



Complete Summary

GUIDELINE TITLE

ACR Appropriateness Criteria™ for bone metastases.

BIBLIOGRAPHIC SOURCE(S)

Kagan AR, Rose CM, Bedwinek JM, Blitzer PH, Brascho DJ, Brown AP, Coia LR, Earle JD, Janjan NA, Lowy RO, Pieters RS, Rotman M, Leibel SA. Bone metastases. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun; 215(Suppl): 1077-104. [38 references]

COMPLETE SUMMARY CONTENT

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

SCOPE

DISEASE/CONDITION(S)

Bone metastases

GUIDELINE CATEGORY

Treatment

CLINICAL SPECIALTY

Oncology
Radiation Oncology
Radiology

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of radiologic procedures for treatment of bone metastases

TARGET POPULATION

Patients with bone metastases

INTERVENTIONS AND PRACTICES CONSIDERED

1. Surgery prior to radiation therapy
2. Radiation therapy:
 - a. Local radiation with 1-25 fractions
 - b. Hemibody Irradiation
 - c. Strontium-89
 - d. Samarium
3. Complex blocking
4. Computer planning
5. Hormone therapy
6. Needle biopsy

MAJOR OUTCOMES CONSIDERED

- Quality of life
- Improvement in pain control
- Survival

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Literature searches of peer-reviewed medical journals, using primarily Medline database 1966-1994, were conducted 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

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

Please note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary. The recommendations that follow are based on the previous version of the guideline.

ACR Appropriateness Criteria™

Clinical Condition: Bone Metastases

Variant 1: Patient with Karnofsky Performance Score of 70. Diffuse, asymptomatic bone metastasis from a primary prostate cancer with prior orchiectomy. Has rising prostate specific antigen and a new, asymptomatic bone metastasis at C3.

Treatment	Appropriateness Rating	Comments
Local Radiation:		
600-800 cGy/1 fraction	2	
1200 cGy/2 fractions	2	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
2000 cGy/5 fractions	2	
3000 cGy/10 fractions	2	
3500 cGy/14 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
Surgical Intervention	2	

Prior to Radiation Therapy		
Computer Planning	2	
Complex Blocking	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 2: Patient with Karnofsky Performance Score of 70. Prostate cancer. No prior systemic treatment. Now has decreased deep tendon reflexes and early cord compression at T-10.

Treatment	Appropriateness Rating	Comments
Radiation Therapy	9	Radiation shown to reverse early neurological deficits with high probability.
Local Radiation:		
3000 cGy/10 fractions	9	
2000 cGy/5 fractions	6	
3500 cGy/14 fractions	6	
600-800 cGy/1 fraction	3	
1200 cGy/2 fractions	2	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
Hormone Therapy	6	High dose stilphostrol used to reverse changes, but no controlled clinical trial.
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	

Samarium	2	
Computer Planning	2	
Complex Blocking	2	
Surgical Intervention Prior to Radiation Therapy	No Consensus	
<u>Appropriateness Criteria Scale</u> 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 3a: Patient with Karnofsky Performance Score of <40. Prostate cancer, prior orchiectomy. Received Strontium-89 two months ago. Has diffuse bone metastases and pain but no neurological defect. Magnetic resonance imaging reveals epidural metastases at T-4, T-9, and T-12.

Treatment	Appropriateness Rating	Comments
Local Radiation:		
600-800 cGy/1 fraction	5	
1200 cGy/2 fractions	5	1200 cGy in 2 fractions one week apart was recommended if there was a response after 600 cGy. Possible clinical trial.
2000 cGy/5 fractions	5	
3000 cGy/10 fractions	3	
3500 cGy/14 fractions	3	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	

Samarium	2	
Computer Planning	2	
Complex Blocking	2	
Surgical Intervention Prior to Radiation Therapy	2	
Radiation Therapy	No Consensus	Panelists unable to decide whether patient without neurologic deficit should receive radiation therapy.
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 3b: Patient with Karnofsky Performance Score of <40. Prostate cancer, prior orchiectomy. Received Strontium-89 two months ago. Previous bone scan 12 months ago showed diffuse metastases. Now with diffuse pain.

Treatment	Appropriateness Rating	Comments
Hemibody Irradiation:		
600-800 cGy/1 fraction	6	
Local Radiation:		
600-800 cGy/1 fraction	2	
1200 cGy/2 fractions	2	
2000 cGy/5 fractions	2	
3000 cGy/10 fractions	2	
3500 cGy/14 fractions	2	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
Radionuclides:		
Strontium-89: 4 mCi	2	.

