellular contrast media (e.g., gadolinium chelates)	5	
Computed Tomography		
Axial computed tomography with dynamic bolus in portal venous phase (PVP) (>35 gm of iodine)	5	
Helical computed tomography without contrast followed by hepatic arterial phase (HAP) and portal venous phase (PVP)	5	
Helical computed tomography in hepatic arterial phase (HAP) and portal venous phase (PVP)	5	
Computed tomography without contrast	4	
Computed tomography arterial portography or computed tomography angiography (CTA)	2	
Ultrasound		
Abdominal ultrasound	4	Useful to guide biopsy.
Abdominal ultrasound with color	4	

Doppler		
Intraoperative/laparoscopic ultrasound	4	Indicated if surgery performed.
Nuclear Imaging		
Radionuclide liver scan with blood pool agent	4	
Immunoscintigraphy	4	
Positron emission tomography	4	
Radionuclide liver scan with reticulo-endothelial agent	3	
Somatostatin receptor imaging	3	
Hepatic angiography with or without computed tomography arterial portography or computed tomography angiography (CTA)	2	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 8: Abnormal spin-echo magnetic resonance imaging (MRI): high suspicion of benignancy.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Magnetic Resonance Imaging		
Spin-echo magnetic resonance imaging then gradient-echo magnetic resonance imaging with extracellular contrast media (e.g., gadolinium chelates)	6	
Magnetic resonance imaging with reticulo-endothelial contrast (e.g., iron-oxide)	6	
Computed Tomography		
Axial computed tomography with dynamic bolus in portal venous phase (>35 gm of iodine)	6	

Helical computed tomography without contrast followed by hepatic arterial phase (HAP) and portal venous phase (PVP)	6	
Helical computed tomography in hepatic arterial phase (HAP) and portal venous phase (PVP)	6	
Computed tomography without contrast	4	
Computed tomography arterial portography or computed tomography angiography (CTA)	2	
Ultrasound		
Abdominal ultrasound	6	
Abdominal ultrasound with color Doppler	6	
Intraoperative/laparoscopic ultrasound	2	
Nuclear Imaging		
Radionuclide liver scan with reticulo-endothelial agent	5	
Radionuclide liver scan with blood pool agent	5	
Immunoscintigraphy	4	
Positron emission tomography	4	
Somatostatin receptor imaging	4	
Hepatic angiography with or without computed tomography arterial portography or computed tomography angiography (CTA)	2	
Appropriateness Criteria Scale 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Summary

There are many radiologic techniques available for preoperative detection of metastatic carcinoma to the liver and postoperative surveillance. Some of the less widely used screening techniques can be useful when there is a need for specific problem solving. Rapid technological changes in both equipment, contrast agents and radioisotopes make direct comparison of the techniques difficult to assess. In addition, local custom and variation within communities or medical centers can be expected to lead to a variety of indications and applications in detection of hepatic metastatic disease.

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 suspected of liver metastases

POTENTIAL HARMS

None identified

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.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Bree RL, Greene FL, Ralls PW, Balfe DM, DiSantis DJ, Glick SN, Kidd R, Levine MS, Megibow AJ, Mezwa DG, Saini S, Shuman WP, Laine LA, Lillemoe K. Suspected liver metastases. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215(Suppl):213-24. [13 references]

ADAPTATION

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

DATE RELEASED

1998

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

Names of Panel Members: Robert L. Bree, MD; Frederick Leslie Greene, MD; Philip W. Ralls, MD; Dennis M. Balfe, MD; David J. DiSantis, MD; Seth N. Glick, MD; Reiley Kidd, MD; Marc S. Levine, MD; Alec J. Megibow, MD, MPH; Duane G. Mezwa, MD; Sanjay Saini, MD; William P. Shuman, MD; Loren A. Laine, MD; Keith Lillemoe, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

This is the current release of the guideline.

The ACR Appropriateness Criteria™ are reviewed after five years, if not sooner, depending upon introduction of new and highly significant scientific evidence. The next review date for this topic is 2003.

GUIDELINE AVAILABILITY

Electronic copies: Available from the American College of Radiology (ACR) Web site.

Print copies: Available from ACR, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

AVAILABILITY OF COMPANION DOCUMENTS

None available

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.

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