


Guidelines at a Glance

Recommendations for the Prevention of Secondary Stroke in Patients With Transient Ischemic Attack (TIA) or Ischemic Stroke





Prevention of Secondary Stroke in Patients With TIA and Ischemic Stroke

Stroke is a complicated disease that exacts a heavy burden on the patient, the caregivers, and the healthcare system. It is the third-leading cause of death in the United States, with more than 700,000 strokes occurring annually, including 200,000 secondary attacks.¹ The consequences of stroke are often life-altering, leaving about 20% of survivors in need of institutional care and permanently disabling up to 30% of survivors.² The economic burden of stroke is no less devastating, with a total cost estimate of \$62.7 billion for 2007 alone.³

Managing risk factors, implementing appropriate lifestyle changes, and employing decisive interventions—including surgery, antithrombotics, and antiplatelet agents—will help to decrease TIA and stroke recurrence and reduce the burden of this disease.⁴

Management of Hypertension

Antihypertensive therapy has been shown to reduce stroke by up to 40%.⁴ Stroke prevention recommendations regarding blood pressure (BP) control^{2,4} are similar to those found in *The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7)*:

- Regular screening
 - Every 2 years for adults
 - More frequent screening in minority and elderly patients
- Appropriate management
 - Dietary and lifestyle modification (see Lifestyle Modifications section on page 5)
 - Pharmacological therapy as outlined in Table 1

Table 1. Classification and Treatment of Blood Pressure (JNC 7)²

Classification	Systolic BP, mm Hg		Diastolic BP, mm Hg	No Compelling Indication ^a	With Compelling Indication ^a
Normal	<120	and	<80	No BP drug	No BP drug
Prehypertension	120-139	or	80-89	No BP drug	Drugs for compelling indication
Stage 1 Hypertension	140-159	or	90-99	Thiazide-type diuretics for most. May consider ACEIs, ARBs, β -blockers, calcium channel blockers, or combination	Drugs for compelling indication. Other drugs (diuretics, ACEIs, ARBs, β -blockers, calcium channel blockers) as needed
Stage 2 Hypertension	≥ 160	or	≥ 100	Two-drug combination for most ^b (usually thiazide-type diuretic and ACEI or ARB or β -blocker or calcium channel blocker)	Drugs for compelling indications. Other drugs (diuretics, ACEIs, ARBs, β -blockers, calcium channel blockers) as needed

^a Dietary and lifestyle changes listed under the Lifestyle Modifications section on page 5 are recommended for all. Also included are recommendations to reduce sodium intake (<2.34 g) and for adequate potassium intake (>120 mmol/d). Compelling indications include congestive heart failure, myocardial infarction, diabetes, chronic renal failure, and prior stroke.

^b Initial combined therapy should be used cautiously in those at risk for orthostatic hypotension.

ACEI = Angiotensin-converting enzyme inhibitor.

ARB = Angiotensin receptor blocker.

Adapted from Goldstein LB, *Stroke*. 2006;37:1583-1633..

Management of Diabetes

There are 20.8 million people estimated to have diabetes in the U.S., with 30% currently undiagnosed.⁵ Review of the correlation between diabetes and stroke confirms that diabetes is a risk factor.⁴ Moreover, diabetes is a risk factor for heart disease, which compounds the risk of stroke, underscoring the importance of effective management.⁷ Current recommendations for the reduction of stroke risk in patients with diabetes include^{2,4}

- Dietary and lifestyle modifications (see page 5)
- Glucose control to achieve near-normal glycemic levels
 - Hemoglobin A_{1c} levels <7%⁷
- Rigorous control of BP
 - <130/80 mm Hg according to JNC 7⁸
- Rigorous control of lipids

Management of Lipid Levels

While cholesterol levels have been only weakly associated with risk of ischemic stroke, new research shows that statin agents may reduce the occurrence of stroke in patients with coronary heart disease by 27% to 31%.^{4,8} Patients with ischemic stroke or TIA should be managed according to the National Cholesterol Education Program III guidelines, which include dietary and lifestyle modifications (see next section), as well as medication.^{2,4}

- Statins are recommended for cholesterol reduction
- The goal for patients with coronary heart disease or symptomatic atherosclerotic disease is LDL-C of <100 mg/dL
- The goal for very-high-risk patients with multiple risk factors is LDL-C of <70 mg/dL
- Statins are recommended in patients with ischemic stroke or TIA presumed to be of atherosclerotic origin in the absence of preexisting indications (normal cholesterol, absence of coronary artery disease, no evidence of atherosclerosis)
- Niacin or gemfibrozil may be considered in patients with ischemic stroke or TIA with low HDL