Samarium	2	
Surgical Intervention Prior to Radiation Therapy	2	
Computer Planning	2	
Complex Blocking	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 4: Patient with Karnofsky Performance Score of 60. Recent diagnosis of large cell undifferentiated cancer of lung. Moderate back pain. Bone scan shows multiple metastases. Chest film discloses RUL and hilar masses. Plain film shows loss of L-4 pedicle.

Treatment	Appropriateness Rating	Comments
Local Radiation:		
3000 cGy/10 fractions	8	
3500 cGy/14 fractions	8	For large volume.
2000 cGy/5 fractions	6	
600-800 cGy/1 fraction	6	
1200 cGy/2 fractions	2	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
Complex Blocking	2	

Computer Planning	2	
Surgical Intervention Prior to Radiation Therapy	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 5a: Patient with Karnofsky Performance Score <40. Prostate cancer. 3000 cGy to L4-L5 one year ago. Strontium-89 three months ago; now myelosuppressed. Recurrent back pain. Bone scan suggests reactivation of metastasis in lower lumbar spine.

Treatment	Appropriateness Rating	Comments
Local Radiation:		
600-800 cGy/1 fraction	8	
1200 cGy/2 fractions	8	1200 cGy in 2 fractions one week apart was recommended if there was a response after 600 cGy. Possible clinical trial.
2000 cGy/10 fractions	8	No randomized studies and paucity of literature but panel voted that this fractionation program was safe over the estimated life-span of this patient.
3000 cGy/ 10 fractions	2	
3500 cGy/14 fractions	2	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	

Samarium	2	
Complex Blocking	2	
Computer Planning	2	
Surgical Intervention Prior to Radiation Therapy	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 5b: Patient with Karnofsky Performance Score of 60. Prostate cancer. One year ago, 3000 cGy to L4-L5. Strontium-89 three months ago. Recurrent back pain. Bone scan suggests reactivation of metastasis in lower lumbar spine. Complete blood count normal.

Treatment	Appropriateness Rating	Comments
Local Radiation:		
600-800 cGy/1 fraction	8	
1200 cGy/ 2 fractions	8	1200 cGy in 2 fractions one week apart was recommended if there was a response after 600 cGy. Possible clinical trial.
2000 cGy/10 fractions	6	No randomized studies and paucity of literature but panel voted that this fractionation program was safe over the estimated life-span of this patient.
2000 cGy/ 5 fractions	3	
3000 cGy/10 fractions	3	
3500 cGy/14 fractions	2	
4000 cGy/ 20 fractions	2	
5000 cGy/25 fractions	2	
Hemibody Irradiation:		

600-800 cGy/1 fraction	2	
Complex Blocking	2	
Computer Planning	2	
Surgical Intervention Prior to Radiation Therapy	2	
Radionuclides:		
Strontium-89: 4 mCi	No Consensus	Panelists could not agree on whether the patient was strontium-resistant.
Samarium	No Consensus	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 5c: Patient with Karnofsky Performance Score of 60. Prostate cancer. Bone metastases in T-spine. 3000 cGy in 10 fractions to T-spine 1 year ago. Strontium-89 three months ago. Bone scan suggests reactivation of T-spine metastases in previously treated area. No pain.

Treatment	Appropriateness Rating	Comments
Local Radiation:		
600-800 cGy/1 fraction	2	
1200 cGy/ 2 fractions	2	
2000 cGy/10 fractions	2	
3000 cGy/10 fractions	2	
3500 cGy/14 fractions	2	
4000 cGy/ 20 fractions	2	
5000 cGy/25 fractions	2	
2000 cGy/ 5 fractions	2	
Hemibody Irradiation:		

600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
Radiation Therapy	2	Panelists unwilling to deliver additional radiation to T-spine in patient without pain.
Complex Blocking	2	
Computer Planning	2	
Surgical Intervention Prior to Radiation Therapy	2	
<u>Appropriateness Criteria Scale</u> 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 5d: Patient with Karnofsky Performance Score of 60. Prostate cancer. Bone metastases in T-spine. 3000 cGy in 10 fractions to T-spine 1 year ago. Strontium-89 three months ago. Bone scan suggests reactivation of T-spine metastases in previously treated area. Patient has localized pain.

