American College of Radiology
ACR Appropriateness Criteria®

Workup of Noncerebral Systemic Arterial Embolic Source

Variant: 1 Known upper extremity arterial occlusion. Suspected embolic etiology. Next imaging study to determine source.

Procedure	Appropriateness Category	Relative Radiation Level
US echocardiography transesophageal	Usually Appropriate	O
US echocardiography transthoracic resting	Usually Appropriate	O
MRA chest without and with IV contrast	Usually Appropriate	O
MRI heart function and morphology without and with IV contrast	Usually Appropriate	O
MRI heart function and morphology without IV contrast	Usually Appropriate	O
CTA chest with IV contrast	Usually Appropriate	☢☢☢
CT heart function and morphology with IV contrast	Usually Appropriate	☢☢☢☢
MRA chest without IV contrast	May Be Appropriate	O
US duplex Doppler abdomen	Usually Not Appropriate	O
Aortography chest	Usually Not Appropriate	☢☢☢

Variant: 2 Known arterial occlusion in the mesenteric or renal arterial system or renal infarcts. Suspected embolic etiology. Next imaging study to determine source.

Procedure	Appropriateness Category	Relative Radiation Level
US echocardiography transesophageal	Usually Appropriate	O
US echocardiography transthoracic resting	Usually Appropriate	O
MRA chest and abdomen without and with IV contrast	Usually Appropriate	O
MRI heart function and morphology without and with IV contrast	Usually Appropriate	O
MRI heart function and morphology without IV contrast	Usually Appropriate	O
CTA chest with IV contrast	Usually Appropriate	☢☢☢
CT heart function and morphology with IV contrast	Usually Appropriate	☢☢☢☢
CTA chest and abdomen with IV contrast	Usually Appropriate	☢☢☢☢
US duplex Doppler abdomen	May Be Appropriate	O
MRA chest and abdomen without IV contrast	May Be Appropriate	O
MRA chest without and with IV contrast	May Be Appropriate	O
MRA chest without IV contrast	May Be Appropriate	O
Aortography chest and abdomen	Usually Not Appropriate	☢☢☢☢

Variant: 3 Known lower extremity arterial occlusion. Suspected embolic etiology. Next imaging study to determine source.

Procedure	Appropriateness Category	Relative Radiation Level
US echocardiography transesophageal	Usually Appropriate	O
US echocardiography transthoracic resting	Usually Appropriate	O
MRA chest abdomen pelvis without and with IV contrast	Usually Appropriate	O
MRA chest without and with IV contrast	Usually Appropriate	O
MRI heart function and morphology without and with IV contrast	Usually Appropriate	O
MRI heart function and morphology without IV contrast	Usually Appropriate	O

CTA chest with IV contrast	Usually Appropriate	☢☢☢
CT heart function and morphology with IV contrast	Usually Appropriate	☢☢☢☢
CTA chest abdomen pelvis with IV contrast	Usually Appropriate	☢☢☢☢☢
MRA chest abdomen pelvis without IV contrast	May Be Appropriate	O
MRA chest without IV contrast	May Be Appropriate	O
US duplex Doppler abdomen	Usually Not Appropriate	O
Aortography chest abdomen pelvis	Usually Not Appropriate	☢☢☢☢

Variant: 4 Known multiorgan system arterial occlusions. Suspected embolic etiology. Next imaging study to determine source.

Procedure	Appropriateness Category	Relative Radiation Level
US echocardiography transesophageal	Usually Appropriate	O
US echocardiography transthoracic resting	Usually Appropriate	O
MRA chest abdomen pelvis without and with IV contrast	Usually Appropriate	O
MRA chest abdomen pelvis without IV contrast	Usually Appropriate	O
MRA chest without and with IV contrast	Usually Appropriate	O
MRI heart function and morphology without and with IV contrast	Usually Appropriate	O
MRI heart function and morphology without IV contrast	Usually Appropriate	O
CTA chest with IV contrast	Usually Appropriate	☢☢☢
CT heart function and morphology with IV contrast	Usually Appropriate	☢☢☢☢
CTA chest abdomen pelvis with IV contrast	Usually Appropriate	☢☢☢☢☢
US duplex Doppler abdomen	May Be Appropriate	O
MRA chest without IV contrast	May Be Appropriate	O

Panel Members

Summary of Literature Review

Introduction/Background

Special Imaging Considerations

Initial Imaging Definition

Discussion of Procedures by Variant

Variant 1: The variant assumes that an upper extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.

