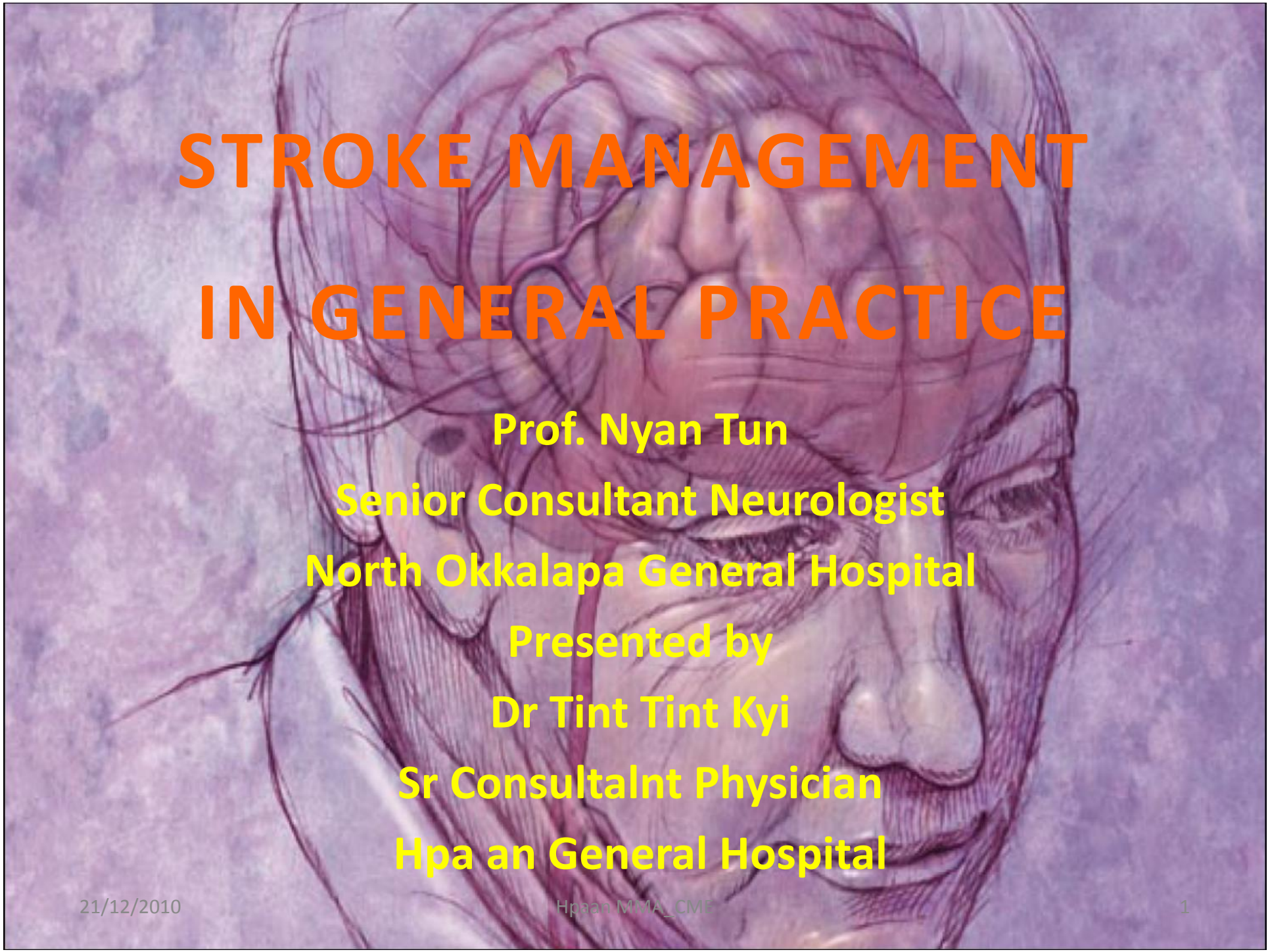

STROKE MANAGEMENT

IN GENERAL PRACTICE

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Presented by

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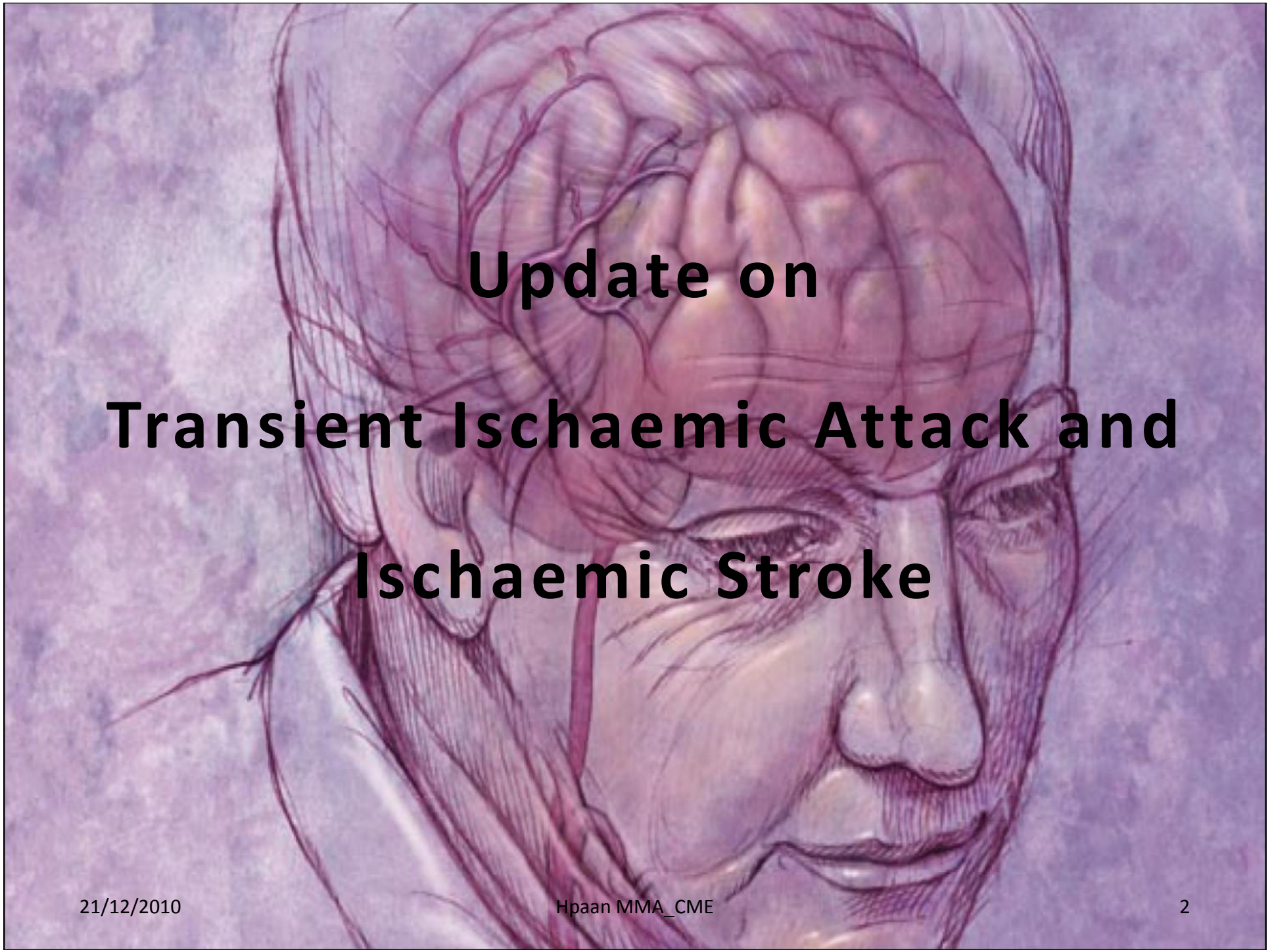
Hpa an General Hospital



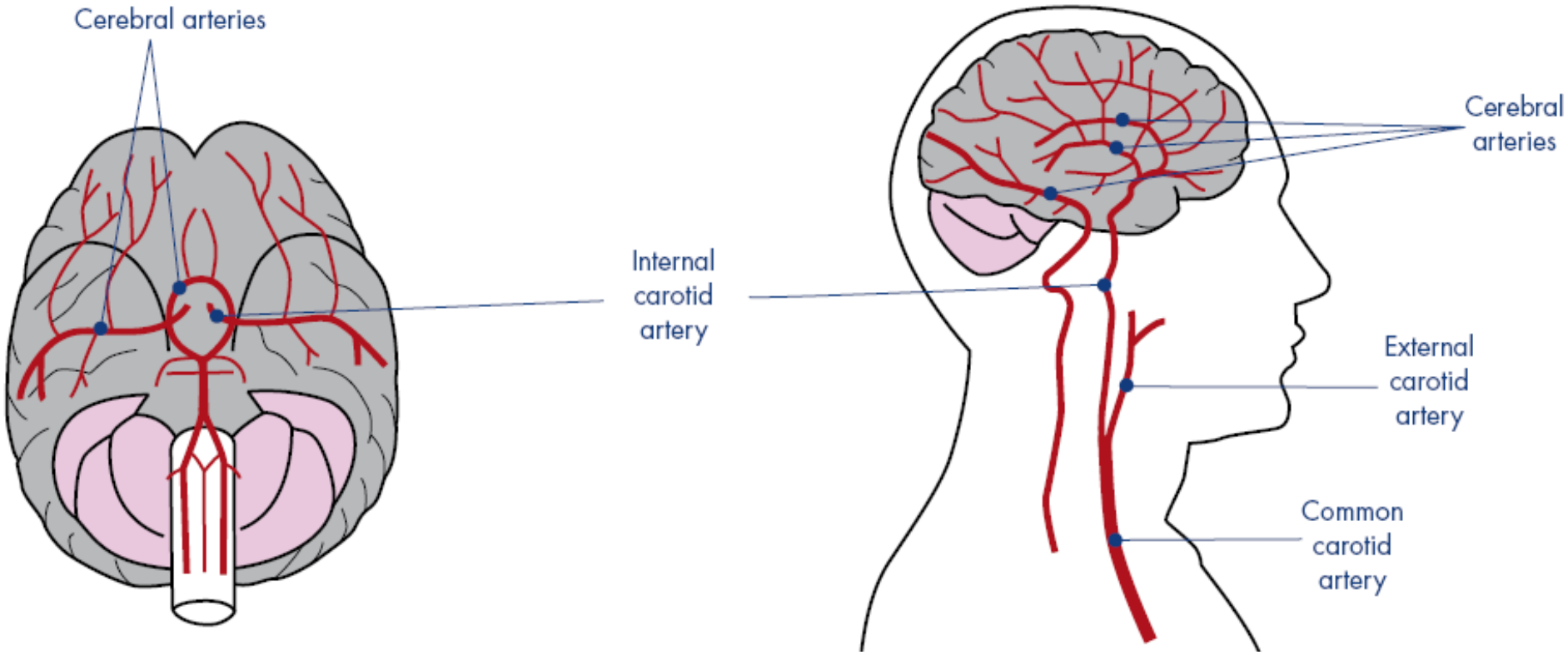
Update on

Transient Ischaemic Attack and

Ischaemic Stroke

What is a stroke?

