

2011 Imaging Criteria

Magnetic Resonance Angiogram (MRA), Kidney^(1, 2, 3)

ICD-9-CM: 88.90, 88.95, 88.97

CPT: 72198, 74185

I/O Setting: Outpatient

INDICATION(S)

100 Suspected renal artery stenosis

200 Pre/postoperative evaluation

100 Suspected renal artery stenosis **[One]**⁽⁴⁾110 HTN **[One]**111 Abrupt onset of HTN^(5, 6)112 Hypertensive emergency⁽⁷⁾113 Continued HTN after Rx \geq 2 medications⁽⁸⁾120 Decreased renal mass/function **[One]**121 Renal insufficiency with creatinine \geq 1.7 mg/dL(150 μ mol/L) of unknown etiology⁽⁹⁾

122 Unexplained hypokalemia

123 Size of 1 kidney decreased \geq 1 cm yearly by US

124 Affected kidney smaller than other kidney by 2 cm

125 \geq 50% increase in creatinine with ACE inhibitor Rx200 Pre/postoperative evaluation **[One]**⁽¹⁰⁾210 Renal tumor⁽¹¹⁾

220 Renal transplant donor/recipient

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Notes

(1)

MRA is an application of MRI that produces images of blood vessels for noninvasive evaluation of the arterial as well as venous circulation. Unlike a conventional angiogram or CTA, MRA does not involve ionizing radiation or the administration of iodinated IV contrast which is nephrotoxic and can cause an allergic reaction in some patients. MRA is not usually performed in addition to an angiogram, but as a substitute for angiogram.

(2)

MRA of the kidney provides information about the anatomy of the renal arteries, kidneys, and the aorta for diagnostic purposes or preoperative mapping. Duplex US, an alternative to renal MRA, has a 10% to 20% failure rate in accurately identifying renal artery stenosis secondary to operator inexperience and other factors (e.g., obesity, bowel gas) (Kendrick and Chonchol, *Adv Chronic Kidney Dis* 2008, 15: 355-62; Safian and Textor, *N Engl J Med* 2001; 344(6): 431-442).

(3)

The following are examples of relative and absolute contraindications to the use of magnetic resonance imaging:

- Implanted devices that are electrically or magnetically activated (e.g., cardiac pacemakers, automatic cardioverter defibrillators, drug infusion pumps, cochlear implants)
- Ferromagnetic metal objects (e.g., cerebral aneurysm clips, intraocular metallic foreign body, prostheses, screws)
- Pregnancy, first trimester
- Renal insufficiency in cases when magnetic resonance imaging is performed with gadolinium-based contrast

(4)

MRA of the kidney has become a primary screening tool for detecting renal artery stenosis, with both a sensitivity and specificity > 90%. It is significantly better than US and renography for detecting renal artery stenosis and provides a good screening tool for evaluating hypertensive patients (Eklof et al., *Acta Radiol* 2006, 47: 764-74).

(5)

The abrupt onset of HTN before age 30 is suggestive of fibromuscular dysplasia, a non atherosclerotic and noninflammatory disease that usually involves the middle and distal two thirds of the main renal artery (Plouin et al., *Orphanet J Rare Dis* 2007; 2: 28; Hirsch et al., *J Am Coll Cardiol* 2006; 47(6): 1239-1312). Fibromuscular dysplasia accounts for < 10% of cases of renal artery stenosis and is usually seen in women 30 to 50 years old (Plouin et al., *Orphanet J Rare Dis* 2007; 2: 28).

(6)

The onset of HTN at or after age 50 with a progression different than that seen with essential hypertension, or hypertension in younger individuals, is suggestive of atherosclerotic renal artery stenosis which accounts for 90% of cases of renal artery stenosis and usually involves the ostium and proximal third of the main renal artery and the perirenal aorta (Textor, *Med Clin North Am* 2009; 93(3): 717-732, Table of Contents).

(7)

Accelerated, or malignant HTN refers to HTN associated with end organ damage. Hypertensive "emergencies" pertain to situations where the BP must be reduced immediately, though not necessarily to normal levels, to prevent or limit organ damage (e.g., encephalopathy, myocardial ischemia, intracranial hemorrhage, aortic dissection, eclampsia). Parenteral therapy (e.g., IV sodium nitroprusside) is often required. "Urgent" hypertensive states require BP reduction within a few hours in order to prevent target organ complications. Emergency treatment is rarely required for HTN in the absence of symptoms or signs of end organ damage (Chobanian et al., *Hypertension* 2003; 42(6): 1206-1252).

(8)

The ACC/AHA guidelines recommend medical management (e.g., ACE inhibitors, calcium channel blockers, beta-blockers) of HTN associated with renal artery stenosis. Angiotensin receptor blockers may also be effective in the treatment of HTN related to unilateral stenosis (Hirsch et al., *J Am Coll Cardiol* 2006; 47(6): 1239-1312).

(9)

This criteria point addresses situations where there is a high suspicion of renal artery stenosis due to a rising creatinine level ≥ 1.7 mg/dL (150 μ mol/L) which cannot be explained by another cause (e.g., diabetic nephropathy).

(10)

MRA provides preoperative information on the number and location of renal vessels. Identification of normal renal vasculature and anatomic variants can aid in preoperative planning. MRA is also useful in assessing renal bypass grafts, as well as evaluation of renal

transplant donors and recipients (Rankin et al., AJR Am J Roentgenol 2001; 177(2): 349-355; Marcos and Choyke, Semin Nephrol 2000; 20(5): 450-455).

(11)

The development of noninvasive imaging modalities has reduced the use of traditional angiography in the evaluation of renal masses (Zhang et al., Radiol Clin North Am 2007; 45(1): 119-147).