Guideline
For Management Ischemic Stroke

นายแพทย์ธิติ อึ้งอารี
Guideline For Ischemic Stroke

In the past

- Stroke prevention
- Supportive care
- Rehabilitation
1995
NINDS (National Institute of Neurological Disorders and Stroke)

• rtpA in Acute Ischemic Stroke (FDA)
• Medical emergency
• Treated early, few sequelae

○ stroke occur while sleeping
○ patient cannot call for help
○ unrecognized caregivers

ECASS (EUROPEAN COOPERATIVE ACUTE STROKE STUDY)
NINDS  624 pt, 39 center
1991-1994

onset <= 3 hr
CT brain exclude hemorrhage
BP > 185/110
Previous Intracranial hemorrhage,
recent stroke, head injury < 3 mo
received heparin, anticaogulant < 48 hr
BS > 400 mg

Rx rtpA

0.9 mg/kg (90 mg.total) over 1 hr
Significant increase full recovery, disability
6.4% Symptomatic intracranial hemorrhage
ECASS I

620 pt, 75 hospital

- onset <= 6 hr
- CT no hemorrhage,
- rtpA dose 1.1 mg/kg (Max 100 mg)
- no recent trauma, surgery,

receiving anticoagulant

MCA occlusion > 33% (1/3)

- Significant increase recovery
American Heart Association Stroke Council guidelines, 1999

Prevention after TIA/Stroke

1. HT : maintain BP < 140/90
2. Smoking : cessation
3. DM : BS < 126 mg/dl
4. Carotid Stenosis : surgery if > 70%
5. AF : anticoagulant
6. Cholesterol : statin if LDL > 130 mg/dl
7. Antiplatelet agent : if atherothrombotic
8. Other : diet, exercise, alcohol
Royal colladge of physicians of London
National clinical guideline for stroke 2000
Guideline for Secondary prevention of stroke (all patients)

(Metaanalysis or randomised controlled trial evidence)

All patients HT persist > 1 mo → RX
All patients ASA 50–300 mg
or low dose ASA + dipyridamole modified release

ASA intolerant → clopidogrel 75 mg
Anticoagulant all AF unless contraindicated
<table>
<thead>
<tr>
<th><strong>Anticoagulant</strong></th>
<th>after brain imaging</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>14 days after acute stroke</td>
</tr>
<tr>
<td></td>
<td>no used in TIA</td>
</tr>
<tr>
<td></td>
<td>(except cardiac emboli)</td>
</tr>
<tr>
<td><strong>Endarterectomy</strong></td>
<td>stenosis &gt; 70%</td>
</tr>
<tr>
<td></td>
<td>Specialist surgeon</td>
</tr>
<tr>
<td></td>
<td>low complication &lt; 3–5%</td>
</tr>
<tr>
<td><strong>Statin</strong></td>
<td>MI</td>
</tr>
<tr>
<td></td>
<td>Cholesterol &gt; 5 mmol/l</td>
</tr>
<tr>
<td><strong>(E) All patients</strong></td>
<td>(descriptive study)</td>
</tr>
<tr>
<td></td>
<td>assessed vascular risk factor</td>
</tr>
</tbody>
</table>
(C) (Expert committee) 
Anticoagulant 
  Mitral value 
  prosthetic value 
  MI < 3 mo 
Carotid ultrasound 
  carotid stroke 
Endarterectomy 
All patients 
  Lifestyle modification
European Stroke Initiative (EUSI) 2003

Recommendation

- Stroke patients should be treated in stroke units
- Once stroke symptoms are suspected, patients or their proxies should call the EMS or a similar system
Requirements for stroke management

Minimum Requirements

1. Availability of 24-hr CT scanning
2. Established stroke treatment guidelines and operational procedures
3. Close co-operation of neurologists, internists and rehabilitation experts
4. Specially trained nursing personnel
5. Early multidisciplinary rehabilitation
   including speech therapy, occupational therapy
   and physical therapy
6. Neurosonological investigations within 24 hr
   (extracranial vessels, colour-coded duplex sonography)
7. ECG
8. Laboratory examinations
   (including coagulation parameters)
9. Monitoring of blood pressure, ECG,
   oxygen saturation, blood glucose, body temperature
Additional facilities recommended