- A clinical syndrome characterized by an ***acute loss of focal brain function lasting more than 24 hours or leading to (earlier) death***
- **Ischemic stroke/cerebral infarction** (death of brain tissue) - due to inadequate blood supply to apart of the brain as a result of low blood flow, thrombosis or embolism associated with diseases of the blood vessels, heart or blood
- ***Haemorrhagic stroke*** (primary intracerebral haemorrhge or subarachnoid haemorrhage) - due to either spontaneous haemorrhage into or over the brain substance)



Key symptoms of stroke

Sudden onset of one or more of:

- Weakness or numbness in face, arm or leg, especially on one side of the body;
- Difficulty speaking or understanding;
- Loss of balance or coordination such as difficulty walking.

Risk factors for stroke

- High blood pressure;
- Previous stroke or TIA, or a family history of stroke;
- Atrial fibrillation (irregular heart rhythm);
- High blood cholesterol;
- Diabetes;
- Smoking;
- Advancing age;
- Unhealthy diet.

What is a Transient Ischaemic Attack (TIA)?

- Traditional definition - a ***sudden, focal neurological deficit of presumed vascular origin lasting <24 hours***.
- ***Reversible ischemic neurological deficit*** *(RIND)* - events lasting 24 hours to 7 days. (obsolete)
- ***1970*** - events lasting 24 hours to 7 days were associated with infarction
- ***2002***: Time-based definition $\Longrightarrow$ tissue-based, because many ischemic episodes with symptoms lasting <24 hours also are associated with new infarction in high-resolution CT and especially diffusion-weighted MRI studies.

New Definitions

- A brief episode of neurological dysfunction caused by focal brain or retinal ischemia, with clinical symptoms typically lasting less than one hour, and without evidence of acute infarction.

Arguments in Favor of the New Definition

- The classic 24-hour definition is misleading in that many patients with transient <24-hour events actually have associated cerebral infarction.

AHA-Endorsed Revised Definition of TIA

- *A transient episode of neurological dysfunction caused by focal brain, spinal cord, or retinal ischemia, without acute infarction.*

New Definitions

- **Ischemic stroke** - an **infarction of central nervous system tissue.**

- **Symptomatic ischemic strokes** are manifest by clinical signs of focal or global cerebral, spinal, or retinal dysfunction caused by central nervous system infarction.
- A **silent stroke** is a documented central nervous system infarction that was asymptomatic.

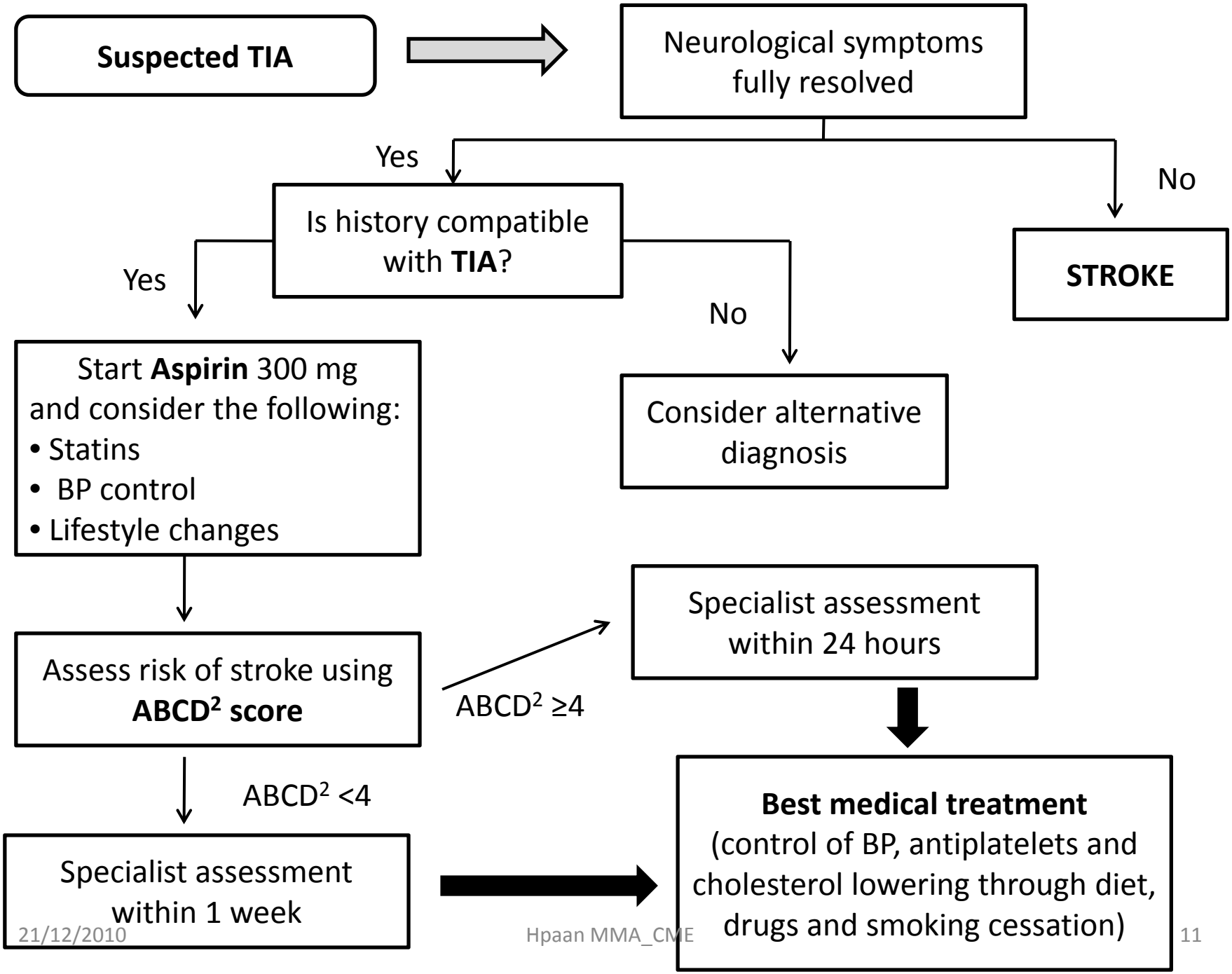
TIA MANAGEMENT

Grade a TIA – ABCD²

ABCD	RISK FACTOR	SCORE
AGE	Age below 60	0
	Age 60 or above	1
BLOOD PRESSURE	Systolic BP above 140 mmHg, and/or diastolic BP 90 mmHg or higher	1
CLINICAL	One-sided weakness of face, arm, hand or leg	2
	Speech disturbance without weakness	1
DURATION	Symptoms lasted more than 60 minute	2
	Symptoms lasted 10 to 60 minutes	1
	Symptoms lasted less than 10 minutes	0
DIABETES		1

ABCD² Score

- 6 to 7 points = **HIGH** risk (21% of pts 8.1% two day risk)
- 4 to 5 points = **Moderate** risk (45% of pts 4.1% two day risk)
- 0 to 3 points = **Low** risk (34% two day risk)


Suspected TIA
Neurological symptoms fully resolved
Yes
No
Is history compatible with TIA?
Yes
No
STROKE
Start Aspirin 300 mg and consider the following:
• Statins
• BP control
• Lifestyle changes
Consider alternative diagnosis
Assess risk of stroke using ABCD² score
ABCD² ≥4
Specialist assessment within 24 hours
ABCD² <4
Specialist assessment within 1 week
Best medical treatment
(control of BP, antiplatelets and cholesterol lowering through diet, drugs and smoking cessation)

