Stroke Society of the Philippines

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Guidelines for Acute Stroke Treatment

Definition of “Stroke”
- Sudden onset of focal neurological deficit lasting more than 24 hours due to an underlying vascular pathology.

1. Stroke

2. TIA & mild stroke?
   - N

3. TIA:
   - Y
   - Deficits resolved within 24 hrs incl transient blindness in one eye (transient monocular blindness)
   - N

4. Alert patients with any of the ff:
   - a. mild pure motor weakness of one side of the body defined as can raise arm above shoulder, clumsy hand, or can ambulate without assistance
   - b. pure sensory deficit
   - c. slurred speech but intelligible
   - d. vertigo with incoordination, like gait disturbance, unsteadiness, or clumsy hand
   - e. visual field defects alone
   - f. combination of (a) and (b)

5. Moderate stroke?
   - Y
   - Awake patient with significant motor &/or sensory &/or language &/or visual deficit
   - N
   - Disoriented, drowsy, or stuporous patient but with purposeful response to painful stimuli

6. See Fig. 2

7. Severe stroke
   - Comatose patient with non-purposeful response, decorticate, or decerebrate posturing to painful stimuli (appendix I)
   - Comatose patient with no response to painful stimuli

8. See Fig. 4

FIGURE 1
Guidelines for Transient Ischemic Attack (TIA) and Mild Stroke

Management Priorities
Ascertain clinical diagnosis of stroke or TIA - history & physical exam very important
• Exclude common stroke mimickers (appendix IIA and IIB)
Monitor & manage blood pressure, treat if SBP ≥220 or DBP ≥120 or MAP >130 (appendix IIIA).
Precautions:
• Avoid precipitous drop in BP >20% of baseline MAP
• Do not use rapid-acting sublingual agents; when needed use oral or easily titratable IV anti-hypertensive medications (appendix IIIB)
Ensure appropriate hydration. If IV fluid is needed, use 0.9 NaCl

Emergent Diagnostics
• Complete blood count (CBC)
• Blood sugar (CBG, HGT, or RBS)
• Electrocardiogram (ECG)
• PT/PTT (if EKG shows atrial fibrillation or possible cardio-embolic source)
• Plain CT scan of brain as soon as possible

Early Specific Treatment
(Appendix IV)

CT scan confirmed?
• No specific emergent drug treatment recommended
• Neuroprotection (appendix IVD)
• Consult a neurologist, or neurosurgeon
• Early supportive rehabilitation

FIGURE 2
Ischemic? Y > 4
Hemorrhagic N > 2
Non-cardioembolic (Thrombotic, Lacunar)? Y
Cardioembolic N
TIA
Aspirin 160-325 mg/day start as early as possible and continue for 14 days (for secondary prevention, see below under delayed management)
• Neuroprotection (appendix IVD)
• Early rehabilitation within 72 hrs.
Non-cardioembolic (Thrombotic, Lacunar)? Y
Cardioembolic N
TIA
Aspirin 160-325 mg/day start as early as possible and continue for 14 days (for secondary prevention, see below under delayed management)
• Neuroprotection (appendix IVD)
• Early rehabilitation within 72 hrs.

• Anticoagulation with IV heparin or subcutaneous low molecular weight heparin (LMWH), or
• Aspirin 160-325 mg/day (if heparin & PTT, or LMWH not available)
• Neuroprotection (appendix IVD)
• Early rehabilitation within 72 hrs.
*If infective endocarditis is suspected, give antibiotics & do not anticoagulate

Place of Treatment (Appendix VII)

Admit to Hospital (Stroke Unit)
1. Stroke onset within 48 hrs.
2. Patients requiring specific active interventions for any of the following:
   a. BP control, monitoring, and stabilization
   b. Cardiac stabilization, incl. atrial fibrillation, CHF, acute MI
   c. Hydration
   d. Anticoagulation, if bleed ruled out by CT scan
3. Rapidly worsening deficits
4. >4 TIA's in 2 weeks prior to consult
5. 1-4 TIA's in 2 weeks with high risk (multiple events within hours, increasing severity and duration of deficits, cardiac arrhythmia, carotid bruit)

Urgent Outpatient Work-up
1. Single TIA more than 2 weeks ago
2. 1-4 TIA's in 2 weeks but not high risk (no change in severity and duration of deficit, cardiac arrhythmia, carotid bruit)
3. Transient monocular blindness alone
4. Stable mild strokes occuring >48 hrs not requiring specific active intervention.