1. MRI/MRA
2. Diffusion and perfusion MR
3. CTA
4. ECG (transoesophageal)
5. Cerebral angiography
6. Transcranial Doppler sonography
7. Specialised neuroradiological, neurosurgical and vascular surgical consultation
Emergent diagnostic tests in acute stroke

1. CT

2. ECG and chest X-ray

3. Clinical chemistry
   - Complete blood count and platelet count,
   - Prothrombin time, INR, PTT
   - Serum electrolytes, blood glucose
   - CRP, sedimentation rate
   - Arterial blood gas analysis,
     if hypoxia is suspected
   - Hepatic and renal chemical analysis
4. Pulse oxymetry

5. Lumbar puncture (only if CT is negative, CT and subarachnoidal haemorrhage is clinically suspected)

6. Duplex and transcranial ultrasound

7. EEG

8. MRI and MRA/CTA

9. Diffusion MR and perfusion MR

10. ECG (transthoracic and transoesophageal)
Primary Prevention

Recommendations

1. Blood pressure should be lowered to normal levels (<140/<90 mm Hg, or <135/80 mm Hg in diabetics)

2. Cholesterol -lowering therapy (simvastatin) is recommended for high-risk patients

3. Cigarette smoking should be discouraged

4. Heavy use of alcohol should be discouraged, light or moderate alcohol consumption may be protective against stroke
5. Regular physical activity is recommended

6. A low salt, low saturated fat, high fruit and vegetable diet rich in fibre is recommended

7. Subjects with an elevated body mass index should take a weight-reducing diet

8. Hormone replacement therapy should not be used for primary prevention of stroke

9. Although aspirin does not reduce the risk of stroke in healthy subjects, it does reduce the risk of MI and can be recommended in subjects with one or more vascular risk factors
10. Clopidogrel, ticlopidine, trifusal and dipyridamole have not been studied in asymptomatic subjects and therefore cannot be recommended for primary stroke prevention.

11. Long-term oral anticoagulation therapy should be considered for all AF patients at high risk of embolism.

12. Carotid surgery may be indicated for some asymptomatic patients with a 60–99% stenosis of the ICA. The carotid endarterectomy (CEA)–related risk of stroke or death must be less than 3%, and patients with a life expectancy of at least 5 years (or under the age of 80)
Secondary prevention of Stroke

Risk factor Modification

HT diuretic, ACEI
Cholesterol lowering statin
Smoking stop
HRT no indication in post menopause

Anti thrombotic

 ASA 50–325 mg
 ASA 50 mg + long release Dipyridamole 200mg bid (recurrent)
clopidogrel
ASA, Dipyridamole intolerance

High risk patients

- TIA or Ischemic stroke + non Q MI or unstable angina

Rx ASA 75 mg + clopidogrel 75 mg

- Patient start with thinopyridine derivatives should receive clopidogrel (fewer side effect)

Oral anticoagulant

- INR 2-3

- Not advice Epilepsy, dementia

- GI bleeding, fall
ACCP (American Colladge of Chest Physicians) September 2004
Anti thrombotic and Thrombolytic Therapy for Ischemic Stroke

- IV tPA in 3 hr of symptom onset
  IV 0.9 mg/kg (Max 90 mg)
  10% initial bolus
  remainder infused > 60 min
  avoid (infarction >1/3 MCA)

- IV tPA between 3-6 hr of symptom onset
  unselected patients not use IV tPA

- IV streptokinase between 0-6 hr of onset not use
Intra -- arterial thrombolysis
- MCA occlusion no sign major infarct
- onset < 6 hr
- basilar artery thrombosis without major infarction

Anticoagulant not digible for thrombolysis iv, sc LMWH

Anticoagulant prevent DVT, PE
(stable intracerebral hemorrhage in second day)
แนวทางการรักษา
โรคหลอดเลือดสมองตีบหรืออุดตัน