NHS

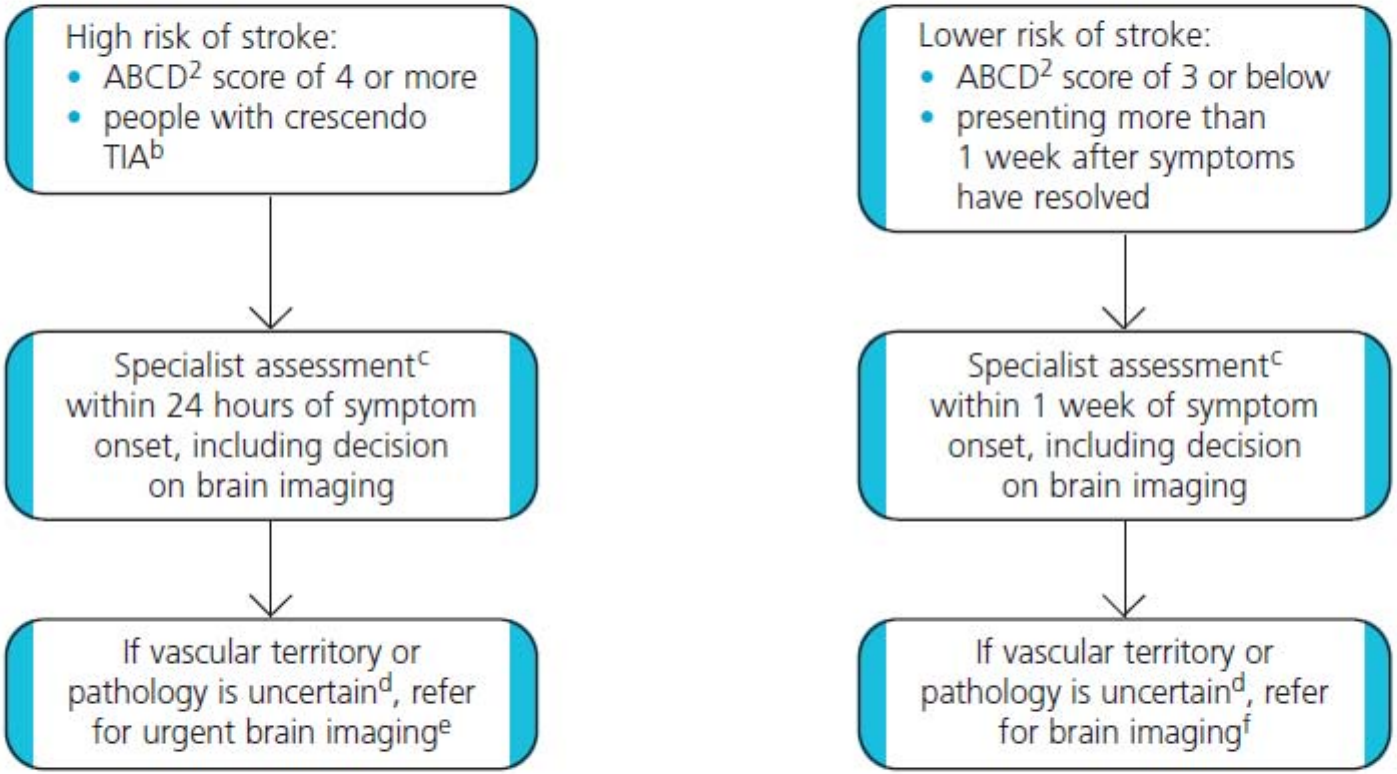
National Institute for Health and Clinical Excellence

Issue date: July 2008

Stroke

Diagnosis and initial management of acute stroke and transient ischaemic attack (TIA)

- Assess risk of subsequent stroke as soon as possible using a validated scoring system[a] such as ABCD^2.



- Use diffusion-weighted MRI for brain imaging, except where contraindicated. For these people use CT scanning.

Brain Imaging

CT is expected to be normal because

- transient ischemia; or
- too small to see on CT; or
- not ischemia.

MRI is more likely than CT to be helpful because

- it shows a *small stroke* that was negative on CT; or
- it shows a *vascular lesion* (small vessel disease, old stroke, arterial stenosis, etc.); or
- it shows *some other* explanation of the *transient event* (subdural hematoma, tumor, etc.).

Decide whether this is more likely a TIA or something else

- Other tests might be done to exclude non-TIA diagnoses if they are suspected.
- **Electrocardiogram (EKG/ECG)** – to rule out AF, that was a likely cause of a cardioembolic TIA.
- **Measurement of blood sugar** - hypoglycemia
- **Measurement of other electrolytes** - electrolyte abnormalities

Management

- *Observe the patient for 24 hours*.
- Start daily *antiplatelets*.
- MRI to evaluate for new and old stroke.
- Carotid ultrasound and transcranial Doppler ultrasound (TCD), MRA of neck and brain, or CT angiogram of neck and brain to look for *arterial stenosis*.
- EKG/ECG, and consider EKG telemetry.
- ***Cardiovascular risk-factor:*** evaluation of BP, lipids, and FBS.
- Consider echocardiogram for evaluation of cardioembolic source.
- Educate the patient about:
  - stroke risk factors including smoking, exercise, weight loss, alcohol;
  - specific medications prescribed for prevention;
  - recurrent symptoms to look for; and
  - calling emergency services for acute stroke symptoms.
- Discharge with established follow-up plans.

Risk of stroke after TIA

- About 5% in the first month
- 12% in the first year
- 30% over 5 years (i.e. about 6-7% per year)
- Risk of a coronary event after a TIA - about 3% per year.

Independent predictors

- TIAs of the brain (compared with TIAs of the eye)
- increasing age
- increasing number of TIAs in the previous 3 months
- peripheral vascular disease
- carotid stenosis >70%

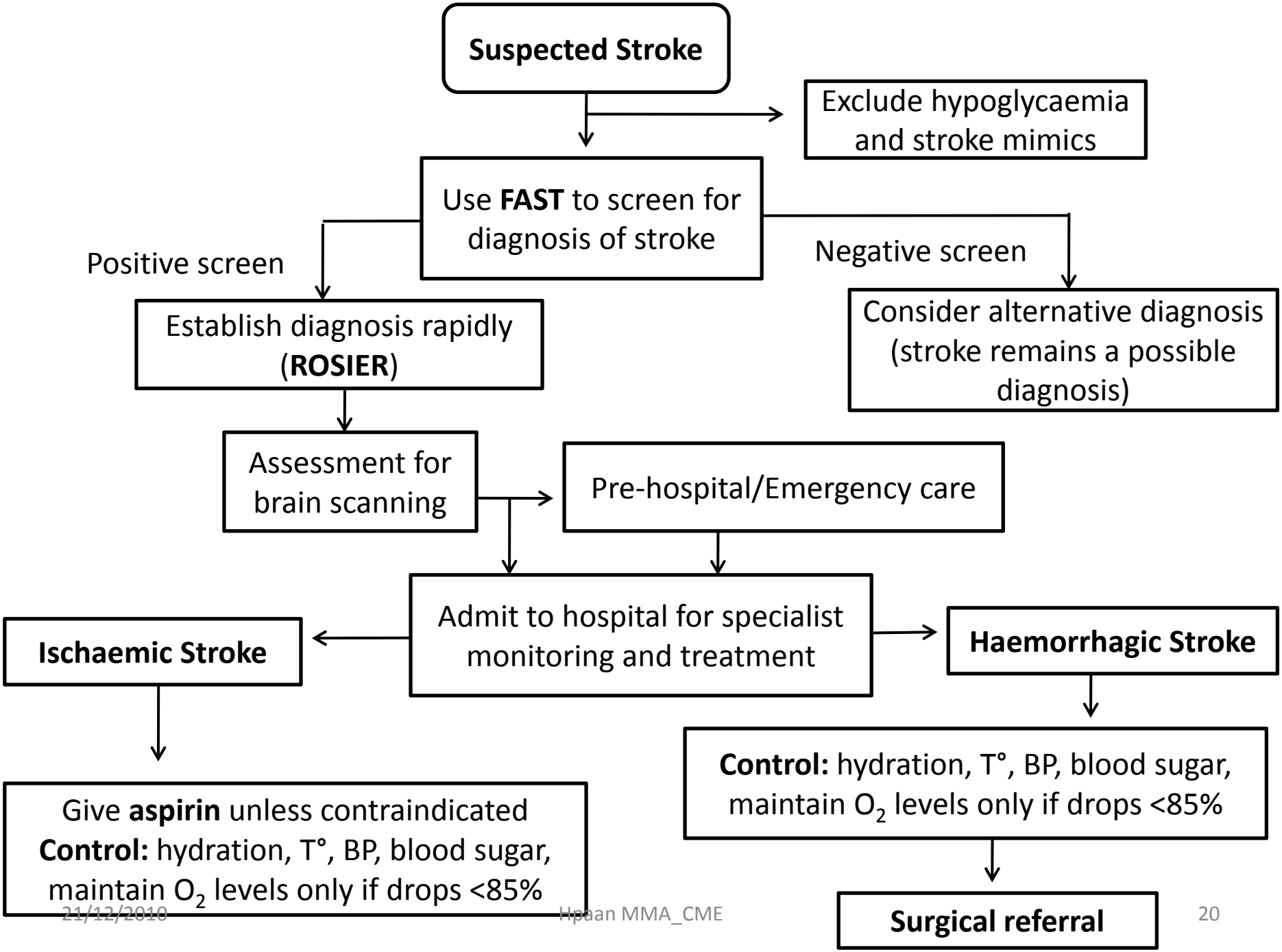
ACUTE STROKE MANAGEMENT

Rapid recognition of symptoms and diagnosis

Rapid recognition of symptoms and diagnosis

- Outside hospital, use a validated tool such as FAST (Face Arm Speech Test) to screen for a diagnosis of stroke or TIA in people with sudden onset of neurological symptoms.

- Exclude hypoglycaemia as the cause of sudden-onset neurological symptoms.
- In A&E, establish the diagnosis rapidly using a validated tool such as ROSIER (Recognition of Stroke in the Emergency Room).


Suspected Stroke
Exclude hypoglycaemia and stroke mimics
Use **FAST** to screen for diagnosis of stroke
Positive screen
Negative screen
Establish diagnosis rapidly (**ROSIER**)
Consider alternative diagnosis (stroke remains a possible diagnosis)
Assessment for brain scanning
Pre-hospital/Emergency care
Admit to hospital for specialist monitoring and treatment
Ischaemic Stroke
Haemorrhagic Stroke
Give **aspirin** unless contraindicated
Control: hydration, T°, BP, blood sugar, maintain O_2 levels only if drops <85%
Control: hydration, T°, BP, blood sugar, maintain O_2 levels only if drops <85%
Surgical referral


The STROKE Association
Suspect a stroke?
Act FAST and call 999.
FAST
Facial weakness
Arm weakness
Speech problems
Time to call 999

What are the symptoms of stroke?