*Advise immediate re-consult if there is worsening of deficit
**Delayed Management & Treatment (Secondary Prevention)** (Appendix VIII)

1. **Delayed Management & Treatment (Secondary Prevention)** (Appendix VIII)

2. **CT scan confirmed?**
   - **Y**
   - **Ischemic?**
     - **Y**
     - **Thrombotic/Lacunar?**
       - **Y**
       - Control of risk factors (see Risk Factor section)
       - Antiplatelets (aspirin, ticlopidine, clopidogrel, dipyridamole, cilostazol)
       - Carotid ultrasound
       - If this reveals >70% stenosis, refer to neurologist for decision-making regarding carotid endarterectomy.
     - **N**
     - **Hemorrhagic**
   - **N**
   - **Cardio-embolic**

3. **Ischemic?**
   - **Y**
   - **Thrombotic/Lacunar?**
     - **Y**
     - Control of risk factors (see Risk Factor section)
     - Antiplatelets (aspirin, ticlopidine, clopidogrel, dipyridamole, cilostazol)
     - Carotid ultrasound
     - If this reveals >70% stenosis, refer to neurologist for decision-making regarding carotid endarterectomy.
   - **N**
   - **Hemorrhagic**

4. **Thrombotic/Lacunar?**
   - **Y**
   - **Control of risk factors (see Risk Factor section)**
   - Antiplatelets (aspirin, ticlopidine, clopidogrel, dipyridamole, cilostazol)
   - Carotid ultrasound
   - If this reveals >70% stenosis, refer to neurologist for decision-making regarding carotid endarterectomy.
   - **N**
   - **Hemorrhagic**

5. **CT scan not available**
   - **No specific emergent drug treatment recommended**
   - **Neuroprotection (appendix IVD)**
   - **Consult a neurologist, or neurosurgeon**
   - **Early supportive rehabilitation**

6. **Hemorrhagic**

7. **Cardio-embolic**

8. **Long-term blood pressure monitoring and treatment**
   - Consider CT angiography, MRA, or angiography in aneurysm or AVM suspects.

9. **Echocardiography and/or cardiology consult**
   - If age <75 and PT/INR available, anticoagulation with coumadin (target INR 2-3)
   - If age >75, aspirin 80-325 mg/day or coumadin with target INR 2-2.5 (if PT/INR available).

10. **Place of Treatment (Appendix VII) - See Figure 2A**

**FIGURE 2B**
Guidelines for Moderate Stroke

Management Priorities
Neuro-vital signs: BP, PR, CR, RR, Temp, Pupils, Glasgow Coma Scale (Appendix X)
Basic emergent supportive care (ABC of resuscitation)
Monitor and manage blood pressure, treat if SBP ≥ 220 or DBP ≥ 120 or MAP ≥ 130 (Appendix IIIA).

Precautions:
- Avoid precipitous drop in BP > 20% of baseline MAP
- Do not use rapid-acting sublingual agents; when needed use oral or easily titratable IV anti-hypertensive medication (Appendix IIIB)
Ascertain clinical diagnosis of stroke—history and physical exam very important
- Exclude common stroke mimickers (Appendix II)
Identify co-morbidities (cardiac disease, gastric ulcer, etc.)
Recognize and treat early signs and symptoms of increased ICP (Appendix IX)

Emergent Diagnostics
- Complete blood count (CBC)
- Blood sugar (CBG, HGT, or RBS)
- PT/PIT
- Serum Na⁺ and K⁺
- Electrocardiogram
- Plain CT scan of brain as soon as possible

Early Specific Treatment (Appendix IV)

CT scan confirmed? (Appendix VIA)

CT scan not available
- Use scoring system (Appendix VIB)

Likely ischemic?

