Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

ACR Appropriateness Criteria® soft-tissue masses.

Bibliographic Source(s)

Zoga AC, Weissman BN, Kransdorf MJ, Adler R, Appel M, Bancroft LW, Bruno MA, Fries IB, Morrison WB, Mosher TJ, Palestro CJ, Roberts CC, Tuite MJ, Ward RJ, Expert Panel on Musculoskeletal Imaging. ACR AppropriatenessÂ® soft-tissue masses. [online publication]. Reston (VA): American College of Radiology (ACR); 2012. 8 p. [31 references]

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Morrison WB, Zoga AC, Daffner RH, Weissman BN, Bancroft L, Bennett DL, Blebea JS, Bruno MA, Fries IB, Jacobson JA, Luchs JS, Payne WK III, Resnik CS, Roberts CC, Schweitzer ME, Seeger LL, Taljanovic MS, Wise JN, Expert Panel on Musculoskeletal Imaging. ACR Appropriateness Criteria® soft-tissue masses. [online publication]. Reston (VA): American College of Radiology (ACR); 2009. 7 p.

Recommendations

Major Recommendations

ACR Appropriateness Criteria®

Clinical Condition: Soft-Tissue Masses

Variant 1: Soft-tissue mass. Clinically suspected superficial lipoma. Initial imaging study.

Radiologic Procedure	Rating	Comments	RRL*
X-ray area of interest	9		Varies
US area of interest	7		O
MRI area of interest without contrast	6		O
MRI area of interest with and without contrast	4,5,6 May be appropriate; 7,8,9 Usually appropriate	Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate. See statement regarding contrast in the text below under "Anticipated Exceptions."	*Relative Radiation Level

Radiologic Procedure	Rating	Comments	RRL*
CT area of interest without contrast	1		Varies
CT area of interest with contrast	1		Varies
CT area of interest without and with contrast	1		Varies
Tc-99m bone scan area of interest	1		
FDG-PET/CT area of interest	1		
X-ray arthrography area of interest	1		Varies
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

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

Variant 2: Soft-tissue mass. Nonspecific clinical assessment. Initial imaging study.

Radiologic Procedure	Rating	Comments	RRL*
X-ray area of interest	9		Varies
MRI area of interest without contrast	1		O
MRI area of interest without and with contrast	1		O
US area of interest	1		O
CT area of interest without contrast	1		Varies
CT area of interest with contrast	1		Varies
CT area of interest without and with contrast	1		Varies
Tc-99m bone scan area of interest	1		
FDG-PET/CT area of interest	1		
X-ray arthrography area of interest	1		Varies
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

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

Variant 3: Juxta-articular soft-tissue mass. Clinically suspect ganglion or popliteal cyst. Initial imaging study.

Radiologic Procedure	Rating	Comments	RRL*
X-ray area of interest	9		Varies
MRI area of interest without contrast	7		O
MRI area of interest without and with contrast	6	If the mass is around a joint, contrast is less important. See statement regarding contrast in text under "Anticipated Exceptions."	O
US area of interest	6		O
CT area of interest without contrast	1		Varies
CT area of interest with contrast	1		Varies
CT area of interest without and with contrast	1		Varies
Tc-99m bone scan area of interest	1		
FDG-PET area of interest	1		
X-ray arthrography area of interest	1		Varies
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

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

Variant 4: Soft-tissue mass. Nondiagnostic radiologic evaluation. Next study.

Radiologic Procedure	Rating	Comments	RRL*
MRI area of interest without contrast	9		O
MRI area of interest without and with contrast	8	See statement regarding contrast in text under "Anticipated Exceptions."	O
US area of interest	5		O
CT area of interest without contrast	4		Varies
CT area of interest with contrast	1		Varies
CT area of interest without and with contrast	1		Varies
Tc-99m bone scan area of interest	1		
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

Radiologic Procedure	Rating	Comments	RRL*
X-ray arthrography area of interest	1		Varies
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

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

Variant 5: Soft-tissue mass. Prominent calcification on radiologic evaluation. Next study.

