

Noninvasive Carotid Imaging Can Replace Invasive Imaging

■ **CLINICAL QUESTION:** Can noninvasive imaging replace invasive testing in patients with suspected carotid artery disease?

■ **BOTTOM LINE:** Noninvasive testing, especially contrast-enhanced magnetic resonance angiography (CEMRA), compares very favorably with invasive angiography. Since noninvasive testing appears to be less accurate in patients with less severe stenosis, a reasonable strategy might begin with CEMRA. If CEMRA demonstrates a greater than 70% stenosis, the diagnosis is settled. If the stenosis appears to be less than 70%, invasive angiography might be considered. Of course, this diagnostic approach needs formal evaluation. (LOE = 1a-).

■ **REFERENCE:** Wardlaw JM, Chappell FM, Best JJ, Wartolowska K, Berry E; NHS Research and Development Health Technology Assessment Carotid Stenosis Imaging Group. Non-invasive imaging compared with intra-arterial angiography in the diagnosis of symptomatic carotid stenosis: a meta-analysis. *Lancet* 2006; 367:1503-1512.

■ **STUDY DESIGN:** Systematic review

■ **FUNDING:** Government

■ **SETTING:** Various (meta-analysis)

■ **SYNOPSIS:** Two members of this research team searched MEDLINE and EMBASE and hand-searched several journals to identify 41 prospective studies of at least 20 patients with suspected carotid artery disease who underwent 1 or more noninvasive test and invasive angiography. Any disagreements were settled by discussion with a third reviewer. Similarly, 2 reviewers extracted the data and discrepancies were arbitrated by a third reviewer. The identified studies included a total of 2541 patients. Overall, CEMRA generally performed best, although computed tomographic angiography, magnetic resonance angiography, and Doppler ultrasound also performed well. The authors found some variability in test performance, mainly due to differences in accuracy on the basis of the degree of stenosis. Nonetheless, depending on the degree of stenosis, CEMRA provided the most diagnostic information (positive likelihood ratio ranged from 13 to 26 and negative likelihood ratio from 0.04 to 0.24). Generally speaking, the noninvasive tests were not as accurate in patients with moderate stenosis (50%-69%). Since this group also has a narrow surgical risk-benefit margin, diagnostic certainty is critical. Finally, CEMRA results may be biased because of small study sizes and, as a new technology, the potential for reporting overly positive studies. Stay tuned.