Likely hemorrhagic

FIGURE 3
**Ischemic?**

- **Y**
  - If within 3 hours of stroke onset, consider rtPA treatment and refer to specialist
  - Aspirin 160-325 mg/day start as early as possible
  - Neuroprotection (Appendix IVD)
  - Early supportive rehabilitation

- **N**
  - Hemorrhagic

**Hemorrhagic**

**Non-cardioembolic**

- **Thrombotic/Lacunar?**
  - **Y**
    - If within 3 hours of stroke onset, consider rtPA treatment and refer to specialist
    - Aspirin 160-325 mg/day start as early as possible
    - Neuroprotection (Appendix IVD)
    - Early supportive rehabilitation
  - **N**
    - Cardio-embolic (Appendix V)

**Cardio-embolic**

**Place of Treatment** (Appendix VII): Hospital - Intensive Care Unit or Stroke Unit

**Delayed Management & Treatment (Secondary Prevention)** (Appendix VIII)

1. **Mild stroke**

2. **Ischemic?**
   - **Y**
     - Thrombotic/Lacunar?
       - **Y**
         - Control of risk factors (see Risk Factor section)
         - Antiplatelets (aspirin, ticlopidine, clopidogrel, dipyridamole, cilostazol)
         - Carotid ultrasound
         - If this reveals >70% stenosis, refer to neurologist for decision-making regarding carotid endarterectomy.
       - **N**
         - Cardio-embolic

3. **Hemorrhagic**

4. **Cardio-embolic**

**Long-term blood pressure monitoring and treatment**
- Consider CT angiography, MRA, or angiography in aneurysm or AVM suspects

**Figure 3**

**FIGURE 3A**

**FIGURE 3B**
Guidelines for Severe Stroke

### Management Priorities
- Basic emergent supportive care (ABC of resuscitation)
- Neuro-vital signs: BP, PR, CR, RR, Temp, Pupils, Glasgow Coma Scale (Appendix X)
- Recognize & treat early signs & symptoms of increased ICP (Appendix IX)
- Monitor and manage blood pressure, treat if SBP ≥ 220 or DBP ≥ 120 or MAP ≥ 130 (appendix IIIA). Precautions:
  - Avoid precipitous drop in BP > 20% of baseline MAP
  - Do not use rapid-acting sublingual agents; when needed use oral or easily titratable IV anti-hypertensive medication (appendix IIIB)
- Ascertain clinical diagnosis of stroke—history and physical exam very important
  - Exclude common stroke mimickers (appendix II)

### Emergent Diagnostics
- Complete blood count (CBC)
- Blood sugar (CBG, HGT, or RBS)
- PT/PTT
- Serum Na⁺ and K⁺
- Electrocardiogram (ECG)
- Plain CT scan of brain

### Early Specific Treatment (Appendix IV)

#### FIGURE 4

- CT scan confirmed (Appendix VIA)
  - Ischemic?
    - Y
      - Non-cardioembolic (Thrombotic)?
        - Y
          - Cardio-embolic (Appendix V)
        - N
          - Hemorrhagic

- Hemorrhagic
  - Y
    - Neurosurgery consult if:
      - Patient not herniated, bleed located in putamen, subcortical area, or cerebellum, and goal is reduction of mortality
      - Herniated patient but family is willing to accept consequences of high mortality or irreversible coma and persistent vegetative state
      - ICP monitoring contemplated and salvage surgery is considered
      - Early supportive rehabilitation
  - N
    - May give aspirin 160-325 mg/day
      - Neuroprotection (Appendix IVD)
      - If cerebellar infarct, consult neurosurgeon as soon as possible
      - Early supportive rehabilitation

- Supportive treatment:
  1. Mannitol 20% 0.5 mg/kg BW q 6h for 2-5 days
  2. Neuroprotection (appendix IVD)
  3. Neurosurgery consult if:
     1. Patient not herniated, bleed located in putamen, subcortical area, or cerebellum, and goal is reduction of mortality
     2. Herniated patient but family is willing to accept consequences of high mortality or irreversible coma and persistent vegetative state
     3. ICP monitoring contemplated and salvage surgery is considered
  - Early supportive rehabilitation
ACUTE STROKE TREATMENT

APPENDICES FOR ACUTE STROKE TREATMENTS

Appendix II

Differential Diagnosis of Stroke

A. The presence of any of the following should alert the physician to consider conditions other than stroke:
   - Gradual progressive course and insidious onset
   - Pure hemifacial weakness including forehead
   - Trauma
   - Fever prior to onset of symptoms
   - Recurrent seizures
   - Weakness with atrophy
   - Recurrent headaches

B. Conditions that mimic stroke in the emergency department (according to decreasing frequency):
   1. Seizures
   2. Systemic infection
   3. Brain tumor
   4. Toxic-metabolic
   5. Positional vertigo
   6. Cardiac
   7. Syncope
   8. Trauma
   9. Subdural hematoma
   10. Herpes encephalitis
   11. Transient global amnesia
   12. Dementia
   13. Demyelinating disease
   14. Cervical spine fracture
   15. Myasthenia gravis

References:

Appendix III

Blood Pressure Management

A. If SBP is 185-220 mmHg or DBP is 105-120 mm Hg, emergency therapy for blood pressure control should be deferred unless there is left ventricular failure, aortic dissection, or acute myocardial ischemia.
Patients who are potential candidates for rtPA therapy but who have persistent elevations in SBP >185 mm Hg or DBP >110 mm Hg may be treated with small doses of IV anti-hypertensive medication to maintain the BP just below these limits.

