

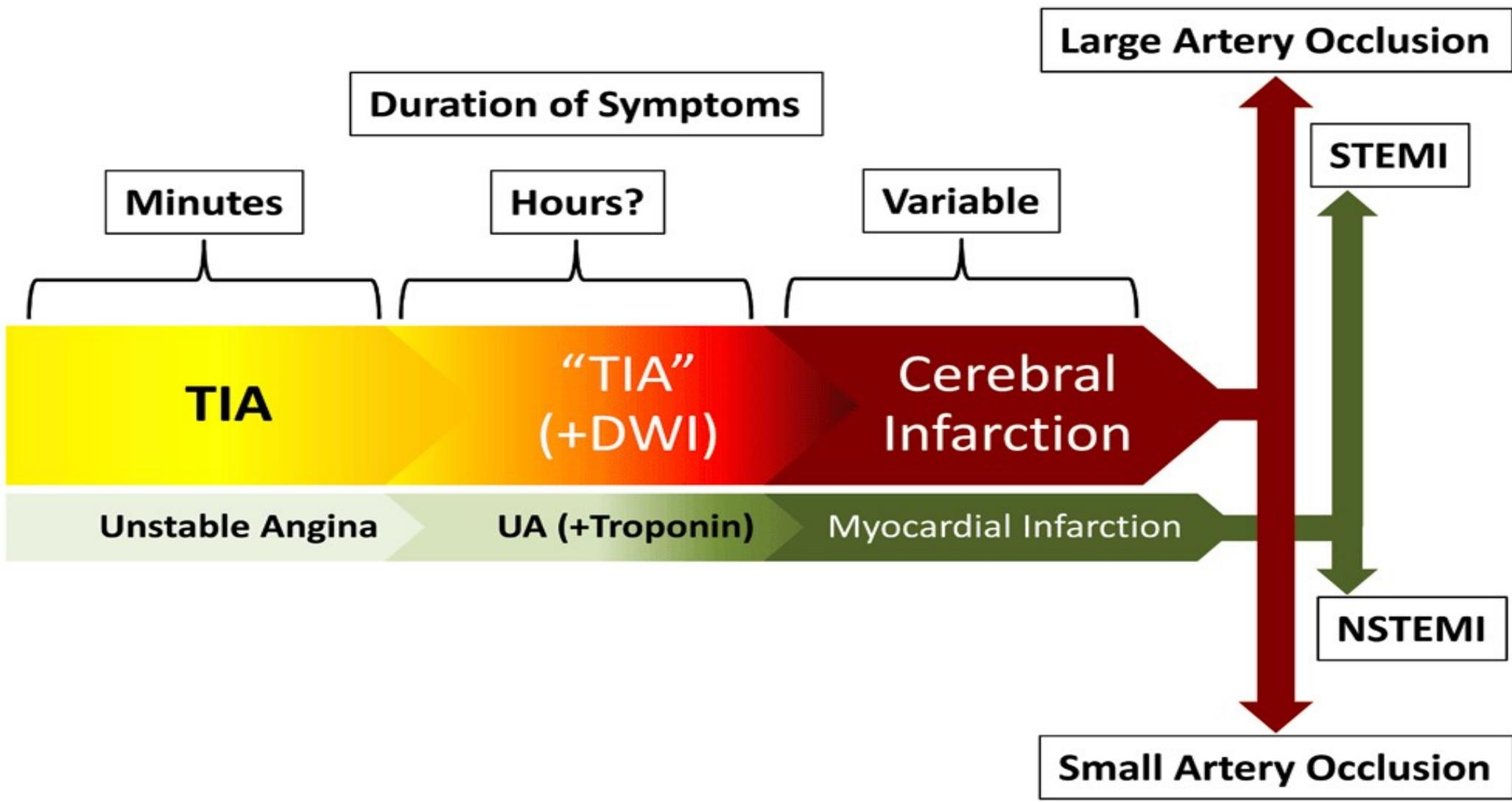
**STROKE AND TIA:
NEWER APPROACH IN MANAGEMENT**

**PROF M.A. HASSAN CHOWDHURY
FCPS FRCP FACP
DIRECTOR BITID
FOUZDERHAT CHATTOGRAM**

The Burden of Stroke

- Most common life-threatening neurologic disease
- It is the 2nd leading causes of death and third leading cause of disability
- Every year over 17 million people worldwide suffer a stroke, with 5 million dies & the 5 million left significantly disabled.
- The incidence stroke in falling in some developed countries but rising in developing countries.