Radiologic Procedure	Rating	Comments	RRL*
MRI area of interest with or without contrast	9	See statement regarding contrast in the text below under "Anticipated Exceptions."	O
MRI area of interest without contrast	8		O
CT area of interest without contrast	5		Varies
US area of interest	1		O
CT area of interest with contrast	1		Varies
CT area of interest without and with contrast	1		Varies
Tc-99m bone scan area of interest	1		
FDG-PET/CT area of interest	1		
X-ray arthrography area of interest	1		Varies
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

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

Variant 6: Patient presenting with spontaneous hemorrhage, with palpable mass. Nondiagnostic radiographic evaluation. Next study.

Radiologic Procedure	Rating	Comments	RRL*
MRI area of interest without and with contrast	9	See statement regarding contrast in the text below under "Anticipated Exceptions."	O
MRI area of interest without contrast	7		O
CT area of interest without and with contrast	4		Varies
US area of interest	3		O
CT area of interest without contrast	2		Varies
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative

Radiologic Procedure	Rating	Comments	RRL*
CT area of interest with contrast	2		Varies
Tc-99m bone scan area of interest	1		
FDG-PET/CT area of interest	1		
X-ray arthrography area of interest	1		Varies
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

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

Variant 7: Patient presenting with spontaneous hemorrhage, without palpable mass. Nondiagnostic radiographic evaluation. Next study.

Radiologic Procedure	Rating	Comments	RRL*
MRI area of interest without and with contrast	9	See statement regarding contrast in the text below under "Anticipated Exceptions."	O
MRI area of interest without contrast	7		O
CT area of interest without and with contrast	4		Varies
CT area of interest without contrast	2		Varies
CT area of interest with contrast	2		Varies
US area of interest	1		O
Tc-99m bone scan area of interest	1		
FDG-PET/CT area of interest	1		
X-ray arthrography area of interest	1		Varies
Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate			*Relative Radiation Level

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

Summary of Literature Review

Introduction/Background

Imaging may be requested for patients with suspected soft-tissue masses because of a painful or painless soft-tissue abnormality palpated by the patient or physician or because of symptoms such as pain or other complaints with no detectable mass on physical examination. The type of imaging technique initially selected varies depending on the history and physical findings as well as the suspected location of the mass. It is well

known that biopsy of a presumed soft-tissue mass without an imaging work-up is inadvisable.

There has been tremendous progress in imaging evaluation of soft-tissue masses over the years. With the advent of magnetic resonance imaging (MRI), lesion detection, differentiation of normal anatomic variants from true lesions, and characterization of lesions have improved because of MRI's superior soft-tissue contrast and multiple-image plane capabilities. Computed tomography (CT) and ultrasound (US) can be useful for problem solving by helping to characterize the nature of soft-tissue masses. Also note that some lesions arising from bone (i.e., osteochondroma or the soft-tissue component of a bone tumor) can present as deep soft-tissue masses clinically. In this case, radiographs can be useful.

Radiography

Radiographs are useful in the workup of a soft-tissue mass and are almost always indicated as the initial imaging study. However, they are often nonspecific when interpreted in isolation, and they may not obviate the need for more definitive cross-sectional evaluation. Most often radiographs should be considered a complementary examination, providing useful information when interpreted in conjunction with advanced modalities, including MRI and CT. If there has been a clear history of trauma and a masslike swelling develops, radiographs can be useful to track development of myositis ossificans; however, MRI or CT may still be needed to evaluate the extent of soft-tissue injury. Small but aggressive soft-tissue masses may be radiographically occult. Often the isolated radiographic finding is a "visible soft-tissue mass," and further imaging with MRI, CT, or US will be necessary.

Ultrasound

US is not frequently used as a primary imaging modality for evaluating soft-tissue masses at most institutions. However, this technique is valuable in differentiating cystic from solid lesions and has also been used to study vascularity of lesions. US can be useful as an initial imaging study in the setting of superficial or subcutaneous lipomas. If US shows a lipomatous lesion to be internally simple and well encapsulated, further imaging may not be necessary.

Soft-tissue masses palpated around joints (especially around the knee) including lesions such as ganglia, parameniscal or paralabral cysts, and bursal collections often originate from the joint or the juxta-articular connective tissues. While soft-tissue sarcomas often occur near joints, they rarely are intra-articular or communicate with the joint; therefore, demonstration of communication with the joint is essential for establishing an appropriate differential. This can be performed using US or MRI; MRI gives the added benefit of documenting internal derangement that is often the cause of the juxta-articular lesion.