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A. Aortography Chest

Variant 1: The variant assumes that an upper extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
B. CT Heart Function and Morphology With IV Contrast

Variant 1: The variant assumes that an upper extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
C. CTA Chest With IV Contrast

Variant 1: The variant assumes that an upper extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
D. MRA Chest Without and With IV Contrast

Variant 1: The variant assumes that an upper extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
E. MRA Chest Without IV Contrast

Variant 1: The variant assumes that an upper extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
F. MRI Heart Function and Morphology Without and With IV Contrast

Variant 1: The variant assumes that an upper extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
G. MRI Heart Function and Morphology Without IV Contrast

Variant 1: The variant assumes that an upper extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
H. US Duplex Doppler Abdomen

Variant 1: The variant assumes that an upper extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
I. US Echocardiography Transesophageal

Variant 1: The variant assumes that an upper extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
J. US Echocardiography Transthoracic Resting

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
A. Aortography Chest and Abdomen

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
B. CT Heart Function and Morphology With IV Contrast

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
C. CTA Chest With IV Contrast

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
D. CTA Chest and Abdomen With IV Contrast

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
E. MRA Chest Without and With IV Contrast

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
F. MRA Chest Without IV Contrast

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
G. MRA Chest and Abdomen Without and With IV Contrast

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
H. MRA Chest and Abdomen Without IV Contrast

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA,

although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
I. MRI Heart Function and Morphology Without and With IV Contrast

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
J. MRI Heart Function and Morphology Without IV Contrast

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
K. US Duplex Doppler Abdomen

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
L. US Echocardiography Transesophageal

Variant 2: The variant assumes that a mesenteric/renal arterial occlusion or renal infarct has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Imaging of Mesenteric Ischemia" [55]).
M. US Echocardiography Transthoracic Resting

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
A. Aortography Chest, Abdomen, and Pelvis

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
B. CT Heart Function and Morphology With IV Contrast

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
C. CTA Chest With IV Contrast

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
D. CTA Chest, Abdomen, and Pelvis With IV Contrast

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
E. MRA Chest Without and With IV Contrast

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
F. MRA Chest Without IV Contrast

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
G. MRA Chest, Abdomen, and Pelvis Without and With IV Contrast

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
H. MRA Chest, Abdomen, and Pelvis Without IV Contrast

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
I. MRI Heart Function and Morphology Without and With IV Contrast

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
J. MRI Heart Function and Morphology Without IV Contrast

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
K. US Duplex Doppler Abdomen

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the

clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
L. US Echocardiography Transesophageal

Variant 3: The variant assumes that a lower extremity arterial occlusion has already been established. Typically, this diagnosis is made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used (see the ACR Appropriateness Criteria® topic on "Sudden Onset of Cold, Painful Leg" [59]).
M. US Echocardiography Transthoracic Resting

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
A. CT Heart Function and Morphology With IV Contrast

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
B. CTA Chest With IV Contrast

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
C. CTA Chest, Abdomen, and Pelvis With IV contrast

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
D. MRA Chest Without and With IV Contrast

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
E. MRA Chest Without IV Contrast

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
F. MRA Chest, Abdomen, and Pelvis Without and With IV Contrast

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
G. MRA Chest, Abdomen, and Pelvis Without IV Contrast

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although

the clinical examination or another imaging study could also be used.
H. MRI Heart Function and Morphology Without and With IV Contrast

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
I. MRI Heart Function and Morphology Without IV Contrast

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
J. US Duplex Doppler Abdomen

Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
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Variant 4: The variant assumes that multiorgan arterial occlusions have already been established. Typically, these diagnoses are made by CTA, arteriography, or MRA, although the clinical examination or another imaging study could also be used.
L. US Echocardiography Transthoracic Resting

Summary of Recommendations

Supporting Documents

The evidence table, literature search, and appendix for this topic are available at https://acsearch.acr.org/list. The appendix includes the strength of evidence assessment and the final rating round tabulations for each recommendation.

For additional information on the Appropriateness Criteria methodology and other supporting documents, please go to the ACR website at https://www.acr.org/Clinical-Resources/Clinical-Tools-and-Reference/Appropriateness-Criteria.

Appropriateness Category Names and Definitions

Appropriateness Category Name	Appropriateness Rating	Appropriateness Category Definition
Usually Appropriate	7, 8, or 9	The imaging procedure or treatment is indicated in the specified clinical scenarios at a favorable risk-benefit ratio for patients.
May Be Appropriate	4, 5, or 6	The imaging procedure or treatment may be indicated in the specified clinical scenarios as an alternative to imaging procedures or treatments with a more favorable risk-benefit ratio, or the risk-benefit ratio for patients is equivocal.
May Be Appropriate	5	The individual ratings are too dispersed from the

(Disagreement)		panel median. The different label provides transparency regarding the panel's recommendation. "May be appropriate" is the rating category and a rating of 5 is assigned.
Usually Not Appropriate	1, 2, or 3	The imaging procedure or treatment is unlikely to be indicated in the specified clinical scenarios, or the risk-benefit ratio for patients is likely to be unfavorable.

Relative Radiation Level Information

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