TIA TO STROKE



What is a transient ischemic attack?

- Classical definition: Episode of focal cerebral, retinal, or spinal cord ischemia causing transient neurologic dysfunction lasting <24 h (most TIAs resolve in <1 h)

But : despite complete symptom resolution... 20%-50% with TIA have evidence of acute tissue infarction on MRI

- AHA revised definition: TIA should only refer to transient episode of neurologic dysfunction caused by focal brain, spinal cord or retinal ischemia without evidence of acute infarction, regardless symptoms or duration

What is the spectrum of presentations for patients with TIA?

➤ Symptoms of TIA

- Impaired speech and/or language
- Visual loss in one or both eyes
- Double vision
- Facial drooping
- Swallowing dysfunction
- Unilateral weakness
- Unilateral sensory loss
- Impaired limb coordination
- Vertigo
- Gait dysfunction

How should clinicians assess the risk for subsequent stroke in patients after TIA?

➤ Clinical risk scores: ABCD²

- Age: ≥ 60 y = 1 point
- Systolic BP ≥ 140 mm Hg and/or diastolic BP ≥ 90 mm Hg = 1 point
- Unilateral weakness = 2 points, Speech impairment = 1 point
- Diabetes: yes = 1 point
- Symptom duration: ≥ 60 min = 2 points; 10-59 min = 1 point

Score	Risk	Stroke Risk		
		2 Days	7 Days	90 Days
0-3	Low	1.0	1.2	3.1
4-5	Moderate	4.1	5.9	9.8
6-7	High	8.1	11.7	17.8

What diagnostic tests are helpful in diagnosis?

- **Brain CT**: To exclude brain hemorrhage, large mass lesions, and identify old areas of infarction
- **Brain MRI**: Evidence acute infarction in 20%-50% with TIA
- **Carotid US**: Sensitivity & specificity 80%-90% for carotid bifurcation stenosis >70%; not helpful for TIA in vertebrobasilar system
- **Transcranial doppler US**: Sensitivity ~70%; specificity 30%-50% for intracranial stenosis >50%
- **MRA, CTA**: Sensitivity & specificity 80%-90% for stenosis >50%; Gd-enhanced cervical MRA ups accuracy; CTA requires IV contrast

- **ECHO**: To detect intracardiac thrombus, tumors, valve disorders
- **EKG**: To identify AF
- **Serum glucose & hemoglobin A_{1C}**: To detect latent diabetes mellitus
- **Serum lipids**: To detect hyperlipidemia
- **Clotting studies**: Obtain baseline prothrombin/partial thromboplastin time to prep for possible anticoagulation

What drug therapy should consider for patients having acute TIA?

Aspirin

- Antiplatelet: for acute TIA; to prevent stroke

Combined aspirin + dipyridamole

- Antiplatelet: benefit over aspirin alone; similar to clopidogrel

Clopidogrel

- Antiplatelet: for acute TIA in patients with aspirin allergy

Heparin

- Anticoagulant: consider if documented cardioembolic source, severe large vessel stenosis, history of multiple TIAs

Warfarin

- Anticoagulant: for TIA due to AF; reduces stroke, recurrent TIA

Dabigatran

- Anticoagulant: for TIA due to AF; direct thrombin inhibitor; more effective than antiplatelet Rx in this setting

What surgical or other non drug therapies can be used to prevent recurrent TIA or stroke?

➤ Carotid Endarterectomy

- If carotid stenosis $\geq 50\%$: reduces future stroke risk (especially when stenosis $> 70\%$)
- Best if performed within 2 weeks of TIA, especially when carotid stenosis 50%-69%