- Sudden weakness or numbness of the face, arm or leg on one side of the body
- Sudden loss or blurring of vision, in one or both eyes
- Sudden difficulty speaking or understanding spoken language
- Sudden confusion
- Sudden or severe headache with no apparent cause
- Dizziness, unsteadiness or a sudden fall, especially with any of the other signs

Why act FAST?

Stroke is a medical emergency. By calling 999, you can help someone reach hospital quickly and receive the early treatment they need. Prompt action can prevent further damage to the brain and help someone make a full recovery. Delay can result in death or major long-term disabilities, such as paralysis, severe memory loss and communication problems. Ambulance crews use FAST and with hospital staff can act fast to identify and diagnose a stroke quickly.

STROKE IS AN EMERGENCY!

LEARN TO RECOGNISE STROKE SYMPTOMS –

FAST!

FACE WEAKNESS

One side of your face is weak or paralysed

ARM WEAKNESS

Your arm feels numb or weak

SPEECH PROBLEM

Your speech is slurred or does not make sense

TIME

FAST! Assessment

The more **Time** you waste, the more **Brain** you waste.

CINCINNATI PREHOSPITAL STROKE SCALE

Facial Droop

- Normal: Both sides of face move equally
- Abnormal: One side of face does not move at all

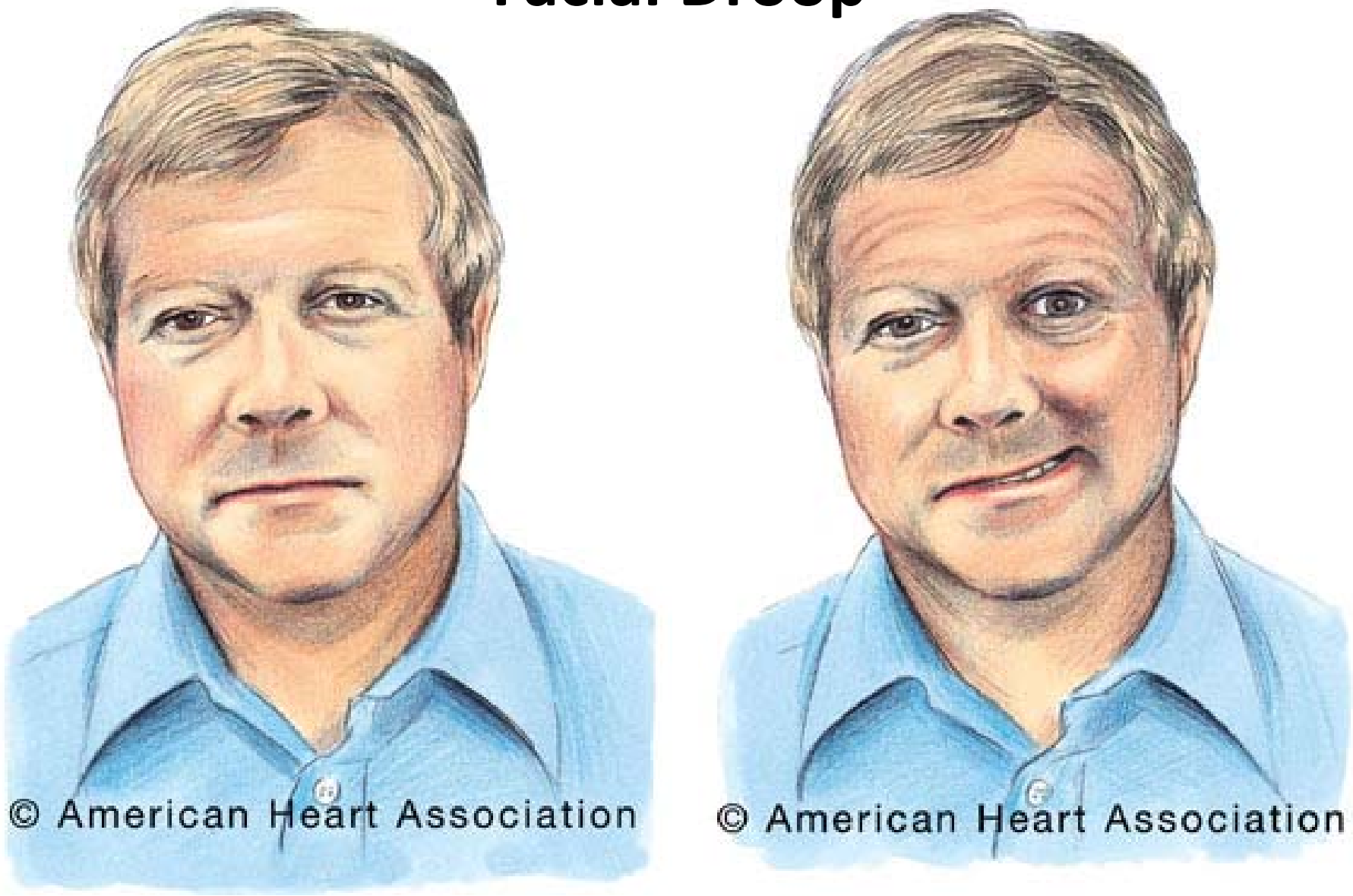
Arm Drift

- Normal: Both arms move equally or not at all
- Abnormal: One arm drifts compared to the other

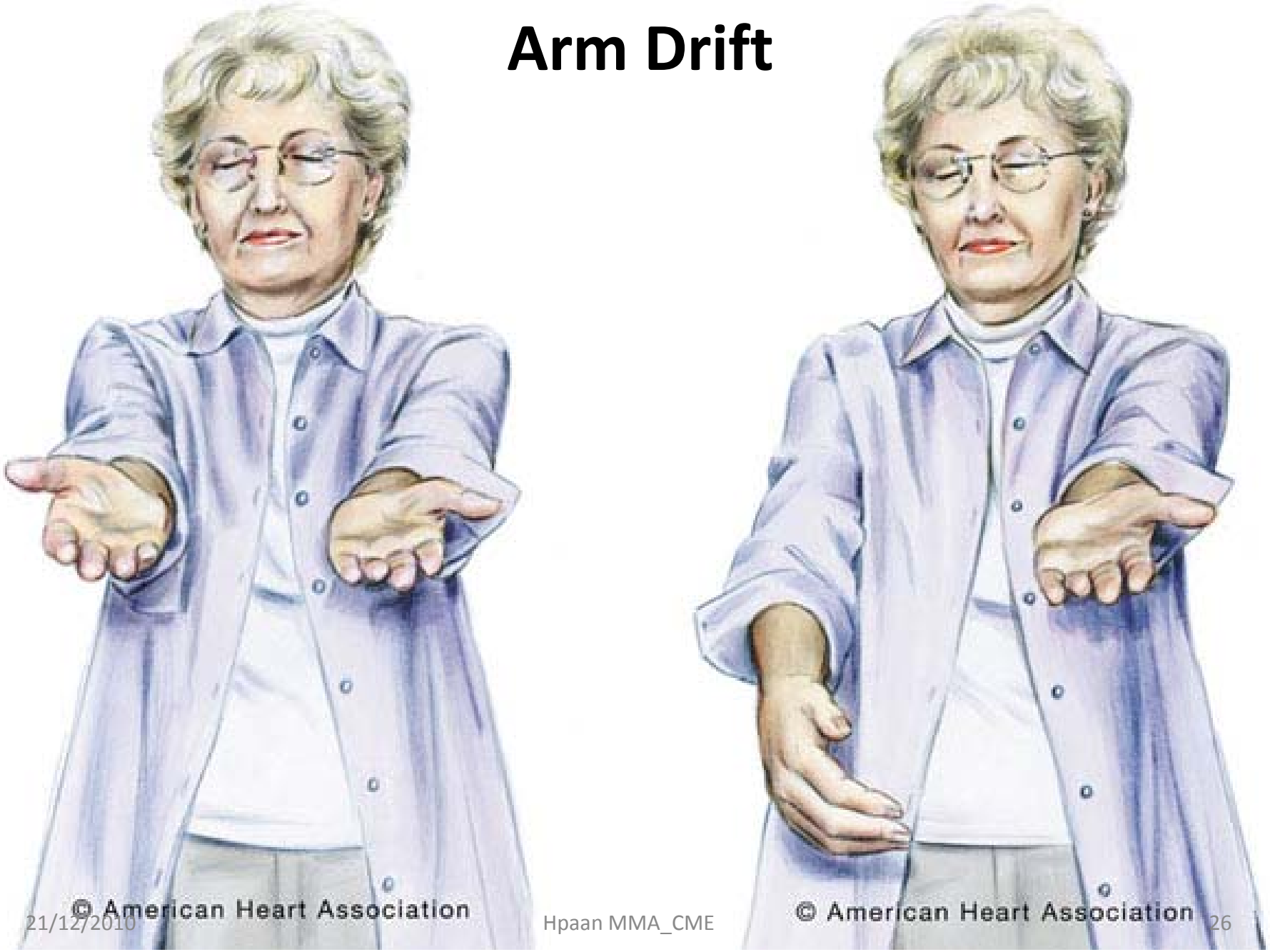
Speech

- Normal: Patient uses correct words with no slurring
- Abnormal: Slurred or inappropriate words or mute

Facial Droop



Arm Drift



Recognition of Stroke in the Emergency Room
Rosier

Date/time of symptom onset _____

Has there been loss of consciousness or syncope?

Y(-1) ❑ N(0) ❑

Has there been seizure activity?

Y(-1) ❑ N(0) ❑

Is there a NEW ACUTE onset or on awakening from sleep

Asymmetric facial weakness	Y(1)	❑	N(0)	❑
Asymmetric arm weakness	Y(1)	❑	N(0)	❑
Asymmetric leg weakness	Y(1)	❑	N(0)	❑
Speech disturbance	Y(1)	❑	N(0)	❑
Visual field defect	Y(1)	❑	N(0)	❑

** Total Score _____ (-2 to +6)

***Refer to stroke team if total score is 1 or more.**

ROSIER STROKE SCALE The aim of this assessment tool is to enable medical and nursing staff to differentiate patients with stroke and stroke mimics.