Treatment	Appropriateness Rating	Comments
Local Radiation:		
2000 cGy/10 fractions	8	Despite a lack of literature panelists endorsed re-irradiation to a low dose.
600-800 cGy/1 fraction	8	Panelists preferred 600 cGy because of the previous irradiation.
1200 cGy/ 2 fractions	2	Not recommended because of previous irradiation.
2000 cGy/ 5 fractions	2	
3000 cGy/10 fractions	2	

3500 cGy/14 fractions	2	
4000 cGy/ 20 fractions	2	
5000 cGy/25 fractions	2	
Radionuclides:		
Strontium-89: 4 mCi	3	
Samarium	3	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Complex Blocking	2	
Computer Planning	2	
Surgical Intervention Prior to Radiation Therapy	2	Only consider surgical intervention if impending cord compression.
<u>Appropriateness Criteria Scale</u> 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 5e: Patient with Karnofsky Performance Score of 60. Prostate cancer. Bone metastases in T-spine. 3000 cGy in 10 fractions to T-spine 1 year ago. Strontium-89 three months ago. Bone scan suggests reactivation of T-spine metastases in previously treated area. Patient has pain and spinal cord compression.

Treatment	Appropriateness Rating	Comments
Local Radiation:		
2000 cGy/ 10 fractions	8	With or without surgical intervention.
600-800 cGy/1 fraction	7	Panelists preferred 600 cGy for only postoperative patients because of the previous irradiation.
1200 cGy/ 2 fractions	2	

2000 cGy/ 5 fractions	2	
3000 cGy/10 fractions	2	
3500 cGy/14 fractions	2	
4000 cGy/ 20 fractions	2	
5000 cGy/25 fractions	2	
Surgical Intervention	7	Some panelists suggested hormonal manipulation was an appropriate alternative to this more invasive option.
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
Complex Blocking	2	
Computer Planning	2	
<u>Appropriateness Criteria Scale</u> 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 6: Patient with Karnofsky Performance Score of 60. One month history of adenocarcinoma of the lung, stage III -B. Received palliative radiation to the lung. Right femur pinned for 50% destruction of the cortex by metastatic disease. Now referred by orthopedist.

Treatment	Appropriateness Rating	Comments
Surgical Intervention Prior to Radiation Therapy	8	Literature endorses prophylactic fixation prior to radiation for > 1/3 cortical thickness involvement.
Complex Blocking	8	To include the proximal femur, acetabulum and ischium with exclusion of

		viscera.
Local Radiation:		
2000 cGy/ 5 fractions	8	
3750 cGy/15 fractions	8	
3000 cGy/10 fractions	8	
3500 cGy/14 fractions	8	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
1200 cGy/ 2 fractions	No Consensus	No experience or literature. Possible clinical trial.
600-800 cGy/1 fraction	No Consensus	No experience or literature. Possible clinical trial.
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
Computer Planning	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 7: Patient with Karnofsky Performance Score of 50. Renal cell carcinoma. Bone scan shows multiple metastatic lesions. Severe right hip pain when walking; none at rest. Plain film shows 3 cm lytic lesion involving >1/3 of cortex of bone.

Treatment	Appropriateness Rating	Comments
Radiation Therapy	9	
Complex Blocking	8	To include the proximal

		femur, acetabulum, and ischium with exclusion of viscera.
Local Radiation:		
2000 cGy/5 fractions	8	
3000 cGy/10 fractions	8	
3500 cGy/14 fractions	8	
3750 cGy/15 fractions	6	
1200 cGy/2 fractions	2	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
600-800 cGy/1 fraction	No Consensus	Too little experience with renal cell carcinoma.
Surgical Intervention Prior to Radiation Therapy	6	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
Computer Planning	2	
<u>Appropriateness Criteria Scale</u> 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 8a: Patient with Karnofsky Performance Score of 80. Breast carcinoma, stage I, 15 months ago. Treated with 6 cycles of CMF. Now has low back pain. Bone scan and magnetic resonance imaging show destructive lesion at L-4. No cord involvement. Biopsy shows breast cancer. Solitary lesion.