➤ Carotid angioplasty and stenting

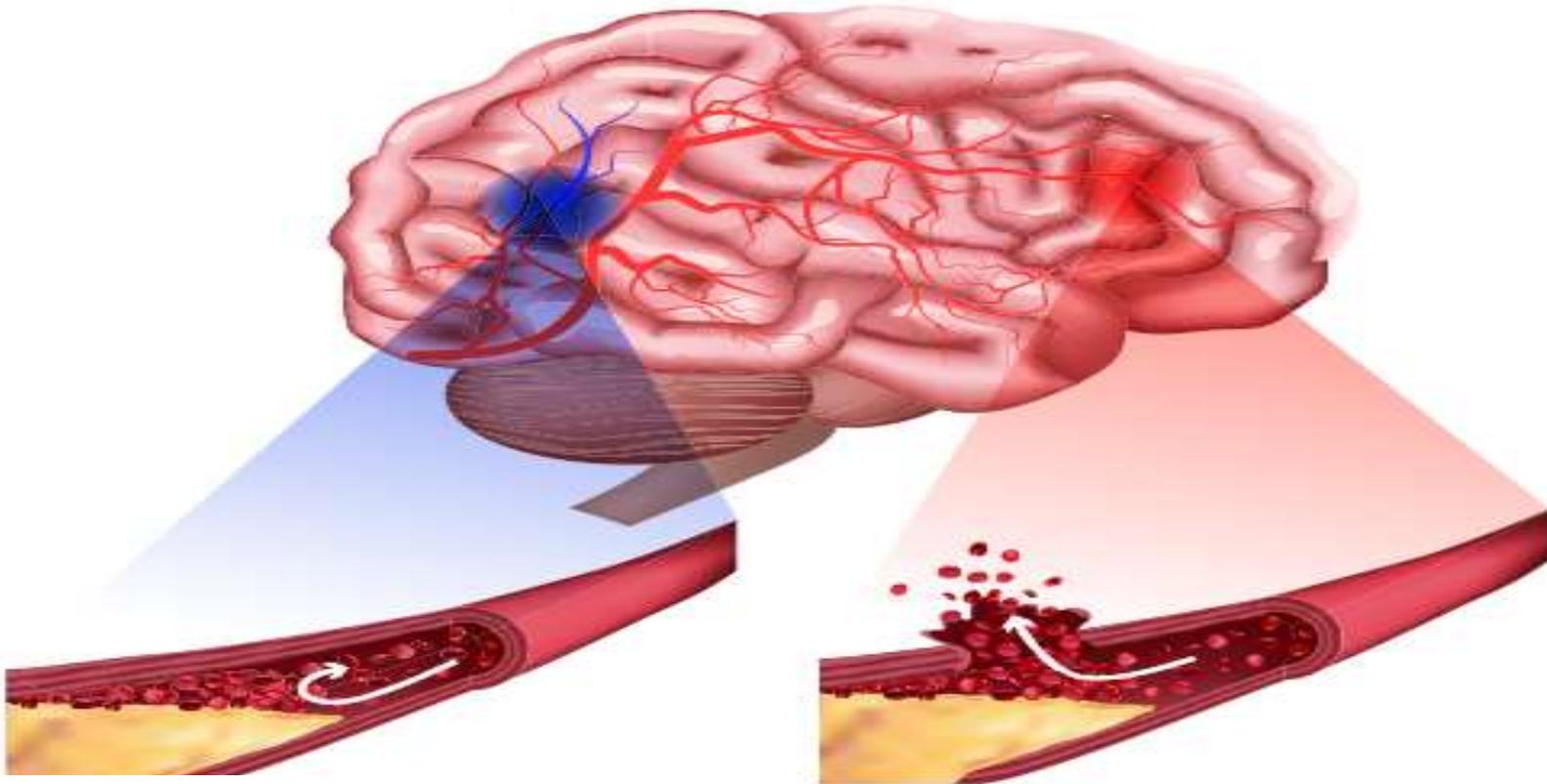
- Alternative to CEA
- Use if surgery contraindicated (high carotid bifurcation, previous neck radiation, extremely high cardiac risk)

STROKE

The **WHO** clinically defining stroke as the rapid development of clinical signs & symptoms of a focal neurological disturbance lasting more than 24 hours or leading to death with no apparent cause other than vascular origin.

