

other risk factors for atherosclerosis and is commonly superimposed upon preexisting small-vessel disease in the kidney resulting from hypertension, aging, and diabetes. Nearly 85% of patients considered for renal revascularization have stage 3–5 chronic kidney disease (CKD) with GFR <60 mL/min per 1.73 m². The presence of ARAS is a strong predictor of morbidity- and mortality-related cardiovascular events, independent of whether renal revascularization is undertaken.

DIAGNOSIS OF RENOVASCULAR DISEASE

Diagnostic approaches to renal artery stenosis depend partly on the specific clinical questions to be addressed. Noninvasive characterization of the renal vasculature may be achieved by several techniques, summarized in [Table 278-1](#). Although activation of the renin-angiotensin system is a key step in developing renovascular hypertension, it is transient. Levels of renin activity are therefore subject to timing, the effects of drugs, and sodium intake, and do not reliably predict the response to vascular therapy. Peak systolic renal artery velocities by Doppler ultrasound >200 cm/s generally predict hemodynamically important lesions (>60% vessel lumen occlusion), although some treatment trials have required velocity >300 cm/s to avoid false positives. The renal resistive index has predictive value regarding the viability of the kidney. It remains operator- and institution-dependent, however. Contrast-enhanced computed tomography (CT) with vascular reconstruction provides excellent vascular images and functional assessment, but carries a small risk of contrast toxicity. It provides a more reliable evaluation of accessory vessels and the distal vasculature than duplex or magnetic resonance imaging (MRI). Magnetic resonance angiography (MRA) is now less often used, as gadolinium contrast has been associated with nephrogenic systemic fibrosis particularly in patients with reduced GFR. Captopril-enhanced renography has a strong negative predictive value when entirely normal.

TABLE 278-1 Summary of Imaging Modalities for Evaluating the Kidney Vasculature