Has there been loss of consciousness or syncope	Yes **(-1)** ☐ No **(0)** ☐
Has there been seizure activity	Yes **(-1)** ☐ No **(0)** ☐

Is there a New Acute onset (or on awakening from sleep)

Asymmetric Facial Weakness	Yes **(+1)** ☐ No **(0)** ☐
Asymmetric Arm Weakness	Yes **(+1)** ☐ No **(0)** ☐
Asymmetric Leg Weakness	Yes **(+1)** ☐ No **(0)** ☐
Speech Disturbance	Yes **(+1)** ☐ No **(0)** ☐
Visual Field Defect	Yes **(+1)** ☐ No **(0)** ☐

Total score = _____ (-2 to +5)

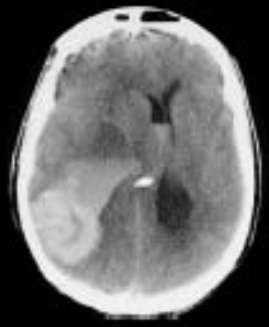
Stroke likely if total scores > 0.
If total score 0, -1 or –2 low probability of stroke but not completely excluded, needs further medical review

What is the lesion? Hemorrhagic vs. Ischemic Stroke

	Hemorrhagic	Ischaemic
• **Hypertension**	usually present	often present
• **Preceding TIA**	no	30% of cases
• **Onset**	often with activity	often at night or no activity
• **Course**	rapidly progressive	static (rarely stepwise)
• **Increased ICP**	yes	no
• **CT scan**	shows blood	normal or changes of infarction

CT (or MRI) is the only reliable way to rule out hemorrhage

Differentiating Haemorrhagic and Ischaemic Stroke



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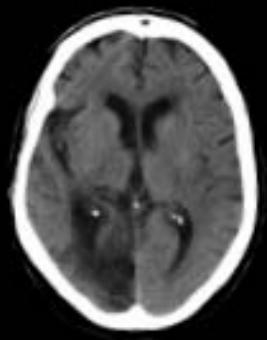


No clinical scoring system (Siraj, Guy's, others) reliably distinguishes between haemorrhagic stroke and ischaemic stroke,

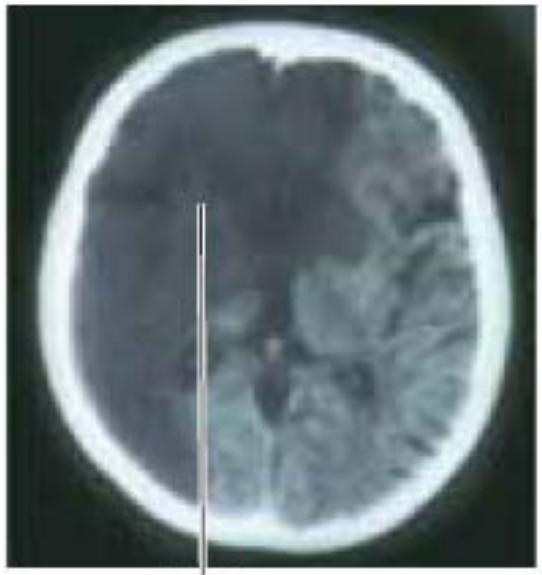
so imaging is essential

Rapid deterioration

Headache

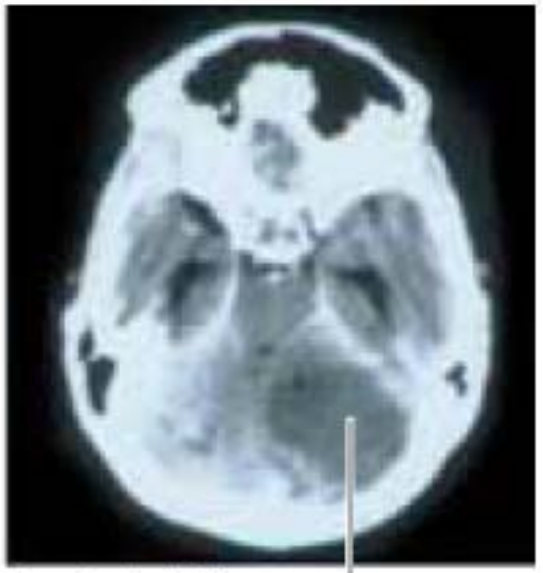
Vomiting

Suggest haemorrhagic stroke, although all can be seen in patients with ischaemia



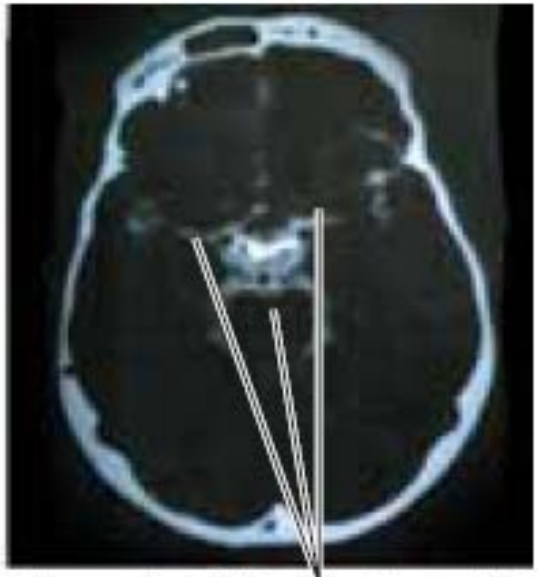
Territorial infarct
(anterior + middle cerebral a., CT)

Territorial infarct
(anterior cerebral a., CT)

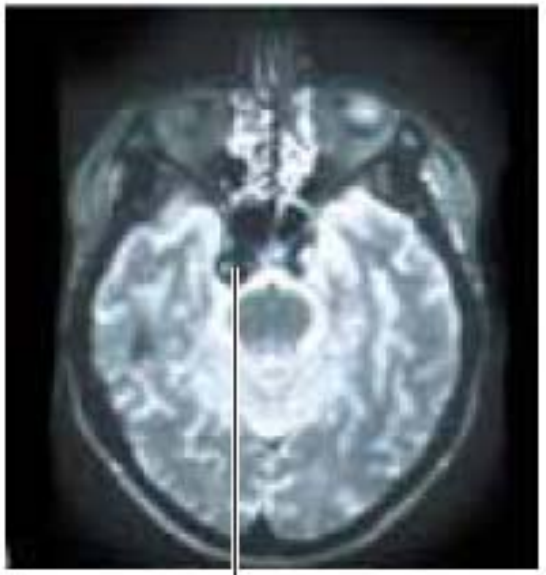


Territorial infarct
(posterior inferior cerebellar a., CT)

Intracerebral hemorrhage
(brain stem, CT)



Subarachnoid hemorrhage (CT)



Aneurysm
(internal carotid a., MRI)

Causes of stroke

Chart comparing features of transient ischemic attack (TIA), ischemic stroke, intracerebral hemorrhage (ICH), subarachnoid hemorrhage (SAH)

	TIA	Ischemic stroke	ICH	SAH
Decreased LOC	Uncommon in history, absent after minutes	Possible, but uncommon	Common (50%)	Common if large
Headache	Usually absent	10%, especially with arterial dissection	Common (40%)	Universal, unless patient unconscious
Focal symptoms and signs	Absent after minutes	Almost always	Very common	Common if large
Seizures	Absent	Uncommon	6–7%	10–25%
Nausea/vomiting	Absent	Uncommon	40–50%	Common
Head CT	Normal	Normal in first few hours, then hypodense regions	Blood in parenchyma	Blood in subarachnoid space

Immediate Evaluation

- Stabilization of the ABCs.
- Patients with stroke should have a **careful clinical assessment**, including history, physical examination, especially **brief and thorough neurological examination in a timely fashion**.
- Diagnostic tests

Guidelines for Emergency Management of patients with Suspected Stroke

Recommended	Not Recommended
• Manage ABCs	Dextrose-containing fluids in non-hypoglycemic patients
• Cardiac monitoring	Hypotension/excessive BP reduction
• Intravenous access	Excessive intravenous fluids

- Oxygen (as required O_2 saturation 92%)
- Assess for hypoglycemia
- Nil per os (NPO)
- Rapid transport to closest appropriate facility capable of treating acute stroke

Stroke Mimics and Clinical Features

• ***Conversion disorder***	Lack of cranial nerve findings, neurological findings in a nonvascular distribution, inconsistent examination
• ***HTN encephalopathy***	Headache, delirium, significant hypertension, cerebral oedema
• ***Hypoglycemia***	History of diabetes, serum glucose low, decreased level of consciousness
• ***Complicated migraine***	History of similar events, preceding aura, headache
• ***Seizures***	History of seizures, witnessed seizure activity, postictal period

What are the most frequent mimics of stroke?