An **updated definition of stroke** is an acute episode of focal dysfunction of brain, retina or spinal cord lasting longer than 24 hour or of any duration if imaging CT or MRI or autopsy shows as focal Infraction or Hemorrhage relevant to symptoms

Brain Stroke



Ischemic
Blockage of blood vessels;
lack of blood flow to affected area

Hemorrhagic
Rupture of blood vessels; leakage of
blood

Modifiable and non-modifiable risk factors for stroke

Modifiable risk factors	Non-modifiable risk factors
Hypertension	Age
Cardiac disease	Gender
Diabetes	Race
Hyperlipidemia	Hereditiy
Cigarette smoking	Previous history of vascular event
Alcohol consumption	High fibrinogen
Lifestyle factors, obesity, lack of physical activity and poor diet	Sickle cell disease
Oral contraceptive	
Polycythemia	
Transient ischemic attack	

Classification of Stroke

Pathological Classification:

- Ischemic-80%
 - Thrombotic
 - Embolic
- Haemorrhagic-20%
 - Intracranial Hemorrhage (ICH)
 - Subarachnoid Hemorrhage(SAH)

Clinically ischaemic stroke syndrome

- 1.Total anterior circulation syndrome
- 2.Partial anterior circulation syndrome,
- 3.Lacunar syndrome
- 4.Post circulation syndrome

Etiological subtypes of ischemic stroke

ASCOD

- A- Atherosclerotic
- S- Small Vessel
- C- Cardiac Pathology
- O- Other Causes
- D- Dissection

SIGNS AND SYMPTOMS

Contralateral hemiparesis
(leg > face and arm)

Contralateral hemiparesis
(face and arm > leg)

Aphasia

Monocular blindness
(amaurosis fugax)

