

ACR Appropriateness Criteria[®] Renovascular Hypertension

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Abstract

Renovascular hypertension is the most common type of secondary hypertension and is estimated to have a prevalence between 0.5% and 5% of the general hypertensive population, and an even higher prevalence among patients with severe hypertension and end-stage renal disease, approaching 25% in elderly dialysis patients. Investigation for renal artery stenosis is appropriate when clinical presentation suggests secondary hypertension rather than primary hypertension, when there is not another known cause of secondary hypertension, and when intervention would be carried out if a significant renal artery stenosis were identified. The primary imaging modalities used to screen for renal artery stenosis are CT, MRI, and ultrasound, with the selection of imaging dependent in part on renal function.

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, CT, MRI, Renal artery stenosis, Renovascular hypertension, US

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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. High index of suspicion of renovascular hypertension. Normal renal function.

Radiologic Procedure	Rating	Comments	RRL
MRA abdomen without and with IV contrast	8		○
CTA abdomen with IV contrast	8		⦿⦿⦿
US kidney retroperitoneal with duplex Doppler	7		○
MRA abdomen without IV contrast	5		○
Tc-99m ACE-inhibitor renography	5		⦿⦿⦿
Arteriography kidney	3		⦿⦿⦿
Venography with renal vein sampling	3		Varies

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

Variant 2. High index of suspicion of renovascular hypertension. Decreased renal function, eGFR < 30 mL/min/1.73 m².

Radiologic Procedure	Rating	Comments	RRL
US kidney retroperitoneal with duplex Doppler	9		○
MRA abdomen without IV contrast	7		○
CTA abdomen with IV contrast	5		⦿⦿⦿
MRA abdomen without and with IV contrast	3		○
Tc-99m ACE-inhibitor renography	3		⦿⦿⦿
Arteriography kidney	3		⦿⦿⦿
Venography with renal vein sampling	3		Varies

Note: Rating scale: 1, 2, 3 = usually not appropriate; 4, 5, 6 = may be appropriate; 7, 8, 9 = usually appropriate. ACE = angiotensin-converting enzyme; CTA = CT angiography; eGFR = estimated glomerular filtration rate; IV = intravenous; MRA = MR angiography; RRL = relative radiation level; US = ultrasound.

Table 1. Relative radiation level designations

RRL	Adult Effective Dose Estimate Range (mSv)	Pediatric Effective Dose Estimate Range (mSv)
○	0	0
⦿	<0.1	<0.03
⦿⦿	0.1-1	0.03-0.3
⦿⦿⦿	1-10	0.3-3
⦿⦿⦿⦿	10-30	3-10
⦿⦿⦿⦿⦿	30-100	10-30

Note: Relative radiation level (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 (eg, region of the body exposed to ionizing radiation, the imaging guidance that is used). The RRLs for these examinations are designated as “varies.”

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