B. Mean Arterial Pressure (MAP):
   \[
   \text{MAP} = \frac{\text{Systolic BP} + 2(\text{Diastolic BP})}{3}
   \]

C. Locally available intravenous anti-hypertensives used in acute stroke:

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Onset of Action</th>
<th>Duration of Action</th>
<th>Adverse Effects</th>
<th>Special Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicardipine HCl</td>
<td>5 - 15 mg/h  IV</td>
<td>5-10 min</td>
<td>1-4 h</td>
<td>Tachycardia, headache, flushing, local phlebitis</td>
<td>Most hypertensive emergencies except acute heart failure; caution with coronary ischemia</td>
</tr>
<tr>
<td></td>
<td>Hydralazine HCl</td>
<td>10 - 20 mg  IV</td>
<td>10 - 20 min</td>
<td>3 - 8 h</td>
<td>Tachycardia, flushing, headache, vomiting, increased angina</td>
</tr>
<tr>
<td></td>
<td>Nitroglycerin</td>
<td>5 - 100 µg/min as IV infusion</td>
<td>2 - 5 min</td>
<td>3 - 5 min</td>
<td>Headache, vomiting, methemoglobinemia, tolerance with prolonged use</td>
</tr>
<tr>
<td>Esmolol</td>
<td>0.5 - mg/kg bolus IV over 30 sec. or 0.05/kg/min infusion</td>
<td>2 - 10 min</td>
<td>10 - 30 min</td>
<td>Hypotension, bradycardia, peripheral ischemia, agitation, confusion, headache, vomiting</td>
<td>Supraventricular tachycardia, hypertension</td>
</tr>
</tbody>
</table>
Appendix IV

Acute Stroke Treatments

References:
Same as Appendix III

A. Risk of treating patient with mild stroke with anti-thrombotics:
- 1% of TIsA are not due to ischemic stroke
- 3 to 14% of mild strokes are hemorrhagic

References:

B. Thrombolytic Therapy
- Thrombolytics are not recommended in mild strokes.
- Streptokinase and Urokinase are not currently recommended in acute stroke
- Recombinant tissue plasminogen activator (rtPA) given within 3 hours of stroke onset may reduce disability by a third at three months

Guidelines:
1. Dose of rtPA is 0.9 mg/kg (maximum 90 mg) - 10% of total volume given as bolus, rest as infusion over 60 minutes.
2. rtPA is recommended as treatment within 3 hours of onset of ischemic stroke. The benefit of IV rtPA for acute ischemic stroke beyond 3 hours from onset of symptoms is not established. Intravenous rtPA is not recommended when the time of onset of stroke cannot be ascertained reliably, including strokes recognized upon awakening.
3. Thrombolytic therapy is not recommended unless the diagnosis is established by a physician with expertise in diagnosis of stroke and CT of the brain is assessed by physicians with expertise in reading this imaging study. If CT demonstrates early changes of a recent major infarction such as sulcal effacement, mass effect, edema or possible hemorrhage, thrombolytic therapy should be avoided.
4. Thrombolytic therapy cannot be recommended for persons with any of the following (NINDS Study):
   a. current use of oral anticoagulants or a prothrombin time >15 seconds (INR >1.7)
   b. use of heparin in the previous 48 hours or a prolonged partial thromboplastin time
   c. a platelet count less than 100,000 mm³
   d. another stroke or a serious head injury in the previous 3 months
   e. major surgery within the preceding 14 days
   f. pretreatment systolic blood pressure greater than 185 mm Hg or diastolic BP >110 mm Hg
   g. rapidly improving neurological signs
   h. isolated, mild neurological deficits, such as ataxia alone, sensory loss alone, dysarthria alone, or minimal weakness
   i. prior intracranial hemorrhage
   j. blood glucose <50 mg/dl or >400 mg/dl
   k. seizure at the onset of stroke
   l. gastrointestinal or urinary bleeding within the preceding 21 days
   m. recent myocardial infarction
5. Thrombolytic therapy should not be given unless the emergent ancillary care and the facilities to handle bleeding complications are readily available.
6. Caution is advised before giving rtPA to persons with:
   a. Severe stroke (NIH Stroke Scale Score >22)
   b. Age >77
   c. Obtunded patients
   d. Major infarct on CT
   e. Acute pericarditis
   f. Recent trauma
   g. Infectious endocarditis
   h. High probability of left heart thrombus
   i. Significant hepatic disease
   j. DM retinopathy or hemorrhagic ophthalmopathy
   k. Pregnancy
   l. Bleeding hazards
7. Because the use of thrombolytic drugs carries the real risk of major bleeding, whenever possible the risks of potential benefits of rtPA should be discussed with the patient and his or her family before treatment is initiated.