Lifestyle Modifications

Dietary and lifestyle modifications are specifically recommended throughout stroke prevention literature, as well as by *The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7)*. The following modifications should be implemented in patients who have experienced TIA or ischemic stroke^{4,6}:

- Weight reduction, if overweight
 - Body mass index of 18.5 to 24.9 kg/m²
 - Waist circumference <35 inches for women and <40 inches for men
- Reduced alcohol intake
 - ≤2 drinks per day for men
 - 1 drink per day for nonpregnant women
- 30 minutes of aerobic exercise most days
- Smoking cessation
- Diet rich in fruits, vegetables, and low-fat dairy products, and low in saturated fat and total fat

Additional Risk Factors for Stroke⁴

Cardiovascular

- Acute myocardial infarction
- Atrial fibrillation
- Cardiomyopathy
- Carotid stenosis
- Extracranial vertebral artery stenosis
- Intracranial atherosclerosis
- Valvular heart disease

General

- Alcohol consumption
- Cigarette smoking
 - Women who smoke and use oral contraceptives have an increased risk for stroke²
- Obesity
- Physical inactivity

Medical Intervention

Survivors of TIA or ischemic stroke are at increased risk of having another attack.⁴ Nearly 30% of all reported strokes are secondary events.¹ Several interventions are available to physicians to help reduce the risk of stroke to the patient. Following are recommendations for pharmacologic treatment within specified patient types.



The Following Are Resources for Pharmacologic Treatment of Stroke and TIA

The American Stroke Association.

www.strokeassociation.org

Sacco RL, Adams R, Albers G, et al. Guidelines for prevention of stroke in patients with ischemic stroke or transient ischemic attack: a statement for healthcare professionals from the American Heart Association/American Stroke Association Council on Stroke: co-sponsored by the Council on Cardiovascular Radiology and Intervention. *Stroke*. 2006;37:577-617.

<http://stroke.ahajournals.org/cgi/content/full/37/2/577>

Goldstein LB, Adams R, Alberts MJ, et al. Primary prevention of ischemic stroke: a guideline from the American Heart Association/American Stroke Association Stroke Council: cosponsored by the Atherosclerotic Peripheral Vascular Disease Interdisciplinary Working Group; Cardiovascular Nursing Council; Clinical Cardiology Council; Nutrition, Physical Activity, and Metabolism Council; and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Stroke*. 2006;37:1583-1633.

<http://stroke.ahajournals.org/cgi/content/full/37/6/1583>

Adams HP Jr, del Zoppo G, Alberts MJ, et al. Guidelines for the early management of adults with ischemic stroke: a guideline from the American Heart Association/American Stroke Association Stroke Council, Clinical Cardiology Council, Cardiovascular Radiology and Intervention Council, and the Atherosclerotic Peripheral Vascular Disease and Quality of Care Outcomes in Research Interdisciplinary Working Groups. *Stroke*. 2007;38:1655-1711.

<http://stroke.ahajournals.org/cgi/content/full/38/5/1655>

Table 2. Recommendations for Patients With Cardioembolic Stroke Types⁴

Risk Factor	Recommendation
Valvular heart disease	
Rheumatic mitral valve disease	<p>For patients with ischemic stroke or TIA who have rheumatic mitral valve disease, whether or not AF is present, long-term warfarin therapy is reasonable, with a target INR^a of 2.5 (range, 2.0-3.0).</p> <p>Antiplatelet agents should not be routinely added to warfarin in the interest of avoiding additional bleeding risk.</p> <p>For ischemic stroke or TIA patients with rheumatic mitral valve disease, whether or not AF is present, who have a recurrent embolism while receiving warfarin, adding aspirin (81 mg/d) is suggested.</p>
Mitral valve prolapse (MVP)	<p>For patients with MVP who have ischemic stroke or TIAs, long-term antiplatelet therapy is reasonable.</p>
Mitral annular calcification (MAC)	<p>For patients with ischemic stroke or TIA and MAC not documented to be calcific, antiplatelet therapy may be considered.</p> <p>Among patients with mitral regurgitation resulting from MAC without AF, antiplatelet or warfarin therapy may be considered.</p>
Aortic valve disease	<p>For patients with ischemic stroke or TIA and aortic valve disease who do not have AF, antiplatelet therapy may be considered.</p>
Prosthetic heart valves	<p>For patients with ischemic stroke or TIA who have modern mechanical prosthetic heart valves, oral anticoagulants are recommended, with an INR target of 3.0 (range, 2.5-3.5).</p> <p>For patients with mechanical prosthetic heart valves who have an ischemic stroke or systemic embolism despite adequate therapy with oral anticoagulants, aspirin 75 mg/d to 100 mg/d, in addition to oral anticoagulants, and maintenance of the INR at a target of 3.0 (range, 2.5-3.5) is reasonable.</p> <p>For patients with ischemic stroke or TIA who have bioprosthetic heart valves with no other source of thromboembolism, anticoagulation with warfarin (INR, 2.0-3.0) may be considered.</p>