Computed Tomography

Since the introduction of MRI, it has largely replaced CT as the technique of choice for evaluating soft-tissue masses. However, in some cases, CT may still be appropriate for evaluating soft-tissue lesions. Conditions such as suspected lipoma, calcification in soft-tissue lesions seen on routine radiographs, or suspected myositis ossificans based on clinical or radiographic data might be better evaluated with CT. Lipomas are easily characterized on both CT and MRI. CT may be the most appropriate imaging modality for very large patients and patients with pacemakers when MRI is not feasible. In addition, large lesions located on the abdominal or chest wall, where motion artifact can create suboptimal MR imaging, may be best evaluated with CT. A report of the Radiology Diagnostic Oncology Group on 133 soft-tissue tumors suggested that MRI and contrast-enhanced CT are comparable for determining tumor size and involvement of surrounding structures. However, MRI has additional benefits in establishing a differential diagnosis of the lesion, including visualization of surrounding soft-tissue edema and vascularity as well as identification of internal fluid and fat components.

Magnetic Resonance Imaging

MRI has become the technique of choice for detecting and characterizing soft-tissue masses. Its improved soft-tissue contrast and multiple-image plane capabilities have provided significant advantages for lesion conspicuity, characterization, and local staging. Vascular structures can also be more easily identified and evaluated without the need for intravenous contrast agents. Vascular structures and neurovascular involvement are more easily defined in 20% of cases compared with CT. Cortical bone involvement by soft-tissue masses can be identified equally by both CT and MRI. However, the extent of marrow involvement can be difficult to determine by CT, and there is evidence that tumor infiltration can extend beyond the apparent margin of the mass.

Though lesions are more easily detected with MRI, its ability to differentiate benign from malignant lesions remains controversial. Numerous studies have evaluated MR imaging features of soft-tissue lesions. Reports discussing correct histologic diagnosis or differentiating benign from malignant lesions describe accuracy ranges from 24% to 90%. Though imperfect, the superior soft-tissue contrast provided by fluid-sensitive MRI sequences reveals features that are useful for characterizing lesions. Malignant lesions are heterogeneous (72% to 94%), larger (90% >33 mm), and more frequently involve bone and neurovascular structures. The pattern of gadolinium enhancement may help identify some lesions as malignant, such as myxoid liposarcoma, and has shown utility in evaluating the aggressiveness of vascular and lipomatous masses. Contrast is useful for identifying

cystic and necrotic components of soft-tissue masses, helping to characterize lesions and identifying solid areas for biopsy. Dynamic gadolinium enhancement characteristics may be useful, but there is overlap between benign and malignant lesions. Advanced MRI techniques such as spectroscopy and diffusion-weighted imaging have potential for differentiating benign from malignant lesions but need more refinement. Even when MRI cannot characterize the type of lesion, it remains very useful for guiding percutaneous biopsy and surgical planning.

Positron Emission Tomography (PET)

PET scanning has shown promise in helping differentiate benign from malignant soft-tissue lesions. While some investigators have found limitations in using the average SUV_{max} (maximum standard uptake value) for differentiating between benign and malignant musculoskeletal masses, others have concluded that CT combined with PET and using fluorodeoxyglucose tracer (FDG-PET/CT) reliably differentiates aggressive soft-tissue and bone tumors from benign lesions. These studies included a variety of lesion types, with low numbers of individual entities that could provide information regarding evaluation of specific tumor types (e.g., lipoid) for malignant potential. Therefore, the role of PET scanning for evaluating soft-tissue tumors has yet to be established. It is unlikely that an SUV acquired from a PET examination could be relied upon to obviate biopsy at this point. However, information from a PET examination could be used for other purposes; for example, one study showed that FDG-PET can be used to determine a tumor glycolytic phenotype in sarcomas which correlates significantly with histologic grade, and PET/CT fusion images could be used to plan biopsy, targeting areas with more metabolic activity that may give higher diagnostic yield. PET scanning has been used mainly for evaluating metastatic disease and follow-up of treated lesions.