From 7 studies*, in order of frequency:

Seizure

Sepsis

Syncope

Migraine

Functional

Toxic/Metabolic

Brain tumours

Vestibulopathy

Neuropathies (mono- and radiculo- combined)

Delirium (not explained by above)

*Stroke 2006;37:769, Lancet Neurology 2005;4:727-734, Stroke. 2003;34:1884, JNNP 2005;76:863-865, J Stroke & Cerebrovasc Dis 2008;17:23-25, Stroke 2009;40:77-85, Whiteley (unpublished)

Recommended emergency diagnostic tests

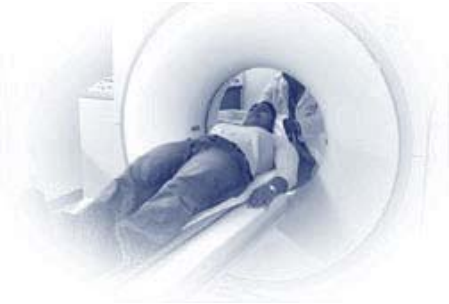
All patients:

- *Serum glucose*
- Full blood count
- *Serum electrolytes* and renal function tests
- Coagulations studies (PT, INR, APTT)
- *Electrocardiogram*
- Cardiac enzymes
- *Non-contrast CT of head*

Selected patients:

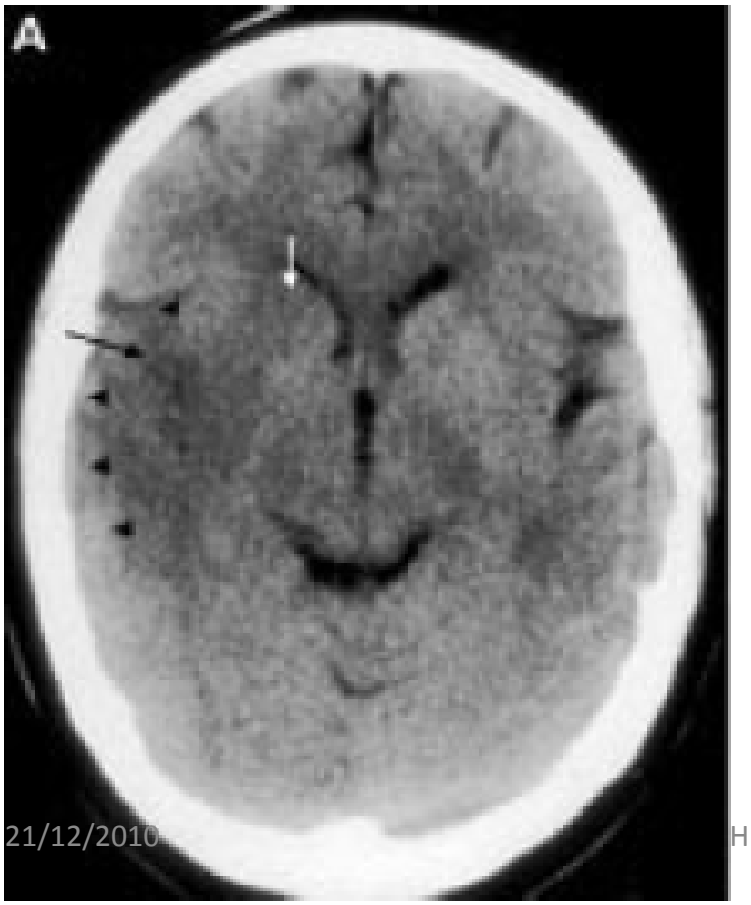
- Pregnancy test
- Liver-function tests
- Blood alcohol concentration
- Urine or serum toxicology screen
- Arterial blood gas
- Chest radiograph
- Lumbar puncture

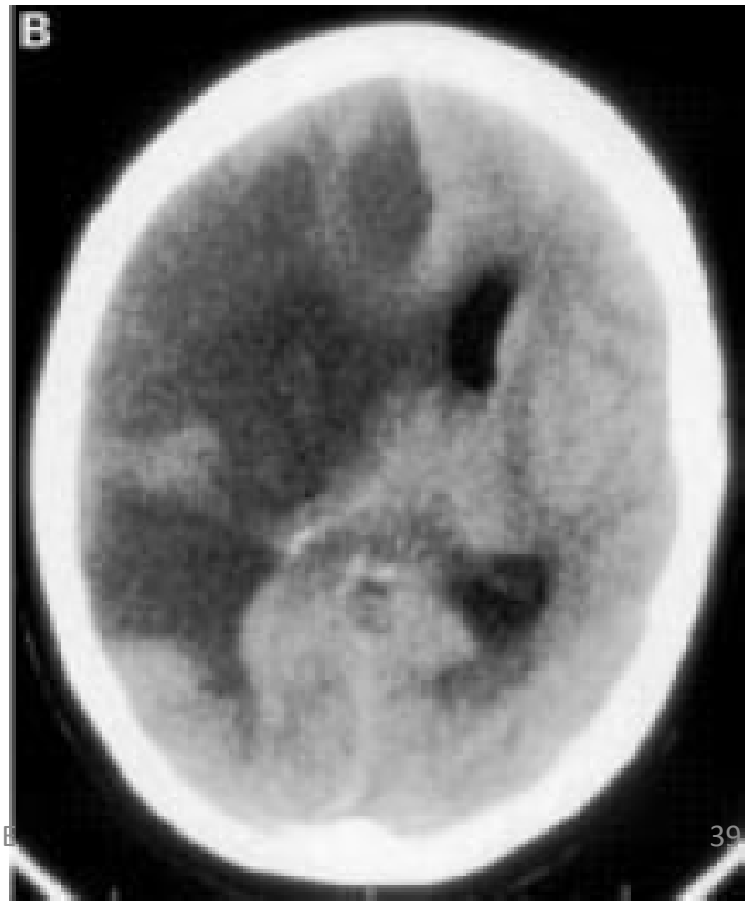
Neuroimaging for early diagnosis



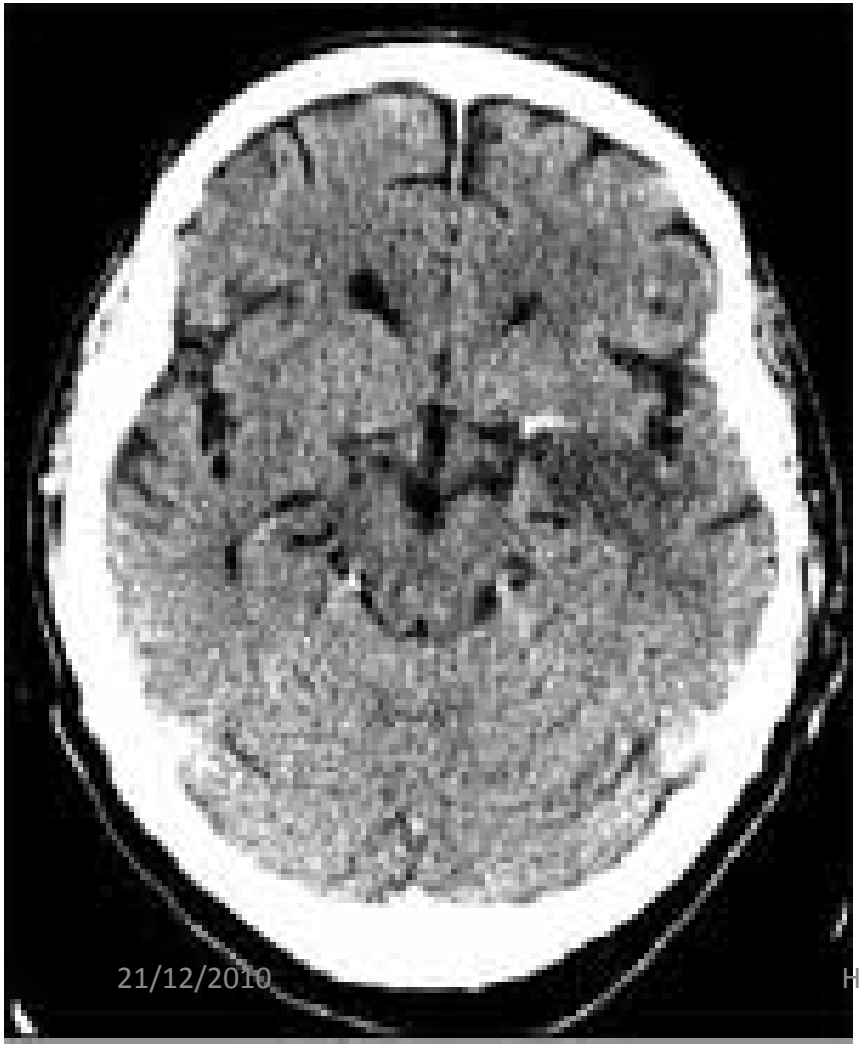
- Imaging of the brain is recommended before initiating any specific therapy (Class I, Level of Evidence A).
- Emergency non-contrast CT head identifies haemorrhage and can help distinguish non-vascular causes such as tumour.
- CT can identify subtle signs of early ischaemia or arterial occlusion.
- Loss of grey-white differentiation, especially in the insular ribbon or lentiform nucleus, and hemispheric sulcal effacement can be detected within 6 h of ischaemia.
- A clearly visible hypodensity on CT is rarely seen within 3 h of onset of stroke.

CT brain scan showing a right hemisphere total *anterior circulation infarct* (**A**) at ***four hours***, and (**B**) at ***five days*** after symptom onset.
Note on (**A**) the ***subtle signs of early infarction:*** loss of the basal ganglia on the right (white arrow—compare with the left where the caudate and lentiform nuclei are clearly visible), loss of the grey/white matter cortical differentiation (black arrowheads), a little swelling with sulcal effacement (black arrow and compare left side). On day 5 there is obvious hypodensity and massive infarct swelling with midline shift and obstruction of the left lateral ventricle.

