Secondary Prevention of Ischemic Stroke and TIA

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Expected Benefits of Primary Stroke Centers

• Improved efficiency of patient care
• Increased use of acute stroke therapies
• Fewer peristroke complications
• Reduced morbidity and mortality
• Improved long-term outcomes
• Reduced costs to health care system
• Increased patient satisfaction
Outcomes After Ischemic Stroke

**Stroke Recurrence**
- 30 day: 3%-10%
- 1 year: 5%-14%
- 5 year: 25%-40%

**Mortality**
- 30 day: 8%-20%
- 1 year: 15%-25%
- 5 year: 40%-60%

**Functional Disability**
- 24%-53% of stroke survivors with complete or partial dependence

**Quality of Life**
- 27% decrement in mean quality of well-being score at 6 months

**Dementia or Cognitive Decline**
- 34% at 52 weeks poststroke

Sacco RL. *Neurology*. 1997;49(suppl 4):S39-S44.
3-Month Outcomes After TIA in ED


Event Rate

- Stroke: 10.5%
- Recurrent TIA: 12.7%
- Cardiac Event: 2.6%
- Death: 2.6%

5% in 48 h
Evidence-based Guidelines

AHA/ASA Guideline

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

The American Academy of Neurology affirms the value of this guideline.

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AHA Classes and Levels of Evidence

• **Class I** Agreement the treatment is useful and effective

• **Class II** Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a treatment.
  – **Class IIa** Weight of evidence is in favor of the treatment.
  – **Class IIb** Usefulness/efficacy is less well established by evidence

• **Class III** Evidence and/or general agreement that the treatment is NOT useful/effective and in some cases may be harmful.

• **Levels of Evidence**
  - **A**: Data derived from multiple randomized trials.
  - **B**: Data derived from a single randomized trial or nonrandomized studies.
  - **C**: Consensus opinion of experts.
Secondary Stroke Prevention

- Risk Factor Control
  - BP, Blood glucose, Cholesterol
- Lifestyle modifications
  - Smoking cessation, alcohol reduction
  - Weight control, physical activity
- Re-vascularization procedures: ICAE and CAS
- Antithrombotic Treatments
  - Anticoagulants
  - Antiplatelet therapy
Blood Pressure Control
ASA 2006 Secondary Stroke Recs

• **Antihypertensives** are recommended beyond the hyperacute period (Class I, Evidence A).
  – Benefit for those with & w/o HTN (Class IIa, Evidence B)
  – Target BP level and reduction are uncertain, but normal BP levels are <120/80 by JNC-7 (Class IIa, Evidence B).

• **Lifestyle modifications** have been associated with BP reductions and should be included (Class IIb, Evidence C).

• **Optimal drug regimen** uncertain; data support diuretics and the combination of diuretics and an ACEI (Class I, Evidence A).
More rigorous control of HTN and dyslipidemia should be considered in patients with DM.

- BP targets of 130/80 mm Hg (Class IIa, Evidence B). ACEIs and ARBs are recommended as first-choice medications for patients with DM (Class I, Evidence A).

Glucose control is recommended to near normoglycemic levels to reduce microvascular complications (Class I, Evidence A) and possibly macrovascular complications.

Hemoglobin A1c goal <7% (Class IIa, Evidence B).
Cholesterol Control
ASA 2006 Secondary Stroke Recs

• Those with elevated chol, CHD, or evidence of an atherosclerotic origin should be managed according to NCEP III (Class I, Evidence A).

• **Statins** are recommended with target LDL-C of <100 mg/dL and <70 mg/dL for the very high–risk (Class I, Evidence A).

• Those with no pre-existing indications for statins (nl chol levels, no CHD, or no atherosclerosis), are reasonable to consider for statins to reduce the risk of vascular events (Class IIa, Evidence B).
Undertreatment of Stroke Risk Factors: Low Rate of In-Hospital Lipid Profiling

Percent of eligible patients with lipid profile

<table>
<thead>
<tr>
<th>State</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA</td>
<td>35.4</td>
</tr>
<tr>
<td>MA</td>
<td>57.4</td>
</tr>
<tr>
<td>MI</td>
<td>45.8</td>
</tr>
<tr>
<td>OH</td>
<td>33.4</td>
</tr>
<tr>
<td>Total</td>
<td>41.5</td>
</tr>
</tbody>
</table>

Lifestyle Issues
ASA 2006 Secondary Stroke Recs

- Cigarette Smoking
- Alcohol Use
- Physical Inactivity
- Obesity
Smoking Cessation: Insufficient Counseling

Percent of eligible patients given counseling predischarge

NORTHERN MANHATTAN STROKE STUDY

Ischemic Stroke Subtypes

- **CRYPTOGENIC**: 36%
- **LACUNAR**: 26%
- **CARDIOEMBOLIC**: 19%
- **INTRACRANIAL**: 8%
- **EXTRACRANIAL**: 8%
- **OTHER**: 3%
Carotid Endarterectomy
ASA 2006 Secondary Stroke Recs

- Ipsilateral severe (70% to 99%) carotid stenosis, CEA is recommended (Class I, Evidence A).