Treatment	Appropriateness	Comments
-----------	-----------------	----------

	Rating	
Local Radiation:		
2000 cGy/5 fractions	8	
3000 cGy/10 fractions	8	
3500 cGy/14 fractions	8	
1200 cGy/2 fractions	2	
5000 cGy/25 fractions	2	
4000 cGy/20 fractions	2	
600-800 cGy/1 fraction	No Consensus	Panelists were undecided because of the length of the disease-free interval.
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
Complex Blocking	2	
Surgical Intervention Prior to Radiation Therapy	2	
Computer Planning	No Consensus	For patient with a solitary lesion and a long natural history, a more sophisticated treatment planning may be considered.
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 8b: Patient with Karnofsky Performance Score of 80. Breast carcinoma, stage I. Treated with 6 cycles of CMF, 5 years ago. Now has low back pain. Bone scan and magnetic resonance imaging show destructive lesion at L-4. No cord involvement. Biopsy shows breast cancer. Solitary lesion.

Treatment	Appropriateness Rating	Comments
Local Radiation:		
3750 cGy/15 fractions	8	
3000 cGy/10 fractions	8	
3500 cGy/14 fractions	8	
2000 cGy/5 fractions	6	
4000 cGy/20 fractions	6	
5000 cGy/25 fractions	5	
1200 cGy/2 fractions	2	
600-800 cGy/1 fraction	No Consensus	Panelists were undecided because of the length of the disease-free interval.
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
Complex Blocking	2	
Surgical Intervention Prior to Radiation Therapy	2	
Computer Planning	No Consensus	For patient with a solitary lesion and a long natural history, a more sophisticated treatment planning may be considered.
<u>Appropriateness Criteria Scale</u> 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 8c: Patient with Karnofsky Performance Score of 80. Malignant melanoma, excised 7 years ago. Now has low back pain and solitary metastasis at L-4, no cord involvement.

Treatment	Appropriateness Rating	Comments
Local Radiation:		
3000 cGy/10 fractions	8	
5000 cGy/25 fractions	8	
3000 cGy/5 fractions/2.5 weeks	6	
1200 cGy/2 fractions	2	
600-800 cGy/1 fraction	No Consensus	Panelists could not agree on the radiosensitivity of melanoma to this schedule. They differed on the tempo of future metastases.
2000 cGy/5 fractions	No Consensus	
3500 cGy/14 fractions	No Consensus	Many panelists (but not enough to achieve consensus) preferred high dose, protracted treatment schedules.
3750 cGy/15 fractions	No Consensus	
4000 cGy/20 fractions	No Consensus	
Needle Biopsy	6	
Complex Blocking	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
Surgical Intervention Prior to Radiation Therapy	No Consensus	
Computer Planning	No Consensus	For patient with a solitary lesion and a long natural history, a more sophisticated treatment planning may be considered.

Appropriateness Criteria Scale

1 2 3 4 5 6 7 8 9

1=Least appropriate 9=Most appropriate

Variant 9a: Patient with Karnofsky Performance Score of 30. Breast cancer 3 years ago. Radiation therapy to multiple bony sites. Refractory to hormones and chemotherapy. Magnetic resonance imaging shows destructive C-5 lesion. No prior radiation therapy to C-5. Numb left arm and impending cord compression.

Treatment	Appropriateness Rating	Comments
Radiation Therapy	6	
Local Radiation:		
2000 cGy/5 fractions	8	
600-800 cGy/1 fraction	6	
1200 cGy/2 fractions	6	
3000 cGy/10 fractions	6	
3500 cGy/14 fractions	6	For large volume.
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
Computer Planning	2	
Complex Blocking	2	
Surgical Intervention Prior to Radiation Therapy	2	

Appropriateness Criteria Scale

1 2 3 4 5 6 7 8 9

1=Least appropriate 9=Most appropriate

Variant 9b: Patient with Karnofsky Performance Score of 70. Treated for breast cancer 3 years ago with adjuvant chemotherapy. No prior radiation therapy. Magnetic resonance imaging shows evidence of impending cord compression at C-5 lesion. Physical exam shows slight increased arm and leg reflexes bilaterally. Bone scan is positive at low C-spine, T-spine, both SI joints. Pain C-spine only.