ACUTE STROKE TREATMENT

C. Antithrombotic therapy

1. International Stroke Trial (IST)
   - Multicenter randomized clinical trial of 19,435 patients
   - Regimen: Aspirin 300-325 mg/day vs. no aspirin
     Heparin subcutaneous vs. no heparin
     5,000 units bid or 12,500 units bid
   - Started within 48 hours of stroke onset for 14 days or until discharge
   - Results:
     a. Aspirin
        - fewer recurrent stroke within 14 days
        - fewer deaths and dependency at 6 months
     b. Heparin
        - no benefit even at 6 months
        - if use, should not exceed 5,000 units bid

2. Chinese Acute Stroke Trial (CAST)
   - 21,106 patients randomized
   - Aspirin 160 mg/day vs. placebo
   - Started within 48 hours of stroke onset
   - Results:
     Risk of recurrent stroke or vascular death:
     Aspirin 5.3%
     Placebo 5.9% (p=0.03)

3. 846 patients in the IST and 2,521 patients in the CAST (total 3,367 patients) did not have a CT scan done. Giving aspirin within 48 hours of stroke onset among these patients without CT scan did not significantly affect outcome at 4 weeks (recurrent stroke, CAST) and at 6 months (functional status, IST)

References:

3. A trial on the use of nadroparin (Fraxiparine) started within 48 hours of stroke onset given at 0.4 cc subcutaneously once or twice a day for 10 days showed improvement in functional outcome at 6 months compared to placebo.

D. Neuroprotection

1. Avoid hypotension, hypoxemia (aspiration pneumonia), hyperglycemia, hyponatremia, and fever during acute stroke in an effort to “salvage” the ischemic penumbra.
2. Several neuroprotectants for acute ischemic stroke have been investigated or are currently under investigation. Some results have been encouraging.

References:


E. Treatment of intracerebral hemorrhage (ICH)

1. Surgical treatment: Role depends on size, location, and extent of hematoma
   a. There is definite evidence of increase in hematoma size (26-107%); about half of which is attributable to impaired coagulation (patients with liver disease, alcoholics, etc.). Early hematoma removal contributes to overall improvement or morbidity and mortality.
   b. There is good evidence of functional recovery after surgery of hematoma size 10-30 cc with reversible hemiplegia or severe hemiparesis.
   c. There is available evidence to show that about 1/3 of patients with significant hematoma size (30 cc) will deteriorate and may die (47% mortality) from ischemia (perifocal) and not from clot enlargement.
   d. There is acceptable evidence to show that mortality rate in patients with larger hematomas but not herniated can be reduced with surgery.

2. Medical Treatment: Goal is to prevent complications and careful management of blood pressure
   a. Maintain MAP <130
      i. Sustained hypertension may alter cerebral autoregulation, promote progression of bleed, and increase edema
      ii. Hypotension may result in cerebral hypoperfusion especially in the setting of increased intracranial pressure (ICP)
   b. Manage increased ICP accordingly (see appendix X)
   c. Consider prophylactic use of anticonvulsants.
      i. There is higher incidence of seizures in ICH especially in lobar hematomas
      ii. Role of prophylactic anticonvulsants in deep hemorrhages is unclear. It is justified...
to withhold anticonvulsants until clinically indicated.

d. Prevention and treatment of respiratory complications
   i. Prevention and treatment of infections
   e. Maintenance of adequate nutrition
   f. Early rehabilitation once stable, bedsore precautions, DVT prophylaxis (Ted hose stockings or compression boots)
   g. Neuroprotectants, like calcium channel blockers, might be useful in reducing tendency to perifocal edema, although evidence is experimental.