Clinical Practice Guidelines For Ischemic Stroke
สมาคมประสาทวิทยา - ราชวิทยาลัยอายุรแพทย์ 2545

แนวทางเวชปฏิบัตินี้ เป็นเครื่องมือส่งเสริมคุณภาพของการบริการด้านสุขภาพที่เหมาะสมกับทรัพยากร และเงื่อนไขของสังคมไทย โดยทั่วไปในการสร้างเสริม และแก้ไขปัญหาสุขภาพของคนไทย องานมีประสิทธิภาพ และคุ้มค่า ข้อแนะนำต่าง ๆ ในแนวทางเวชปฏิบัตินี้ไม่ใช่ข้อบังคับของการปฏิบัติ ผู้ใช้สามารถปฏิบัติตกต่างไปจากข้อแนะนำนี้ได้ ในกรณีที่สถานการณ์แตกต่างออกไปหรือมีเหตุผลที่สมควร โดยใช้วิจารณญาณที่เป็นที่ยอมรับในสังคม

Acute ischemic stroke < 3 hr

Acute ischemic stroke between 3-72 hr
Sudden onset <3 hr

Basic life support
ABC, hypoglycaemia

Facility of thrombolytic drug

No

Yes

Emergency Lab + CT brain
CBC, FBS, Bun, Cr
E’lyte, EKG

Non-Stroke
Appropriate Rx
Normal
Ischemic Stroke
Thrombolytic PX

Stroke
Hypodensity
Hematoma
Onset 3-72 hr
Appropriate Px

Ability to transfer center to obtain thrombolytic in 3 hr

Yes
Refer

No
Onset 3-72 hr

(Advice บ่ายดี)
Indication

1. Onset < 3 hr.
2. > 18 yr.
3. CT brain normal
Contra-indication

1. rapid recovery, Mild ataxia, dysphasia
2. Seizure at onset
3. SBP > 185, DBP > 110
4. Previous cerebral hematoma
5. Head injury < 3 mo
6. PT > 15 sec, INR > 1.7
7. Stop heparin < 48 hr, prolong PTT
8. Platelet < 100,000
9. Major surgery < 14 days
10. UGIH, hematuria < 21 days
11. BS < 50mg/dl, > 400 mg/dl
12. Recent MI
Dose

r-tpA 0.9 mg/kg (Max 90)
10 % bolus, 90 % drip in 60 min

Observation

1. Avoid antiplatelet, anticoagulant 24 hr.
2. Avoid patient cerebral edema, large infarction
3. Stop r-tpA if suggest cerebral hematoma
4. Available CT, MRI 24 hr
5. Avoid NG-tube, CVP, A-line in 24 hr
6. Avoid Foley’s cath in 30 min
7. Control SBP <180, DBP <120
Onset 3-72 hr

Basic life-Support

Emergency, Lab CBC, BUN, Cr, E'lyte, BS

Emergency CT brain

Non-stroke

Appropriate Px

stroke

Normal/Hypodensity

Hyperdensity

Appropriate Px

General management
- Avoid antihypertensive except SBP >=220, DBP >=120
- Avoid intravenous glucose solution unless necessary
- Control BS <180
- Treatment fever and concomitant conditions
Work up for Etiology of stroke

General

Lipid profile chol TG LDL HDL
FBS, VDRL
Cardiac work up EKG, CXR

Suggest cardiac embolism

Echocardiogram

Holter monitoring
Stroke in the young

(< 45 yrs., no DM, HT, smoking)

ESR

ANA

Coagulogram protein C, S, antithrombin III, anticardiolipin

Vascular work up

TCD, Carotid duplex

MRA

CT angiography
Secondary prevention

Antiplatelet

ASA 60–325 mg

INTOLERANCE

- Ticlopidine 250 mg. Bid
  (thrombocytopenia, Neutropenia)
- clopidogrel 75 mg
- ASA 25 + Dipyridamole extended release 200 mg bid
Anticoagulant

warfarin  INR  1.5–3.0

Carotid endarterectomy

stenosis > 70%