

ACR Appropriateness Criteria[®]

Cerebrovascular Disease

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Abstract

Diseases of the cerebral vasculature represent a heterogeneous group of ischemic and hemorrhagic etiologies, which often manifest clinically as an acute neurologic deficit also known as stroke or less commonly with symptoms such as headache or seizures. Stroke is the fourth leading cause of death and is a leading cause of serious long-term disability in the United States. Eighty-seven percent of strokes are ischemic, 10% are due to intracerebral hemorrhage, and 3% are secondary to subarachnoid hemorrhage. The past two decades have seen significant developments in the screening, diagnosis, and treatment of ischemic and hemorrhagic causes of stroke with advancements in CT and MRI technology and novel treatment devices and techniques. Multiple different imaging modalities can be used in the evaluation of cerebrovascular disease. The different imaging modalities all have their own niches and their own advantages and disadvantages in the evaluation of cerebrovascular disease.

The American College of Radiology Appropriateness Criteria are evidence-based guidelines for specific clinical conditions that are reviewed annually by a multidisciplinary expert panel. The guideline development and revision include an extensive analysis of current medical literature from peer reviewed journals and the application of well-established methodologies (RAND/UCLA Appropriateness Method and Grading of Recommendations Assessment, Development, and Evaluation or GRADE) to rate the appropriateness of imaging and treatment procedures for specific clinical scenarios. In those instances where evidence is lacking or equivocal, expert opinion may supplement the available evidence to recommend imaging or treatment.

Key Words: Appropriateness Criteria, Appropriate Use Criteria, AUC, arteriovenous malformation, cerebral aneurysm, cerebrovascular disease, stroke, transient ischemic attack, vasculitis

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The American College of Radiology seeks and encourages collaboration with other organizations on the development of the ACR Appropriateness Criteria through society representation on expert panels. Participation by representatives from collaborating societies on the expert panel does not necessarily imply individual or society endorsement of the final document. Reprint requests: publications@acr.org

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*The views expressed in this article are those of the authors and do not reflect the official policy of the Department of Army/Navy/Air Force, Department of Defense, or United States government.

Disclaimer: The 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 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.

Variant 1. Asymptomatic. Structural lesion on physical examination (cervical bruit) and/or risk factors.			
Radiologic Procedure	Rating	Comments	RRL
US duplex Doppler carotid	8	If positive, consider follow-up with CTA or CE-MRA.	○
MRA neck without IV contrast	8	If positive, consider follow-up with CTA or CE-MRA.	○
MRA neck without and with IV contrast	8	CTA and CE-MRA are comparable noninvasive imaging alternatives each with their own advantages and disadvantages.	○
CTA neck with IV contrast	8	CTA and CE-MRA are comparable noninvasive imaging alternatives each with their own advantages and disadvantages.	⊕⊕⊕
CT head perfusion with IV contrast	5		⊕⊕⊕
MRI head perfusion with IV contrast	5		○
MRI head without IV contrast	5		○
MRI head without and with IV contrast	5		○
CT head without IV contrast	5		⊕⊕⊕
CT head with IV contrast	3		⊕⊕⊕
CT head without and with IV contrast	3		⊕⊕⊕
MRA head without IV contrast	3		○
MRA head without and with IV contrast	3		○
CTA head with IV contrast	3		⊕⊕⊕
Arteriography cervicocerebral	2		⊕⊕⊕

Note: Rating Scale: 1,2,3 = usually not appropriate; 4,5,6 = may be appropriate; 7,8,9 = usually appropriate. CTA = CT angiography; IV = intravenous; MRA = MR angiography; RRL = relative radiation level; US = ultrasound.

Variant 2. Carotid territory or vertebrobasilar TIA, initial screening survey.			
Radiologic Procedure	Rating	Comments	RRL
MRI head without and with IV contrast	9	Parenchymal brain imaging and CT or MR vascular imaging of the head and neck should be considered.	○
MRI head without IV contrast	8	Parenchymal brain imaging and CT or MR vascular imaging of the head and neck should be considered. Can be useful if there is a contraindication to contrast. MRI is more sensitive than CT for acute infarct.	○
MRA head and neck without IV contrast	8	Can be obtained in conjunction with MRI head. Preferred MR vascular imaging of the head and neck includes noncontrast head MRA and contrast-enhanced neck MRA. Can be useful if there is a contraindication to contrast.	○
MRA head and neck without and with IV contrast	8	Can be obtained in conjunction with MRI head. Preferred MR vascular imaging of the head and neck includes noncontrast head MRA and contrast-enhanced neck MRA.	○
CT head without IV contrast	8	Useful to evaluate for acute intracranial pathology. MRI is more sensitive than CT for acute infarct.	⊕⊕⊕
CTA head and neck with IV contrast	8	CTA can be obtained after NCCT.	⊕⊕⊕
US duplex Doppler carotid	5		○
CT head perfusion with IV contrast	5		⊕⊕⊕
MRI head perfusion with IV contrast	5		○
CT head with IV contrast	3		⊕⊕⊕
CT head without and with IV contrast	3		⊕⊕⊕
Arteriography neck	3		⊕⊕⊕
Arteriography cervicocerebral	3		⊕⊕⊕

Note: Rating Scale: 1,2,3 = usually not appropriate; 4,5,6 = may be appropriate; 7,8,9 = usually appropriate. CTA = CT angiography; IV = intravenous; MRA = MR angiography; RRL = relative radiation level; US = ultrasound.

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