Invasive Techniques

Arthrography is rarely indicated, if at all, for evaluating soft-tissue masses. Popliteal cysts or communicating cystic lesions can be identified by introducing contrast material into the joints. However, this procedure is rarely performed today. Still, it can be useful in determining whether the location of some soft-tissue masses is intra-articular or extra-articular, and it remains indicated when faced with this specific question. But differentiation and classification of potentially intra-articular soft-tissue tumors can usually be accomplished with standard MRI techniques.

Intravascular imaging techniques are generally not indicated for diagnosis and staging; however, they can be a valuable adjunct in the assessment and treatment of arteriovenous hemangiomas/malformations and other highly vascular tumors.

Once a soft-tissue mass is initially assessed with imaging and a differential diagnosis is created, image guidance is often indicated for tissue biopsy, which is addressed in other ACR Appropriateness Criteria® topics.

Summary

- As a general rule, MRI is the technique of choice for evaluating patients with suspected soft-tissue masses and pre- and post-contrast protocols are optimal in many scenarios.
- CT may be of greater value in patients who demonstrate subtle cortical bone involvement or soft-tissue calcifications on radiographs.
- An alternative technique may be required in some patients with a very large body habitus, or other factors rendering MRI unfeasible such as claustrophobia, the presence of certain metallic or electrical implants or devices, or inability to remain motionless for the length of an MRI examination due to pain, Parkinson's disease, etc. CT would be selected in most of these situations.
- Focused US examination can be a valuable tool in the initial assessment of some soft-tissue lesions, especially cysts and lipomas.
- Radiographs remain an important initial imaging study and often serve as a valuable complement to MRI or CT assessment.

Anticipated Exceptions

Nephrogenic systemic fibrosis (NSF) is a disorder with a scleroderma-like presentation and a spectrum of manifestations that can range from limited clinical sequelae to fatality. It appears to be related to both underlying severe renal dysfunction and the administration of gadolinium-based contrast agents. It has occurred primarily in patients on dialysis, rarely in patients with very limited glomerular filtration rate (GFR) (i.e., <30 mL/min/1.73 m^2), and almost never in other patients. There is growing literature regarding NSF. Although some controversy and lack of clarity remain, there is a consensus that it is advisable to avoid all gadolinium-based contrast agents in dialysis-dependent patients unless the possible benefits clearly outweigh the risk, and to limit the type and amount in patients with estimated GFR rates <30 mL/min/1.73 m^2. For more information, see the American College of Radiology (ACR) Manual on Contrast Media (see the "Availability of Companion Documents" field).

Abbreviations

- CT, computed tomography
- FDG-PET, fluorine-18-2-fluoro-2-deoxy-D-glucose positron emission tomography
- MRI, magnetic resonance imaging
- Tc, technetium

- US, ultrasound

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."		

Clinical Algorithm(s)

Algorithms were not developed from criteria guidelines.

Scope

Disease/Condition(s)

Soft-tissue masses

Guideline Category

Diagnosis

Evaluation

Clinical Specialty

Family Practice

Internal Medicine

Nuclear Medicine

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 with soft-tissue masses

Target Population

Patients with soft-tissue masses

Interventions and Practices Considered

1. X-ray area of interest
2. X-ray arthrography area of interest
3. Ultrasound (US) area of interest
4. Computed tomography (CT) area of interest
    - Without contrast
    - With contrast
    - Without and with contrast
5. Magnetic resonance imaging (MRI) area of interest
    - Without contrast
    - Without and with contrast
6. Technetium (Tc)-99m bone scan area of interest
7. Fluorine-18-2-fluoro-2-deoxy-D-glucose positron emission tomography (FDG-PET)/CT area of interest

Major Outcomes Considered

Utility of radiologic examinations in differential diagnosis

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Literature Search Procedure

The Medline literature search is based on keywords provided by the topic author. The two general classes of keywords are those related to the condition (e.g., ankle pain, fever) and those that describe the diagnostic or therapeutic intervention of interest (e.g., mammography, MRI).

The search terms and parameters are manipulated to produce the most relevant, current evidence to address the American College of Radiology Appropriateness Criteria (ACR AC) topic being reviewed or developed. Combining the clinical conditions and diagnostic modalities or therapeutic procedures narrows the search to be relevant to the topic. Exploding the term "diagnostic imaging" captures relevant results for diagnostic topics.