- Ipsilateral moderate (50% to 69%) carotid stenosis, CEA is recommended depending age, gender, comorbidities, and the severity of symptoms (Class I, Evidence A).

- Stenosis < 50%, there is no indication for CEA (Class III, Evidence A).

- Surgery within 2 weeks is suggested rather than delaying surgery (Class IIa, Evidence B).
Carotid Angioplasty and Stenting
ASA 2006 Secondary Stroke Recs

• **CAS may be considered** (Class IIb, Evidence B)
  – Stenosis (>70%) difficult to access surgically,
  – medical conditions that greatly increase the risk for surgery, or
  – when other circumstances exist such as radiation-induced stenosis or restenosis after CEA.

• **CAS is reasonable when performed by operators with morbidity and mortality rates of 4% to 6%** (Class IIa, Evidence B).
Endovascular treatment for extracranial vertebral stenosis may be considered when patients are having symptoms despite medical therapies (antithrombotics, statins, and other treatments for risk factors) (Class IIb, Level of Evidence C).

For patients with hemodynamically significant intracranial stenosis who have symptoms despite medical therapies, the usefulness of endovascular therapy is uncertain and is considered investigational (Class IIb, Level of Evidence C).
Evaluation of the Vascular System

- Atrial fibrillation
- Valve disease
- Cardiogenic emboli
- Left ventricular thrombi

Atrial Fibrillation
ASA 2006 Secondary Stroke Recs

• 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 to 3.0) is recommended (Class I, Evidence A).

• For patients unable to take oral anticoagulants, aspirin 325 mg per day is recommended (Class I Evidence A).

Other Cardiac Conditions
ASA 2006 Recommendations

- **Warfarin**
  - LV Thrombus
  - Rheumatic Mitral Valve Disease
  - Prosthetic Valves
- **Warfarin or Antiplatelets**
  - Dilated Cardiomyopathy
- **Antiplatelets**
  - Mitral Valve Prolapse
  - Mitral Annular Calcification
  - Aortic Valve Disease

Ischemic Stroke Prevention
Non-cardioembolic Stroke

Patient after stroke or TIA

Noncardioembolic stroke

Carotid stenosis
stenosis < 60%

Non-operable atherosclerosis

Lacunar infarction

Cryptogenic stroke

Antiplatelet therapy
For patients with noncardioembolic ischemic stroke or TIA, antiplatelet agents are recommended rather than oral anticoagulation to reduce the risk of recurrent stroke and other cardiovascular events (Class I, Evidence A).
Stroke Prevention - Non-cardioembolic
ASA 2006 Recommendations

• Acceptable options for initial therapy (Class IIa, Level of Evidence A).
  – aspirin (50-325 mg qd)
  – the combination of aspirin and extended-release dipyridamole (25/200 mg bid)
  – clopidogrel (75 mg qd)
Antiplatelets
ASA 2006 Secondary Stroke Recs

• Compared to aspirin alone, both the combination of aspirin and extended-release dipyridamole and clopidogrel are safe.

• The combination of aspirin and extended-release dipyridamole is suggested over aspirin alone. [Class IIa, Level A]

• Clopidogrel is suggested over aspirin alone based on direct comparison trials. [Class IIb, Level B]
• The addition of aspirin to clopidogrel increases the risk of hemorrhage and is not routinely recommended for stroke or TIA patients. [Class III, Level A]

• For patients allergic to aspirin, clopidogrel is recommended. [Class IIa, Level B]
Insufficient data are available to make evidence-based recommendations regarding choices between antiplatelet options other than aspirin. Selection of an antiplatelet agent should be individualized based on patient risk factor profiles, tolerance, and other clinical characteristics.
Other Circumstances
ASA 2006 Secondary Stroke Recs

- Dissections
- PFO and Hyperhomocystinemia
- Hypercoagulable states
- Sickle Cell Disease
- Cerebral Venous Thrombosis
- Stroke and Pregnancy
- Post-menopausal hormone therapy
- Anticoagulation after cerebral hemorrhage
GWTG-Stroke
2005 ASA International Stroke Abstract Presentations
Measuring Secondary Prevention

- Smoking Cessation Counseling
- Lipid and Cholesterol Lowering Therapy
- Anti-thrombotics
- Weight and Exercise Management
- Atrial Fibrillation Management
- Diabetes Management
Table B: Get With The Guidelines—Stroke Produces Sustainable Improvements in Hospital-Based Acute Stroke Care
Prevention of Stroke among TIA and Stroke Survivors

- Stroke and TIA patients have a high risk of recurrence that begins early after an event.
- BP, blood glucose, and cholesterol need aggressive treatment with lifestyle modifications and medications.
- Surgery, angioplasty, oral anticoagulants and antiplatelet decisions depend on the stroke diagnostic subtype.
- Evidence-based approaches for secondary stroke prevention need to begin during the acute hospitalization phase.