

FROM THE FAMILY PRACTICE INQUIRIES NETWORK

# Does early detection of suspected atherosclerotic renovascular hypertension change outcomes?

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## EVIDENCE-BASED ANSWER

We found no evidence for changed outcomes from early detection of renal artery stenosis (RAS). Treatment of RAS in refractory hypertension modestly improves blood pressure control. There was a trend toward improved clinical outcomes but studies were underpowered to demonstrate this (strength of recommendation [SOR]: **A**, based on systematic review of RCTs).

Treatment of RAS in chronic renal impairment does not appear to improve renal function nor change clinical outcomes, but data are conflicting (SOR: **A**, based on 2 RCTs and multiple cohort studies). Subgroups of patients who have recurrent episodes of congestive heart failure or flash pulmonary edema exhibit functional improvement following percutaneous transluminal renal angioplasty (PTRA) with stent placement. (SOR: **C**, based on a retrospective cohort study).

Computed tomography (CT) angiography and magnetic resonance angiography (MRA) are the most accurate and cost-effective noninterventional diagnostic modalities for RAS (SOR: **A**, based on a large meta-analysis).

While revascularization effectively improves patency, the complication rate is high and deaths have occurred (SOR: **B**, based on randomized controlled trials [RCTs]). Patients with worse renal function tend to do more poorly (SOR: **C**, based on retrospective cohort studies). Data are insufficient to recommend a method of revascularization (surgical vs PTRA with or without stenting) (SOR: **C**, based on multiple cohort studies).

## CLINICAL COMMENTARY

**When herding hypertensives, treat them all like**

## horses, not zebras

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“When you hear hoofbeats, think of horses. You will occasionally see a zebra and very rarely a unicorn.” Patients who benefit from physicians looking for and treating renovascular hypertension are unicorns, not zebras. A very few patients benefit by needing fewer drugs, while a few are harmed by complications of revascularization. No benefit in overall mortality, disease specific mortality or vascular morbidity (stroke, heart disease) has been demonstrated. So, the take-home message is: When herding hypertensives, treat them all like horses—you may stumble across a few zebras, but looking for benefit from discovering and treating renovascular hypertension is as fruitful as looking for unicorns—a product of imagination, myth, and hope, not based in reality. Based on this Clinical Inquiry, I will stop feeling guilty about not searching diligently for renovascular causes of “curable hypertension.”

### ■ EVIDENCE SUMMARY

“Early” diagnosis of renovascular hypertension is best defined as diagnosis while blood pressure is controlled by medications or when renal function remains normal.

**Hypertension.** A meta-analysis (3 RCTs, total n=210 patients) examining balloon angioplasty for RAS and poorly controlled hypertension showed modest but significant effect on blood pressure control.<sup>1</sup> Comparing the angioplasty group with medical management, the mean reduction in blood pressure was  $-7$  mm Hg systolic (95% confidence interval [CI],  $-12$  to  $-1$ ) and  $-3$  mm Hg diastolic (95% CI,  $-6$  to  $-1$ ). Patients treated with balloon angioplasty were more likely to use fewer antihypertensive medications (unable to synthesize data for quantity) and to have fewer major cardiovascular and renovascular complications (not defined specifically) (odds ratio [OR]=0.27; 95% CI, 0.06–1.23;  $P=.09$ ).<sup>1</sup> One cohort study of 150 patients found that stenting bilateral (vs unilateral) RAS predicted a more beneficial blood pressure response (OR=4.6;  $P=.009$ ).<sup>2</sup>

**Renal impairment.** The value of RAS intervention for patients with hypertension and worsening renal function is unclear. One RCT of 106 patients with atherosclerotic RAS and serum creatinine (Cr) of  $<2.3$  mg/dL compared PTRAs with medical therapy of hypertension. By an intention-to-treat analysis, there was no significant difference in renal function at 12 months between the groups.<sup>3</sup> A nonblinded RCT of 85 patients found no change in mortality or renal function with intervention. Three groups were compared: observation of 52 patients with unilateral RAS ( $>50\%$ ), intervention on 12 patients with bilateral RAS, and observation of 21 patients with bilateral RAS. All groups reported 32% mortality at 2 years. Only 3 of the 27 deaths were directly related to renal disease (2 from the observation group with unilateral RAS and one from the intervention group).<sup>4</sup> Cohort studies, using different measures of renal function, report improvement, stabilization, or worsening following intervention.<sup>5-7</sup>

### **Congestive heart failure and flash pulmonary edema.**

Patients who have recurrent episodes of congestive heart failure or flash pulmonary edema with severe RAS have marked functional improvement following PTRAs with stenting. One retrospective cohort study (n=39) reported a

decrease in hospitalizations (from 2.4 ±1.4 per year to 0.3 ±0.7 per year;  $P<.001$ ) and improvement in New York Heart Association heart failure functional classification (2.9 ±0.9 to 1.6 ±0.9).<sup>8</sup>

**Diagnosis.** MRA (sensitivity 99%, specificity 93%) and CT angiography (sensitivity 97%, specificity 95%) are the most accurate and cost-effective, based on a large meta-analysis.<sup>9</sup>

**Complications.** Serious or potentially serious complications (ie, bleeding, renal artery injury, need for hemodialysis) were seen in 13% to 25% of patients who underwent angioplasty.<sup>2,5,7</sup> Combining 3 studies (n=632), there were 5 procedure-related deaths.<sup>5,7,10</sup>

Worsened patient survival correlated with Cr >1.7 mg/dL or age >70 (OR=9.96,  $P<.0001$  and OR=3.4,  $P=.001$ , respectively). Worsened renal survival was present in the same subgroups (OR=7.8,  $P<.001$  and OR=2.7,  $P<.01$ , respectively).<sup>7</sup>

### **Recommendations from others**

The American Heart Association lists 3 clinical criteria for revascularization: 1) hypertension (accelerated, refractory, or malignant), 2) renal salvage, 3) cardiac disturbance syndromes (recurrent “flash” pulmonary edema or unstable angina with significant RAS).<sup>11</sup> JNC 7 does not recommend looking for RAS unless hypertension is uncontrollable.<sup>12</sup>

The Society of Nuclear Medicine recommends that only moderate- to high-risk individuals be screened for RAS. This guideline clarifies that RAS does not equal renovascular hypertension and that the future “gold standard” diagnosis of renovascular hypertension should be the response to successful revascularization.<sup>13</sup>

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### **FAST TRACK**

**Only patients with CHF or flash pulmonary edema clearly benefit from stenting**

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