Treatment	Appropriateness Rating	Comments
Radiation Therapy	8	Radiation therapy recommended for C-spine only.
Local Radiation:		
3000 cGy/10 fractions	9	
3500 cGy/14 fractions	9	For large volume.
2000 cGy/5 fractions	6	
600-800 cGy/1 fraction	3	
1200 cGy/2 fractions	2	
5000 cGy/25 fractions	2	
4000 cGy/20 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	Despite literature support for this approach, panel unwilling to support hemibody irradiation.
Computer Planning	2	
Complex Blocking	2	
Surgical Intervention Prior to Radiation Therapy	2	
Radionuclides:		

Strontium-89: 4 mCi	2	
Samarium	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 9c: Patient with Karnofsky Performance Score of 70. Treated for malignant melanoma with multiple metastatic bone lesions. No prior radiation therapy. Magnetic resonance imaging shows evidence of impending cord compression at C-5 lesion. Physical exam shows slight increased arm and leg reflexes bilaterally. Bone scan is positive at low C-spine, T-spine, both SI joints. Pain C-spine only.

Treatment	Appropriateness Rating	Comments
Radiation Therapy	9	Radiation therapy recommended to C-spine only.
Local Radiation:		
2000 cGy/5 fractions	7	
3000 cGy/10 fractions	7	
3500 cGy/14 fractions	7	
600-800 cGy/1 fraction	4	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
1200 cGy/2 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Computer Planning	2	
Complex Blocking	2	
Radionuclides:		
Strontium-89: 4 mCi	2	

Samarium	2	
Surgical Intervention Prior to Radiation Therapy	No Consensus	Individualization required.
<u>Appropriateness Criteria Scale</u> 1 2 3 4 5 6 7 8 9 1=Least appropriate 9=Most appropriate		

Variant 10a: Patient with Karnofsky Performance Score of 45. Breast cancer. Multiple bone metastases treated with radiation including T-spine. Prior chemotherapy and hormones. Destructive rib lesions adjacent to T-spine, all encompassed in one radiation portal.

Treatment	Appropriateness Rating	Comments
Radiation Therapy	8	
Local Radiation:		
600-800 cGy/1 fraction	8	
1200 cGy/2 fractions	8	1200 cGy in 2 fractions one week apart was recommended if there was a response after 600 cGy. Possible clinical trial.
2000 cGy/5 fractions	6	
3000 cGy/10 fractions	5	
3500 cGy/14 fractions	5	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	6	
Computer Planning	2	
Complex Blocking	2	
Surgical Intervention Prior to Radiation Therapy	2	

Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 10b: Patient with Karnofsky Performance Score of 45. Breast cancer. Multiple bone metastases treated with radiation including T-spine. Prior chemotherapy and hormones. Severe chest wall pain and destructive rib lesions adjacent to T-spine, all encompassed in one radiation portal.

Treatment	Appropriateness Rating	Comments
Radiation Therapy	8	
Local Radiation:		
600-800 cGy/1 fraction	8	
1200 cGy/2 fractions	8	1200 cGy in 2 fractions one week apart was recommended if there was a response after 600 cGy. Possible clinical trial.
2000 cGy/5 fractions	6	
3000 cGy/10 fractions	4	
3500 cGy/14 fractions	4	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	6	
Computer Planning	2	
Complex Blocking	2	
Surgical Intervention Prior	2	

to Radiation Therapy		
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 11a: Patient with Karnofsky Performance Score of 60. Multiple myeloma. Metastatic survey shows punched out lesions in most bones including the lumbar spine. Just started on a course of Alkeran and Prednisone. Referred by medical oncologist for intractable low back pain.

Treatment	Appropriateness Rating	Comments
Radiation Therapy	8	Delivered to L-Spine only. Hemibody irradiation as a primary approach is not recommended.
Local Radiation:		
3000 cGy/10 fractions	7	Successful palliation has been reported for lower doses.
3500 cGy/14 fractions	6	Successful palliation has been reported for lower doses.
1800 cGy/6 fractions	6	
2400 cGy/12 fractions	6	
3000 cGy/15 fractions	6	
600-800 cGy/1 fraction	6	
1200 cGy/2 fractions	6	1200 cGy in 2 fractions one week apart was recommended if there was a response after 600 cGy. Possible clinical trial.
2000 cGy/5 fractions	6	

4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Computer Planning	2	
Complex Blocking	2	
Surgical Intervention Prior to Radiation Therapy	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 11b: Patient with Karnofsky Performance Score of 60. Multiple myeloma. Metastatic survey shows punched out lesions in most bones including the lumbar spine. Chemotherapy for 8 months; failed L-PAM/Prednisone, and VAD. Referred for intractable low back pain.