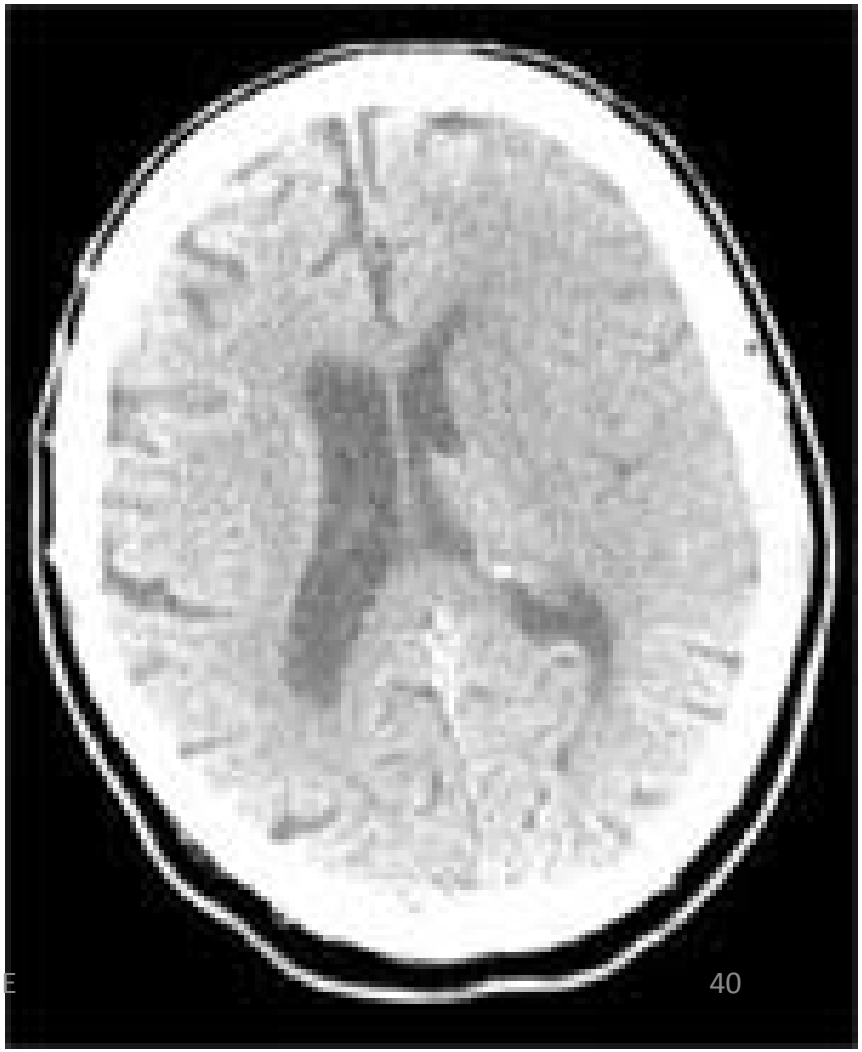




Acute CT at six hours showing "**dense MCA [middle cerebral artery] sign**."



CT scan showing complete left middle cerebral artery territory infarction, three days after the event.



NHS

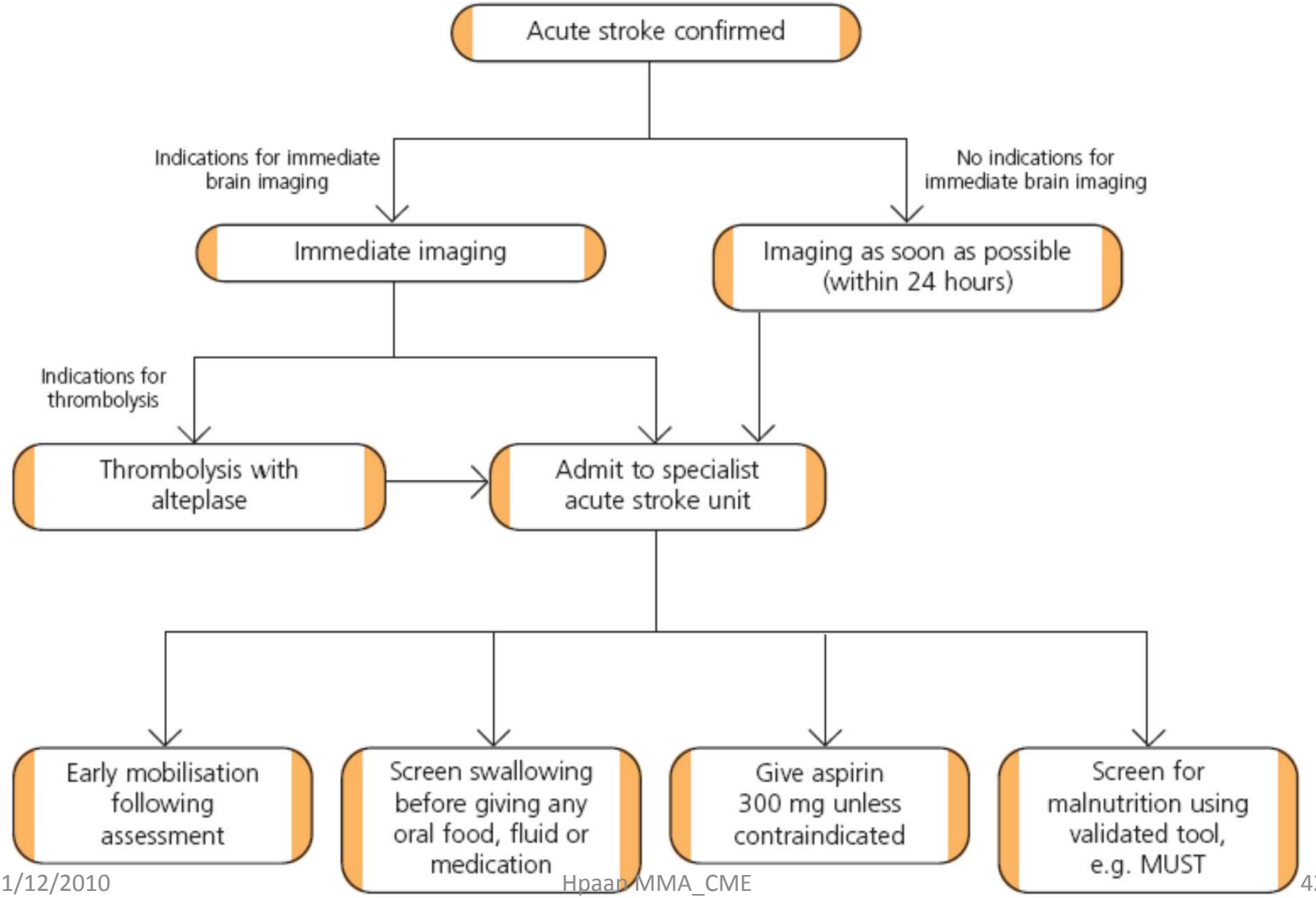
National Institute for Health and Clinical Excellence

Issue date: July 2008

Stroke

Diagnosis and initial management of acute stroke and transient ischaemic attack (TIA)

Emergency treatment for acute stroke



Pre-hospital Management

Stroke Chain of Survival

- *Detection* Recognition of stroke signs and symptoms
- *Dispatch Call* Call ? and priority EMS dispatch
- *Delivery* Prompt transport and pre-hospital notification to hospital
- *Door* Immediate ED triage
- *Data* ED evaluation, prompt laboratory studies, & CT imaging
- *Decision* Diagnosis and decision about appropriate therapy
- *Drug* Administration of appropriate drugs or other interventions

Criteria for admission to hospital versus initial management in the community

Admit immediately for:

- investigation to reach definitive diagnosis
- acute/rehabilitation care to optimize recovery
- immediate support of activities of daily living

Avoid or defer admission only if

- progressive advanced debility (cancer, dementia) and existing nursing support is adequate or
- extremely mild symptoms and rapid outpatient assessment is certain

General Medical Care

- Airway, ventilatory support, and supplemental O_2
- Body Temperature
- Cardiac monitoring and treatment
- Arterial hypertension and hypotension
- Hypoglycemia and hyperglycemia
- Fluid and Electrolytes

Arterial Hypertension

- A **cautious approach** to the treatment of arterial hypertension should be recommended (Class I, Level of Evidence C).
- **Urgent antihypertensive therapy** for patients who also have hypertensive encephalopathy, aortic dissection, acute renal failure, acute pulmonary edema, or acute myocardial infarction.
- **Theoretical reasons for lowering BP:** Reducing the formation of brain edema, lessening the risk of hemorrhagic transformation of the infarction, preventing further vascular damage, and forestalling early recurrent stroke.
- Patients with markedly elevated BP may have to lower BP by **≈15%** during the first 24 hours after onset of stroke.

Arterial Hypertension

- Medications should be withheld unless the **SBP is >220 mm Hg** or **the mean BP is >120 mm Hg** (Class I, Level of Evidence C).
- **No data** are available **to guide selection of medications** for the lowering of BP. (Class IIa, Level of Evidence C).
- **Initiation** of antihypertensive therapy **within 24 hours** of stroke is **relatively safe**.
- Generally, antihypertensive medications should be **restarted at ≈24 hours** for patients who have **preexisting hypertension** and are **neurologically stable** unless a specific contraindication to restarting treatment is known (Class IIa, Level of Evidence B).

Approach to hypertension in acute ischaemic stroke

Patients ineligible for thrombolysis

BP (mm Hg)	**Treatment**
SBP≤220 or DBP≤120	Observation
SBP>220 or DBP 121–140	Captopril (PO or IM)
	Labetalol (IV)
	Nicardipine infusion
DBP>140	Nitroprusside infusion*

*(5 mg/h, titrate up by 0.25 mg/h at 5- to 15-minute intervals, maximum dose 15 mg/h; when desired BP attained, reduce to 3 mg/h)

Blood Glucose

- **Persistent hyperglycemia (>140 mg/dL**) during the **first 24 hours** after stroke is associated with **poor outcomes**, and thus it should be treated.
- Serum glucose concentrations (**possibly >140 to 185 mg/dL**) probably should trigger administration of **insulin** (Class IIa, Level of Evidence C).
- Close monitoring of glucose concentrations with adjustment of insulin doses **to avoid hypoglycemia** is recommended.

Fluid and Electrolytes

- Fluid and electrolyte status should be closely monitored and corrected *to avoid plasma volume contraction*, *raised haematocrit*, and *impairment of rheologic properties of the blood*.
- **Hypotonic solutions** (Na Cl 0.45% or glucose 5%) are ***contraindicated*** due to the risk of brain oedema, increase consequent to reduction of plasma osmolality.

Specific treatment for Acute Ischaemic Stroke

(a) **Recannalizing Therapy**

Thrombolysis

Defibrinogating Enzymes

(b) **Antithrombotic Therapy**

Antiplatelets

Anticoagulants

(c) **Haemodilution**

(d) **Neuroprotectants**

Antiplatelet Agents

- The oral administration of **aspirin** (initial dose is 325 mg) **within 24 to 48 hours** after stroke onset is recommended for treatment of most patients (Class I, Level of Evidence A).
- The administration of **clopidogrel** alone or in combination with aspirin is not recommended for the treatment of acute ischemic stroke (Class III, Level of Evidence C).

