Percutaneous Transluminal Angioplasty and Stenting for Vertebral Artery Stenosis

Lucy J. Coward, MRCP; Roland L. Featherstone, PhD; Martin M. Brown, MD, FRCP

As many as 25% of ischemic strokes occur in the vertebrobasilar region.\textsuperscript{1,2} Data on the prognosis of transient ischemic attack and minor stroke from a systematic review has shown that patients with posterior circulation events have a higher risk of subsequent stroke or death in the acute phase (up to 7 days after presenting symptoms) compared with patients who present with anterior circulation symptoms.\textsuperscript{3} Despite this, much less is known about the natural history of vertebral artery stenosis compared with carotid artery stenosis. Surgery for vertebral artery stenosis is technically difficult, potentially hazardous, and is not considered in most centers. Therefore, vertebral artery stenosis has traditionally been treated conservatively with medical care alone. Nonrandomized case series evidence suggests that vertebral artery stenosis may be treated endovascularly by percutaneous transluminal angioplasty (PTA) and/or stenting,\textsuperscript{4–8} potentially offering an alternative to surgery to relieve symptoms caused by significant stenosis.

Objectives
We wished to assess the safety and efficacy of vertebral artery PTA, with or without stenting, combined with medical care, compared with medical care alone, in patients with vertebral artery stenosis.

Search Strategy
We searched the trial register of the Cochrane Stroke Group, the Cochrane Central Register of Controlled Trials, MEDLINE (1966 to 2004), EMBASE (1980 to 2004), and Science Citation Index (1981 to 2004). We also contacted researchers in the field, as well as balloon catheter and stent manufacturers.

Selection Criteria
We sought to identify truly randomized trials comparing any type of endovascular intervention combined with best medical therapy, or best medical therapy alone, in patients with symptomatic or asymptomatic vertebral artery stenosis. Two reviewers independently applied the inclusion criteria, extracted data, and assessed trial quality.

Main Results
Only 1 completed, randomized trial fulfilling the inclusion criteria was found within the Carotid and Vertebral Artery Transluminal Angioplasty Study (CAVATAS).\textsuperscript{9} This is an international multicenter study in which long-term follow-up is ongoing. In the vertebral stenosis trial within CAVATAS, 16 patients with symptomatic, severe vertebral artery stenosis were randomized to endovascular treatment ($n=8$) or medical treatment alone ($n=8$). The mean time from symptom onset to randomization was 92 days (range, 5 to 376 days). Endovascular treatment was technically successful in all 8 patients but was complicated by posterior circulation transient ischemic attack in 2 patients. There were no strokes in any arterial territory or deaths from any cause in either group within 30 days of randomization or treatment. In the endovascular group, the mean vessel stenosis at follow-up was 47% (range, 0% to 80%). Patients were followed-up for a mean of 4.5 years in the endovascular group and 4.9 years in the medical group, and there were no further vertebrobasilar territory strokes in either group during this time. Morbidity and mortality was related to carotid and coronary artery disease in this trial within CAVATAS.

Implications for Practice
The potential benefits of endovascular intervention could not be assessed from these data. There is currently insufficient evidence from randomized trials to support the routine use of PTA or stenting for vertebral artery stenosis.

Implications for Research
Endovascular treatment of vertebral artery stenosis should be performed only within the context of randomized controlled trials. Future trials should seek to establish what constitutes best medical treatment for vertebral artery stenosis, as well as comparing endovascular intervention with medical treatment.
References

Key Words: angioplasty | prevention | stenosis | stent | vertebral artery
Percutaneous Transluminal Angioplasty and Stenting for Vertebral Artery Stenosis
Graeme J. Hankey, Lucy J. Coward, Roland L. Featherstone and Martin M. Brown

Stroke. 2005;36:2047-2048; originally published online August 18, 2005;
doi: 10.1161/01.STR.0000176586.43385.c5

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://stroke.ahajournals.org/content/36/9/2047

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published in Stroke can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial Office. Once the online version of the published article for which permission is being requested is located, click Request Permissions in the middle column of the Web page under Services. Further information about this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Stroke is online at:
http://stroke.ahajournals.org/subscriptions/