References:


Appendix V

Cardiogenic Sources of Embolism

1. Atrial fibrillation/flutter
2. Valvular heart disease (including Rheumatic heart disease)
3. Bacterial endocarditis
4. Cardiac thrombus
5. Cardiomyopathy
6. Recent myocardial infarction
7. Atrial myxoma
8. Right-to-left shunts
9. Pulmonary vein thrombosis

References:


A. Requirements for intravenous anticoagulation of patients with cardiogenic source of embolism:
1. Heparin sodium in D5W
2. Infusion pump, if available
3. Activated partial thromboplastin time (PTT) or clotting time

B. Procedure

a. Start intravenous infusion at 800 units heparin/hour ideally using infusion pump.
b. Monitor infusion closely. If using soluset instead of infusion pump, intensive monitoring is required.
c. Perform aPTT as often as necessary, every 6 hours if need, to keep aPTT at 1.5 - 2.3 times control. Risk for major hemorrhage, including intracranial bleed, progressively increases as the aPTT becomes prolonged above 80 seconds.
d. Intermittent intravenous heparin administration is not recommended.
e. Infusion may be discontinued once oral anticoagulant with coumadin is adequate or once antiplatelet medication is started for secondary prevention. See section on stroke prevention (page 11, IV Atrial Fibrillation) and secondary prevention (appendix VIII).

C. If using low-molecular-weight heparin (LMWH), give nadroparin (Fraxiparine) at 0.4 cc (4,100 units) subcutaneously once or twice a day for 10 days. There is no need for aPTT monitoring.

Appendix VI

Differentiating Ischemic from Hemorrhagic Stroke

A. Gold standard is plain CT scan
   - Hyperdense (bright) lesion = bleed or intracerebral hemorrhage
   - Normal = Acute infarction or TIA
   - Hypodense (dark) - Infarction

B. Scoring systems have been used in the absence of CT scan
   - Not recommended for use in mild stroke
   - False negative rate for bleed most probably high in mild strokes

DIAZ STROKE SCALE

<table>
<thead>
<tr>
<th></th>
<th>sensitivity</th>
<th>specificity</th>
<th>accuracy</th>
</tr>
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<tbody>
<tr>
<td>A. Vomiting</td>
<td>100%</td>
<td>86%</td>
<td>93%</td>
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<tr>
<td>B. Level of Consciousness</td>
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References for the Stroke Registry:


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References for the Stroke Registry:

<table>
<thead>
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<th>Symptom</th>
<th>Score</th>
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<tbody>
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<td>Unarousable</td>
<td>+4</td>
</tr>
<tr>
<td>Drowsy - arousable</td>
<td>+2</td>
</tr>
<tr>
<td>Awake</td>
<td>0</td>
</tr>
</tbody>
</table>

**C. Fever** +3

**D. Respiratory Pattern**
- Ataxic or apneustic (rapid irregular) +3
- Hyperventilation (rapid regular) +2
- Cheyne-Stokes (slow irregular) +1
- Normal or regular 0

**E. Upper GI Bleeding** +3

**F. Neurologic deficit maximal at onset** +3

**G. Headache** +2

**H. Nuchal rigidity** +2

**I. Diastolic Blood Pressure (mmHg)**
- <90 0
- 91 - 99 0
- ≥100 +2

**J. Systolic Blood Pressure (mmHg)**
- ≤150 -2
- 151-169 -1
- 170-180 0
- 181-199 +1
- ≥200 +2

**TOTAL SCORE**

Interpretation: Score ≥7 = 90% probability of bleed
Score <7 = probably infarct

**ILANO SCORING SYSTEM**

**I. History**

1. Vomiting
   - Present 2
   - Absent 0

2. Headache
   - Present 1
   - Absent 0

3. Loss of consciousness
   - Present 1
   - Absent 0

**II. Physical Examination**

1. Systolic BP
   - >200 mm Hg 5
   - 160-200 mm Hg 1
   - <160 mm Hg 0

2. Diastolic BO
   - ≥90 mm Hg 2
   - <90 mm Hg 0

3. Level of consciousness
   - Stuporous-coma 3
   - Drowsy 1
   - Awake 0

4. Nuchal rigidity
   - Present 2
   - Absent 0

5. Preferential gaze
   - Present 1
   - Absent 0

**TOTAL SCORE**
**Appendix VII**

**Place of Treatment**

A. Mayo algorithm for management of TIA's and minor stroke.

Reference:

B. Admission to an organized Stroke Unit or management by a Stroke Team has been shown to:
- improve functional outcome
- reduce mortality and morbidity by 21-28%
- hasten recovery after a stroke
- shorter hospital stay

References:

C. Requirements for a Stroke Team

1. WHY (Objectives)
   To reduce mortality and morbidity of stroke through efficient delivery of effective therapy for acute stroke after urgent transport and evaluation.
2. WHAT (Components)
   a. Facilities:

**Appendix VIII**

**Secondary Prevention for Stroke**

A. Antithrombotics

1. Aspirin
   • Antiplatelet Trialists Collaboration:
     - 145 trials with almost 100,000 patients
     - 23% risk reduction for stroke, myocardial infarction (MI), and vascular death
   2. Ticlopidine
     • Canadian American Ticlopidine Study (CATS)
       - 23% risk reduction vs. placebo for stroke, MI, or vascular death
     • Ticlopidine Aspirin Stroke Study (TASS)
       - 12% risk reduction vs. aspirin for stroke or death at 3 years
   3. Clopidogrel
     • Clopidogrel Stroke Prevention Study (CSPS)
       - 1,095 patients with cerebral infarction at

References:
5. Dipyridamole

- European Stroke Prevention Study 2
  6,602 patients randomized to:
  - Aspirin 25 mg bid
  - Dipyridamole 200 mg bid
  - Aspirin 25 mg bid + Dipyridamole 200 mg bid
  - Placebo

Results:
- Aspirin better than placebo
- Dipyridamole better than placebo
- Combination aspirin and dipyridamole better than either one alone

References:

B. Carotid endarterectomy

The North American Symptomatic Carotid Endarterectomy Trial (NASCET), European Carotid Surgery Trial (ECST), and the Veterans Administration Symptomatic Carotid Surgery Trial all showed benefit in reducing risk of recurrent stroke in patient with severe internal carotid artery stenosis (>70%) who had a TIA or minor stroke.

References:

C. Anticoagulant

The benefit of oral anticoagulation with coumadin (target INR=2.0-3.0) has been shown in patients with non-valvular atrial fibrillation who are at high risk (hypertension, poor left ventricular function, previous TIA, stroke, or thromboembolic events).

See also page 11 (IV. Atrial Fibrillation)

References:

Appendix IX

Increased Intracranial Pressure (ICP)

A. Signs and symptoms of increased ICP:
- Deteriorating sensorium
- Cushing's triad
  1. Hypertension
  2. Bradycardia
  3. Bradypnea (late)

B. Management options for increased ICP:
1. Manage combative behavior and agitation
   - search for source of pain, e.g. bladder distention
   - appropriate sedation if necessary
2. Elevate head to approximately 30° from horizontal
3. Hyperventilate to pCO₂ of low 30's (maximum of 6 hours)
4. Osmotic agents: goal is serum osmolality of 310-320
   - Mannitol 0.25 - 2.0 gm/kg bolus; may give 0.25 - 0.5 mg/kg every 3 - 5 hours
   - expect response in 20 minutes
   - effect may last for 6 hours
   - difference of <10 between measured and computed osmolality means additional doses are needed

\[
\text{computed osmolality} = 2 (\text{Na}^+) + \text{glucose} + \text{BUN osmolality}
\]

5. Other options (use with caution):
   - Furosemide + albumin
   - Hypertonic saline 3% (50 mL in 5 min)
   - Pentobarbital 10-20 mg/kg loading dose then 1-3 mg/kg/hr

References:
1. Wijdick EFM. Neurology of Critical Illness. F.A. Davies, Philadelphia
## Glasgow Coma Scale

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<tr>
<td>To speech</td>
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<td>To pain</td>
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<td>Localizes</td>
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<td>Withdraws</td>
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Circle one score in each category; add the three scores to obtain total score. Lowest possible GCS score is 3. Highest score is 15.

Reference:

## Drugs Mentioned in the Treatment Guideline

This index lists drugs/drug classifications mentioned in the treatment guideline. Prescribing Information of these drugs can be found in the Philippine Pharmaceutical Directory (PPD) and the Philippine Pharmaceutical Directory Review (PPDr).

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