Risk Factor	Recommendation
Atrial fibrillation (AF)	<p>For patients with ischemic stroke or TIA with persistent or paroxysmal (intermittent) AF, anticoagulation with adjusted-dose warfarin (target INR, 2.5; range, 2.0-3.0) is recommended.</p> <p>In patients unable to take oral anticoagulants, aspirin 325 mg/d is recommended.</p>
Acute myocardial infarction (MI) and left ventricular (LV) thrombus	<p>For patients with an ischemic stroke caused by an acute MI in whom LV mural thrombus is identified by echocardiography or another form of cardiac imaging, oral anticoagulation is reasonable, aiming for an INR of 2.0 to 3.0 for at least 3 months and up to 1 year.</p> <p>Aspirin should be used concurrently for the ischemic coronary artery disease patient during oral anti-coagulant therapy in doses up to 162 mg/d, preferably in the enteric-coated form.</p>
Cardiomyopathy	<p>For patients with ischemic stroke or TIA who have dilated cardiomyopathy, either warfarin (INR, 2.0-3.0) or antiplatelet therapy may be considered for prevention of secondary events.</p>

^aINR = International normalized ratio.

Reprinted with permission from Sacco RL. *Stroke*. 2006;37:577-617.

Surgical Options

In addition to medical therapy, surgeries are indicated within specific degrees of disease. For example, carotid endarterectomy is recommended in patients with recent TIA or ischemic stroke and symptomatic carotid stenosis >50% (depending on age, gender, comorbidities, and symptom severity in more moderate stenosis).⁴ Carotid artery ballooning or stenting may be considered if the stenosis is difficult to access surgically.⁴ Endovascular therapy may be performed in patients having repeated vertebrobasilar TIAs or strokes despite medical therapy.⁴



References: **1.** American Heart Association. *Heart Disease and Stroke Statistics—2007 Update*. Dallas, TX: American Heart Association; 2007:1-40. **2.** Goldstein LB, Adams R, Alberts MJ, et al. Primary prevention of ischemic stroke: a guideline from the American Heart Association/American Stroke Association Stroke Council: cosponsored by the Atherosclerotic Peripheral Vascular Disease Interdisciplinary Working Group; Cardiovascular Nursing Council; Clinical Cardiology Council; Nutrition, Physical Activity, and Metabolism Council; and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Stroke*. 2006;37:1583-1633. **3.** National Heart, Lung, and Blood Institute. *Morbidity & Mortality: 2007 chart book on cardiovascular, lung, and blood diseases*. June 2007. U.S. Department of Health and Human Services, National Institutes of Health; 2007. www.nhlbi.nih.gov/resources/docs/cht-book.htm. Accessed November 6, 2007. **4.** Sacco RL, Adams R, Albers G, et al. Guidelines for prevention of stroke in patients with ischemic stroke or transient ischemic attack: a statement for healthcare professionals from the American Heart Association/American Stroke Association Council on Stroke: co-sponsored by the Council on Cardiovascular Radiology and Intervention. *Stroke*. 2006;37:577-617. **5.** National Diabetes Information Clearinghouse (NDIC). National diabetes statistics: total prevalence of diabetes in the United States, all ages, 2005. <http://diabetes.niddk.nih.gov/dm/pubs/statistics/>. Accessed October 29, 2007. **6.** U.S. Department of Health and Human Services. Complete report: *The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure*. NIH Publication No. 04-5230; August 2004. **7.** American Diabetes Association. Standards of medical care in diabetes—2007. *Diabetes Care*. 2007;30(suppl 1):S4-S41. **8.** American Heart Association. Third report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) final report. *Circulation*. 2002;106:3143-3421. <http://circ.ahajournals.org/cgi/content/full/106/25/3143>.



Boehringer Ingelheim Pharmaceuticals, Inc. has no ownership interest in any other organization that advertises or markets its disease management products and services.

*A healthcare practitioner educational resource provided by
Boehringer Ingelheim Pharmaceuticals, Inc.*



**Boehringer
Ingelheim**



STRATEGIES *for*
CHRONIC CARE™

♻️ Printed on recycled paper in the U.S.A.
Copyright © 2008, Boehringer Ingelheim Pharmaceuticals, Inc.
All rights reserved. (01/08) DM50036

BI24213