Anticoagulants

- ***Urgent anticoagulation*** with the goal of **preventing early recurrent stroke**, **halting neurological worsening**, or **improving outcomes after acute ischemic stroke** is not recommended for treatment of patients with acute ischemic stroke (Class III, Level of Evidence A).
- Urgent anticoagulation is not recommended for patients with **moderate to severe strokes** because of an increased risk of serious intracranial hemorrhagic complications (Class III, Level of Evidence A).

Neuroprotective Agents

- At present, no intervention with putative neuro-protective actions has been established as effective in improving outcomes after stroke, and therefore none currently can be recommended (Class III, Level of Evidence A).
- Improved functional outcome for patients treated with ***Cerebrolysin*** within 12 – 24 hrs.
- Positive effects of ***Cerebrolysin*** on motor function and activities of daily living, improvement of cognitive function after the stroke in a recently completed randomized controlled study.
- Try to confirm a potent anti-ischaemic effect in current larger on-going trials in Asian countries.

General Acute Treatment after hospitalization

- General Care
- Nutrition and hydration
- Infections
- Deep vein thrombosis and pulmonary embolism
- Other care

Treatment of Acute Neurological Complications

- Ischaemic brain swelling
- Haemorrhagic transformation
- Electrolytes imbalance
- Seizures

Initial management of Brain swelling

- Restriction of ***free water*** to avoid hypo-osmolar fluid that may worsen oedema.
- To correct hypoxemia, hypercarbia, and hyperthermia
- To elevate the head of the bed at 20˚ to 30˚
- To avoid antihypertensive agents particularly those that include cerebral vasodilatation

Ischemic Brain Swelling

- **Decompressive surgical evacuation** of a **space occupying cerebellar infarction** is a potentially lifesaving measure, and clinical recovery may be very good (Class I, Level of Evidence B).
- **Unproven aggressive medical measures**, including **osmotherapy**, have been recommended for treatment of deteriorating patients with malignant brain edema after large cerebral infarction (Class IIa, Level of Evidence C).
- **Hyperventilation** is a short-lived intervention.
- **Corticosteroids are not recommended** for treatment of cerebral edema and increased intracranial pressure complicating ischemic stroke (Class III, Level of Evidence A).

Seizures

- Seizures usually occur in the first 24 h and are partial with or without secondary generalisation.
- **AEDs** are recommended if a patient has ***suspected*** or ***witnessed seizures***.
- **Recurrent seizures** after stroke should be treated in a manner similar to other acute neurological conditions (Class I, Level of Evidence B).
- **Prophylactic** administration of a**nticonvulsants** to patients with stroke but who have not had seizures is not recommended (Class III, Level of Evidence C).

Role of the GP in managing stroke patients at home

- Nursing care
- Physiotherapy, occupational therapy and speech therapy
- Social support
- Preventing further stroke for controlling risk factors
  - Stop smoking
  - Avoid alcohol excess
  - Control diabetes
  - Encourage exercise
  - Lower cholesterol
    - if scheme heart disease is present
    - if age < 75
    - if cholesterol x 10 (mmol/L) > age (y)

Aggressive strategy for controlling risk factors

- Stop smoking
- Consider nicotine patch
- Take caution with zyban since stroke increases seizure risk
- Avoid alcohol excess
- Control diabetes
- Consider insulin for poorly controlled type II diabetes
- Encourage exercise
- Enroll in exercise classes, e.g. cardiac rehabilitation, etc.
- Lower cholesterol
- Use a statin, aim for cholesterol < 5 mmol/L and HDL ratio < 4.0
- Consider second-line antiplatelet drug, possibly unusual antiplatelet combination(s)

Recommendations for Antiplatelet Therapy

Class I Recommendations

1. For patients with noncardioembolic ischemic stroke or TIA, *antiplatelet agents* rather than oral anticoagulation are recommended to reduce the risk of recurrent stroke and other cardiovascular events (*Class I, Level of Evidence A*).
2. *Old recommendation*: Aspirin (50 to 325 mg/d), the combination of aspirin and extended-release dipyridamole, and clopidogrel are all acceptable options for initial therapy (*Class IIa, Level of Evidence A*).

   New recommendation: Aspirin (50 to 325 mg/d) monotherapy, the combination of aspirin and extended-release dipyridamole, and clopidogrel monotherapy are all acceptable options for initial therapy (*Class I, Level of Evidence A*).*

* *No evidence of beneficial effect on increasing aspirin dose; no single agent or combination as alternative while receiving aspirin.*

Recommendations for Antiplatelet Therapy

3. *Old recommendation*: Compared with 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 of Evidence A*).

   New recommendation: The combination of aspirin and extended-release dipyridamole is recommended over aspirin alone (*Class I, Level of Evidence B*).

Class III Recommendation

- Increased risk of haemorrhage in addition of aspirin to clopidogrel
- Combination therapy not routinely recommended unless there is a specific indication (ie, coronary stent or acute coronary syndrome)

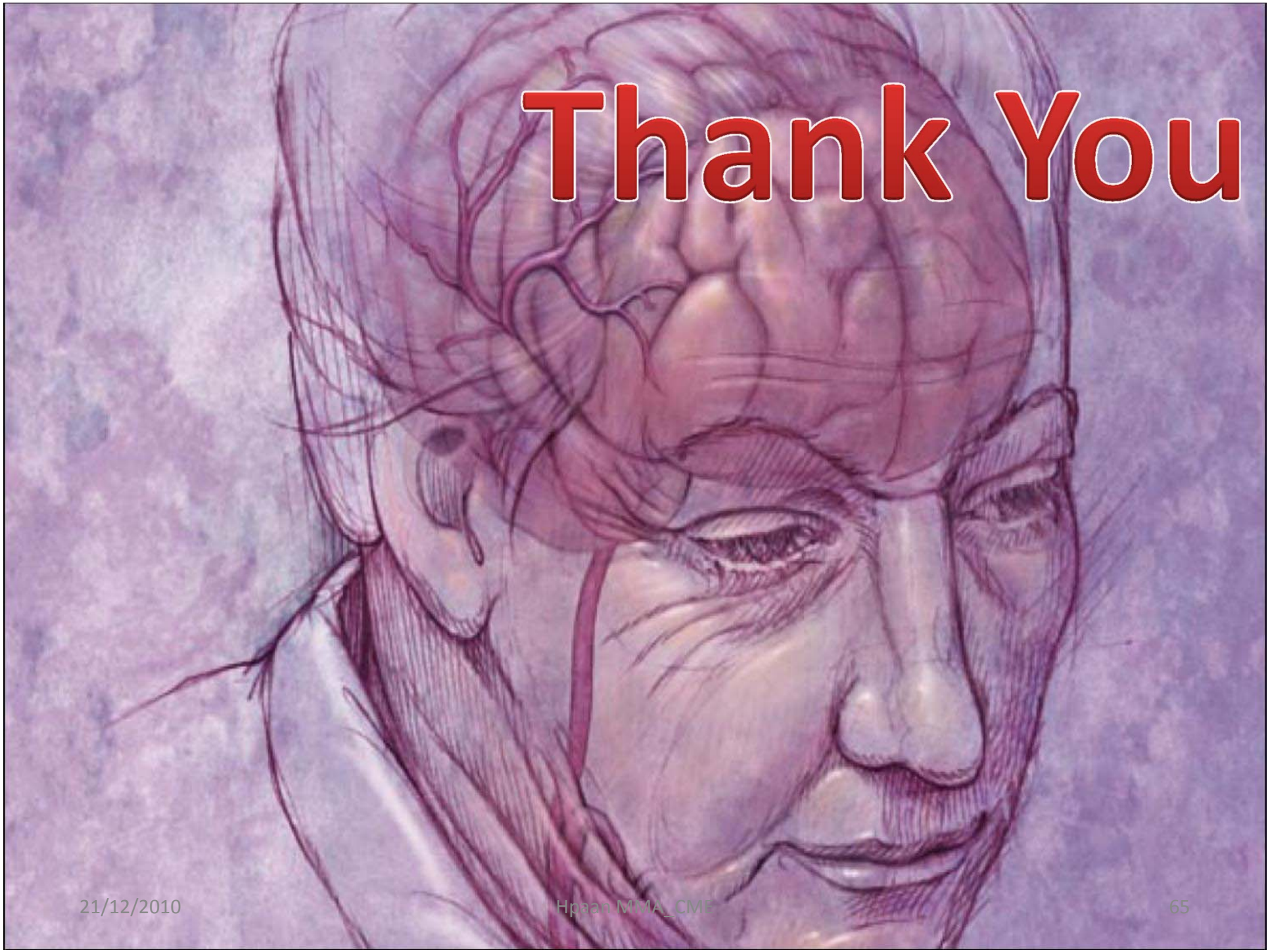
Recommendations for Lipid Management

Class I Recommendations

- *Ischemic stroke or TIA patients with elevated cholesterol, comorbid coronary artery disease, or evidence of an atherosclerotic origin* should be managed according to NCEP III guidelines, which include *lifestyle modification, dietary guidelines,* and *medication recommendations*. (C*lass I, Level A)*
- *Statin* agents are recommended, and the target goal for cholesterol lowering for those with CHD or symptomatic atherosclerotic disease is an LDL-C level of <100 mg/dL. An LDL-C <70 mg/dL is recommended for very high-risk persons with multiple risk factors. (*Class I, Level A)*

New Recommendation

- On the basis of the SPARCL trial, administration of statin therapy with intensive lipid- lowering effects is recommended for patients with *atherosclerotic ischemic stroke* or *TIA* and *without known CHD* to reduce the risk of stroke and cardiovascular events. (*Class I, Level B)*


Thank You