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Carotid Vascular Disease: Intervention vs Medical Treatment?

Many patients are evaluated for carotid vascular disease with a carotid arterial Doppler study even though there are no guidelines recommending carotid screening in patients without cerebral vascular disease (history of stroke or transient ischemic attack). This *Heartbeat* will present data and expert opinion that “argue for intensified medical management rather than revascularization procedures in patients with asymptomatic carotid stenosis (ACS)”. We will then go a step further and recommend not ordering the carotid Doppler study if it isn’t going to change management.

Family practitioners, cardiologists and vascular surgeons frequently order studies in patients with coronary artery disease or in patients with asymptomatic carotid bruits. Many physicians *inappropriately* order a carotid Doppler study as part of a syncope evaluation (carotid artery stenosis does not present with this symptom).

The purpose of carotid ultrasound studies is to screen for significant stenosis (> 70 %). Then either CAT or MRA angiography is performed to more accurately document and determine degree of stenosis before a surgical revascularization (carotid endarterectomy [CEA] or carotid stenting) procedure is performed. Many of these patients end up with a procedure that carries immediate risk. But *what if* optimal medical treatment (OMT) is just as good as surgical

intervention? Would or should that alter management and studies ordered?

Older Studies show benefit of CEA over OMT

Two large randomized trials (including almost 4800 patients) compared CEA with medical therapy. In both trials (North American study published in 1995¹ and a European trial published in 2004²) the 5-year risk for stroke (including perioperative stroke or death) was significantly lower with CEA than with medical therapy, but the difference was only about 5 percentage points (5%–6% vs. 11%–12%). Given the 2%–3% rate of perioperative stroke or death, it took several years for the benefit of CEA to clearly surpass that of medical therapy.

Benefits were not seen in women³. The authors conclude that OMT is the cornerstone of management in ACS and that absolute benefit from CEA for ACS is small, but can sometimes be justified in men. Further research is required to determine long-term benefit in women and to risk stratify patients, particularly in the light of advances in medical treatment.

Recent Improvement in Medical Therapy

Because medical therapy has improved (especially the wide use of statins, angiotensin blockade and aspirin for secondary prevention) since the older trials

were conducted, researchers have reevaluated whether stroke rates in patients with ACS have declined during the past decade. Indeed, **stroke rates have fallen to around 1% annually in optimally medically treated patients.**^{4 5} The systemic review concludes that medical intervention alone is now best for stroke prevention associated with asymptomatic severe carotid stenosis given this new evidence, other cardiovascular benefits, and because high-risk patients who benefit from additional carotid revascularization cannot be identified.

Based on this information, current thinking on ACS should change. **Intensified medical management rather than revascularization is the treatment of choice in patients with ACS** until strategies to identify high-risk patients have been thoroughly investigated.⁶

Cost effective Strategy

The obvious next question is whether ordering carotid Doppler and other subsequent imaging modalities to identify ACS makes any sense if they do not change management or improve outcomes.

Sophisticated Ultrasound Measurements

Recently, researchers have proposed several imaging findings in patients with ACS that might identify high-risk subgroups — plaque echolucency (i.e. unstable with lipid-rich cores), plaque ulceration (using 3D ultrasound), and embolic signals on transcranial Doppler ultrasound of the ipsilateral middle cerebral artery. Small studies show promising results but require larger studies and assurance that the techniques can be performed and are reliable in our local community settings.^{7 8}

The most striking aspect of these two small studies is their confirmation of a very low overall incidence of stroke — about 1% annually. Thus, many asymptomatic patients who now undergo CEA (or carotid stenting, which is not safer than CEA) are likely risking harm without commensurate benefit.

Conclusion:

OMT: Better...safer...cheaper. For now forget the carotid Doppler and interventions.

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¹ Executive Committee for the Asymptomatic Carotid Atherosclerosis Study. Endarterectomy for asymptomatic carotid artery stenosis. *JAMA* May 10 1995; 273:1421.

² Halliday A et al. Prevention of disabling and fatal strokes by successful carotid endarterectomy in patients without recent neurological symptoms: Randomised controlled trial. *Lancet* May 8 2004; 363:1491.

³ Redgrave JN and Rothwell PM. Asymptomatic carotid stenosis: What to do. *Curr Opin Neurol* February 2007; 20:58.

⁴ Marquardt L et al. Low risk of ipsilateral stroke in patients with asymptomatic carotid stenosis on best medical treatment: A prospective, population-based study. *Stroke* January 2010; 41:e11.

⁵ Abbott AL. Medical (nonsurgical) intervention alone is now best for prevention of stroke associated with asymptomatic severe carotid stenosis: Results of a systematic review and analysis. *Stroke* October 2009; 40:e573.

⁶ Marquardt L and Barnett HJM. Carotid stenosis: To revascularize, or not to revascularize. *Neurology* August 23 2011; 77:710-712.

⁷ Topkian R et al. Ultrasonic plaque echolucency and emboli signals predict stroke in asymptomatic carotid stenosis. *Neurology* August 23 2011; 77:751-758.

⁸ Madani A et al. High-risk asymptomatic carotid stenosis: Ulceration on 3D ultrasound vs TCD microemboli. *Neurology* 2011 Aug 23; 77:744-750.

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