The following criteria/limits are used in the searches.

1. Articles that have abstracts available and are concerned with humans.
2. Restrict the search to the year prior to the last topic update or in some cases the author of the topic may specify which year range to use in the search. For new topics, the year range is restricted to the last 5 years unless the topic author provides other instructions.
3. May restrict the search to Adults only or Pediatrics only.
4. Articles consisting of only summaries or case reports are often excluded from final results.

The search strategy may be revised to improve the output as needed.

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 Given)

Rating Scheme for the Strength of the Evidence

Strength of Evidence Key

Category 1 - The conclusions of the study are valid and strongly supported by study design, analysis, and results.

Category 2 - The conclusions of the study are likely valid, but study design does not permit certainty.

Category 3 - The conclusions of the study may be valid but the evidence supporting the conclusions is inconclusive or equivocal.

Category 4 - The conclusions of the study may not be valid because the evidence may not be reliable given the study design or analysis.

Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

The topic author drafts or revises the narrative text summarizing the evidence found in the literature. American College of Radiology (ACR) staff draft an evidence table based on the analysis of the selected literature. These tables rate the strength of the evidence for all articles included in the narrative text.

The expert panel reviews the narrative text, evidence table, and the supporting literature for each of the topic-variant combinations and assigns an appropriateness rating for each procedure listed in the table. Each individual panel member forms his/her own opinion based on his/her interpretation of the available evidence.

More information about the evidence table development process can be found in the ACR Appropriateness Criteria® Evidence Table Development document (see the "Availability of Companion Documents" field).

Methods Used to Formulate the Recommendations

Expert Consensus (Delphi)

Description of Methods Used to Formulate the Recommendations

Modified Delphi Technique

The appropriateness ratings for each of the procedures included in the Appropriateness Criteria topics are determined using a modified Delphi methodology. A series of surveys are conducted to elicit each panelist's expert interpretation of the evidence, based on the available data, regarding the appropriateness of an imaging or therapeutic procedure for a specific clinical scenario. American College of Radiology (ACR) staff distributes surveys to the panelists along with the evidence table and narrative. Each panelist interprets the available evidence and rates each procedure. The surveys are completed by panelists without consulting other panelists. The ratings are a scale between 1 and 9, which is further divided into three categories: 1, 2, or 3 is defined as "usually not appropriate"; 4, 5, or 6 is defined as "may be appropriate"; and 7, 8, or 9 is defined as "usually appropriate." Each panel member assigns one rating for each procedure per survey round. The surveys are collected and the results are tabulated, de-identified and redistributed after each round. A maximum of three rounds are conducted. The modified Delphi technique enables each panelist to express individual interpretations of the evidence and his or her expert opinion without excessive bias from fellow panelists in a simple, standardized and economical process.

Consensus among the panel members must be achieved to determine the final rating for each procedure. Consensus is defined as eighty percent (80%) agreement within a rating category. The final rating is determined by the median of all the ratings once consensus has been reached. Up to three rating rounds are conducted to achieve consensus.

If consensus is not reached, the panel is convened by conference call. The strengths and weaknesses of each imaging procedure that has not reached consensus are discussed and a final rating is proposed. If the panelists on the call agree, the rating is accepted as the panel's consensus. The document is circulated to all the panelists to make the final determination. If consensus cannot be reached on the call or when the document is circulated, "No consensus" appears in the rating column and the 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.

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 soft-tissue masses

Potential Harms

Gadolinium-based Contrast Agents

Nephrogenic systemic fibrosis (NSF) is a disorder with a scleroderma-like presentation and a spectrum of manifestations that can range from limited clinical sequelae to fatality. It appears to be related to both underlying severe renal dysfunction and the administration of gadolinium-based contrast agents. It has occurred primarily in patients on dialysis, rarely in patients with very limited glomerular filtration rate (GFR) (i.e., <30 mL/min/1.73 m^2), and almost never in other patients. Although some controversy and lack of clarity remain, there is a consensus that it is advisable to avoid all gadolinium-based contrast agents in dialysis-dependent patients unless the possible benefits clearly outweigh the risk, and to limit the type and amount in patients with estimated GFR rates <30 mL/min/1.73 m^2. For more information, see the American College of Radiology (ACR) Manual on Contrast Media (see the "Availability of Companion Documents" field).