Treatment	Appropriateness Rating	Comments
Radiation Therapy	9	
Local Radiation:		
600-800 cGy/1 fraction	8	
2000 cGy/5 fractions	8	
1200 cGy/2 fractions	8	1200 cGy in 2 fractions one week apart was recommended if there was a response after 600 cGy. Possible clinical trial.
1800 cGy/6 fractions	6	

2400 cGy/12 fractions	6	
3000 cGy/10 fractions	6	
3000 cGy/15 fractions	4	
3500 cGy/14 fractions	2	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Computer Planning	2	
Complex Blocking	2	
Surgical Intervention Prior to Radiation Therapy	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Variant 12: Patient with Karnofsky Performance Score of 60. Untreated small cell carcinoma of the lung and diffuse metastases involving sacrum, adjacent ilium, ischium, and femur. Referral for concomitant radiation therapy with chemotherapy. Sacral, hip, and leg pain.

Treatment	Appropriateness Rating	Comments
Radiation Therapy	6	Panelists believed that concomitant radiation therapy was probably appropriate and need not wait for response to chemotherapy.
Local Radiation:		

2000 cGy/5 fractions	5	
600-800 cGy/1 fraction	5	Choice of 600 cGy versus 800 cGy depends on volume.
3000 cGy/10 fractions	5	
3500 cGy/14 fractions	5	
1200 cGy/2 fractions	2	
4000 cGy/20 fractions	2	
5000 cGy/25 fractions	2	
Hemibody Irradiation:		
600-800 cGy/1 fraction	2	
Computer Planning	2	
Complex Blocking	2	
Surgical Intervention Prior to Radiation Therapy	2	
Radionuclides:		
Strontium-89: 4 mCi	2	
Samarium	2	
<u>Appropriateness Criteria Scale</u>		
1 2 3 4 5 6 7 8 9		
1=Least appropriate 9=Most appropriate		

Summary

Doses in the range of 20 Gy in 5 fractions to 30 Gy in 10 fractions, or 35-37.5 Gy in 14-15 fractions in better prognosis patients are acceptable in most circumstances. Complex blocking strategies and computerized planning were thought to be inappropriate. The appropriateness guidelines panel did not attempt to examine the point of dose prescription. In the literature, dose is variously prescribed as a given dose, or a dose at a depth (usually 5 cm), or at midplane. The panel hoped that future reports on the palliation of bone metastases would be explicit in the description of dose prescription points. Finally, the panel could not agree upon situations where prospective palliation was appropriate.

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

Appropriate selection of radiologic treatments for bone metastases to palliate pain, reduce the need for analgesic medication, and reduce the number of new sites of pain.

POTENTIAL HARMS

Toxicities of hemi-body irradiation include:

- Nausea and vomiting
- Need for blood component transfusion

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. ACR appropriateness criteria are not designed as a guide for third-party reimbursement.

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)

Kagan AR, Rose CM, Bedwinek JM, Blitzer PH, Brascho DJ, Brown AP, Coia LR, Earle JD, Janjan NA, Lowy RO, Pieters RS, Rotman M, Leibel SA. Bone metastases. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun;215(Suppl):1077-104. [38 references]

ADAPTATION

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

DATE RELEASED

1996 Sep (revised 2000)

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 Radiation Oncology, Bone Metastasis Work Group

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: A. Robert Kagan, MD; Christopher M. Rose, MD; John M. Bedwinek, MD; Peter H. Blitzer, MD; Donn J. Brascho, MD; Andrew P. Brown, MB, BS; Lawrence R. Coia, MD; John D. Earle, MD; Nora A. Janjan, MD; Richard S. Pieters Jr., MD; Marvin Rotman, MD; Steven A. Leibel, MD

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

GUIDELINE STATUS

Please note: This guideline has been updated. The National Guideline Clearinghouse (NGC) is working to update this summary.

GUIDELINE AVAILABILITY

Electronic copies of the updated guideline: Available in Portable Document Format (PDF) 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 25, 1999. The information was verified by the guideline developer on September 9, 1999. The summary was updated on February 12, 2002. The information was verified again by the guideline developer on March 25, 2002.

COPYRIGHT STATEMENT

This NGC summary is based on the original guideline, which is subject to the guideline developer's copyright restrictions.

Appropriate instructions regarding downloading, use and reproduction of the American College of Radiology (ACR) Appropriateness Criteria™ guidelines may be found at the American College of Radiology's Web site www.acr.org.

© 1998-2004 National Guideline Clearinghouse

Date Modified: 11/15/2004

FIRSTGOV