Relative Radiation Level (RRL)

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 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, both because of 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 to those specified for adults. Additional information regarding radiation dose assessment for imaging examinations can be found in the ACR Appropriateness Criteria® Radiation Dose Assessment Introduction document (see the "Availability of Companion Documents" field).

Qualifying Statements

Qualifying Statements

The 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 examinations 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

Getting Better

IOM Domain

Effectiveness

Identifying Information and Availability

Bibliographic Source(s)

Zoga AC, Weissman BN, Kransdorf MJ, Adler R, Appel M, Bancroft LW, Bruno MA, Fries IB, Morrison WB, Mosher TJ, Palestro CJ, Roberts CC, Tuite MJ, Ward RJ, Expert Panel on Musculoskeletal Imaging. ACR Appropriateness CriteriaÂ® soft-tissue masses. [online publication]. Reston (VA): American College of Radiology (ACR); 2012. 8 p. [31 references]

Adaptation

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

Date Released

1995 (revised 2012)

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 Musculoskeletal Imaging

Composition of Group That Authored the Guideline

Panel Members: Adam C. Zoga, MD (*Principal Author*); Barbara N. Weissman, MD (*Panel Chair*); Mark J. Kransdorf, MD (*Panel Vice-chair*); Ronald Adler, MD, PhD; Marc Appel, MD; Laura W. Bancroft, MD; Michael A. Bruno, MD; Ian Blair Fries, MD; William B. Morrison, MD; Timothy J. Mosher, MD; Christopher J. Palestro, MD; Catherine C. Roberts, MD; Michael J. Tuite, MD; Robert J. Ward, MD

Financial Disclosures/Conflicts of Interest

Not stated

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: Morrison WB, Zoga AC, Daffner RH, Weissman BN, Bancroft L, Bennett DL, Blebea JS, Bruno MA, Fries IB, Jacobson JA, Luchs JS, Payne WK III, Resnik CS, Roberts CC, Schweitzer ME, Seeger LL, Taljanovic MS, Wise JN, Expert Panel on Musculoskeletal Imaging. ACR Appropriateness Criteria® soft-tissue masses. [online publication]. Reston (VA): American College of Radiology (ACR); 2009. 7 p.

Guideline Availability

Electronic copies: Available 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 are available:

- ACR Appropriateness Criteria®. Overview. 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.
- ACR Appropriateness Criteria®. Literature search process. Reston (VA): American College of Radiology; 1 p. Electronic copies: Available in PDF from the ACR Web site.
- ACR Appropriateness Criteria®. Evidence table development – diagnostic studies. Reston (VA): American College of Radiology; 2013 Nov. 3 p. Electronic copies: Available in PDF from the ACR Web site.
- ACR Appropriateness Criteria®. Radiation dose assessment introduction. Reston (VA): American College of Radiology; 2 p. Electronic copies: Available in PDF from the ACR Web site.
- ACR Appropriateness Criteria®. Manual on contrast media. Reston (VA): American College of Radiology; 90 p. Electronic copies: Available in PDF from the ACR Web site.
- ACR Appropriateness Criteria®. Procedure information. Reston (VA): American College of Radiology; 1 p. Electronic copies: Available in PDF from the ACR Web site.
- ACR Appropriateness Criteria® soft-tissue masses. Evidence table. Reston (VA): American College of Radiology; 2012. 8 p. Electronic copies: Available from the ACR Web site.

Patient Resources

None available

NGC Status

This summary was completed by ECRI on May 6, 2001. The information was verified by the guideline developer as of June 29, 2001. This summary was updated by ECRI on March 28, 2006. This summary was updated by ECRI Institute on May 17, 2007 following the U.S. Food and Drug Administration (FDA) advisory on Gadolinium-based contrast agents. This summary was updated by ECRI Institute on June 20, 2007 following the U.S. Food and Drug Administration (FDA) advisory on gadolinium-based contrast agents. This summary was updated by ECRI Institute on May 21, 2010. This summary was updated by ECRI Institute on January 13, 2011 following the U.S. Food and Drug Administration (FDA) advisory on gadolinium-based contrast agents. This summary was updated by ECRI Institute on April 17, 2013.

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