Diplopia, dysarthria, dysphagia,
vertigo, gait imbalance, weakness

VESSEL

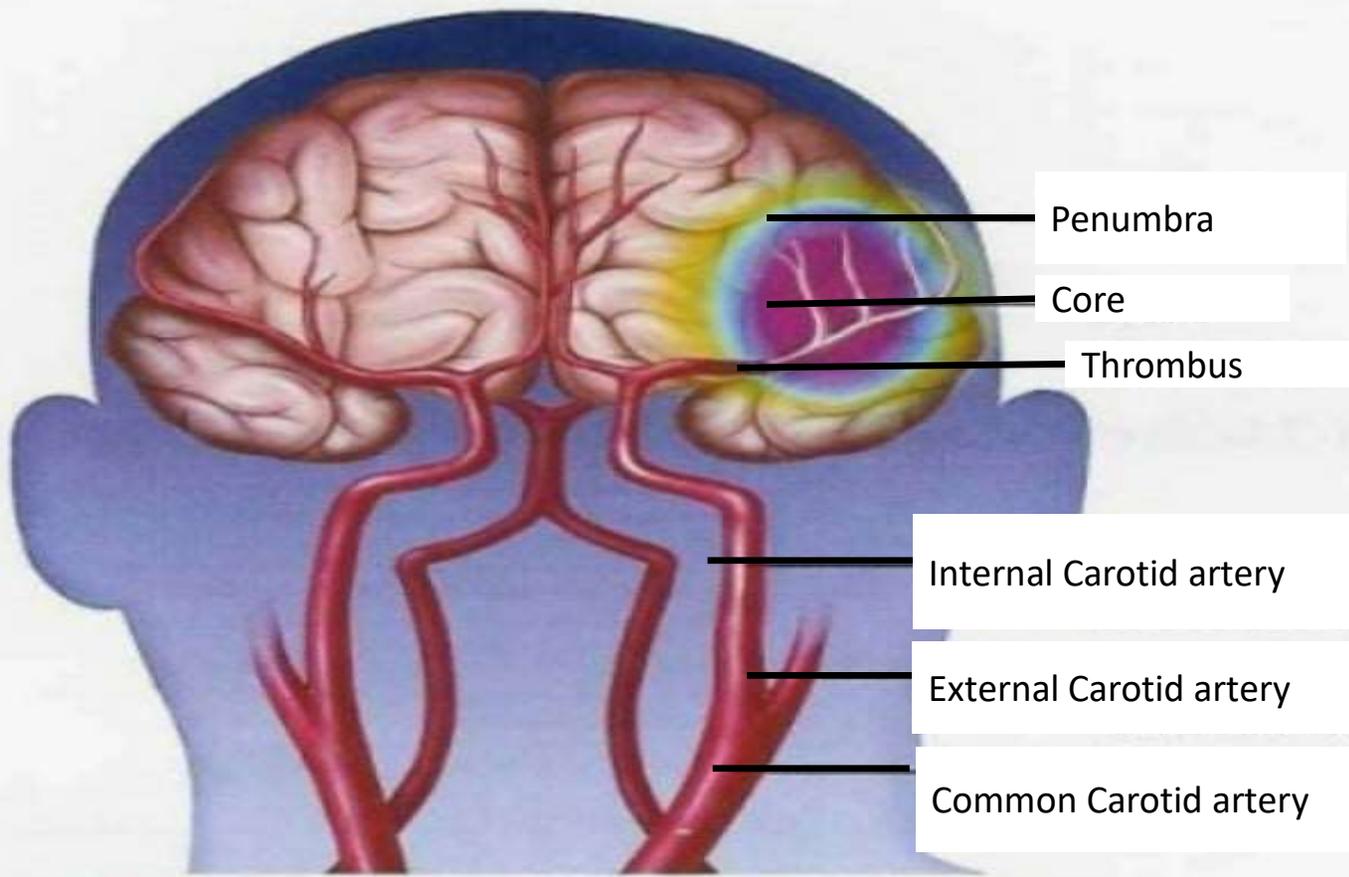
Anterior cerebral artery

Middle cerebral artery

Left middle cerebral artery

Internal carotid artery

Vertebral and basilar arteries



Penumbra

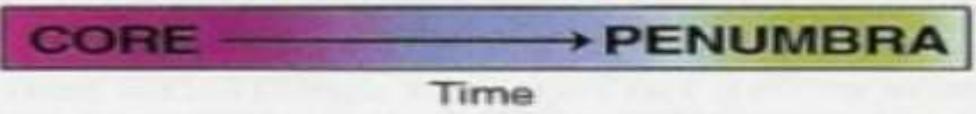
Core

Thrombus

Internal Carotid artery

External Carotid artery

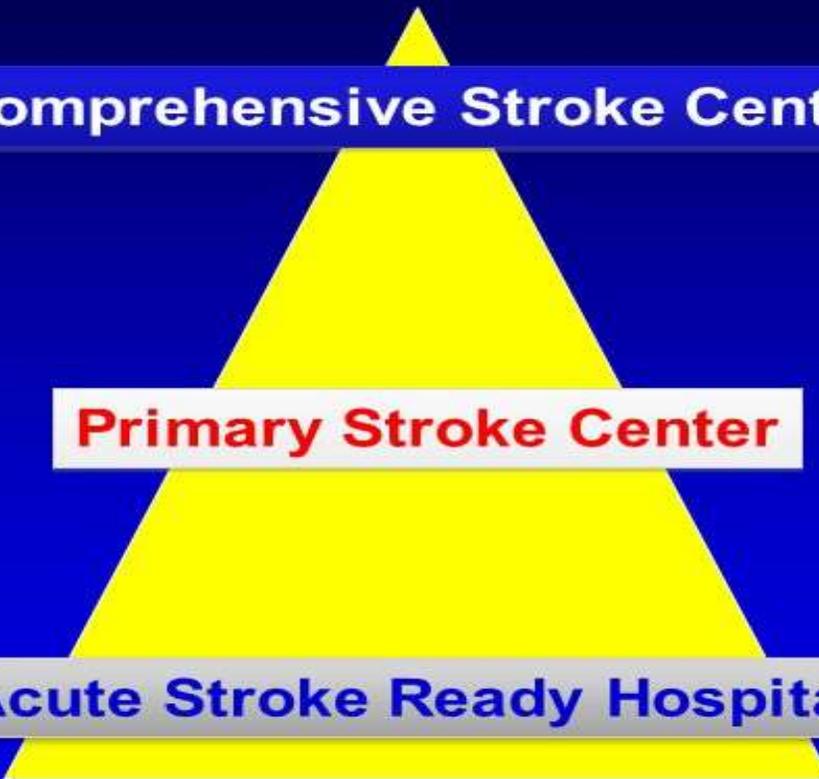
Common Carotid artery



Management Planning of Acute Stroke

- . Pre-hospital care
- . Early assessment and diagnosis
- . Acute medical and surgical management
- . Secondary prevention
- . Rehabilitation
- . Managing complications
- . Discharge planning and transfer of care
- . Community participation and long-term care

Characteristics of Different Stroke Centers



Comprehensive Stroke Center

**Academic Medical Center
Tertiary Care facility**

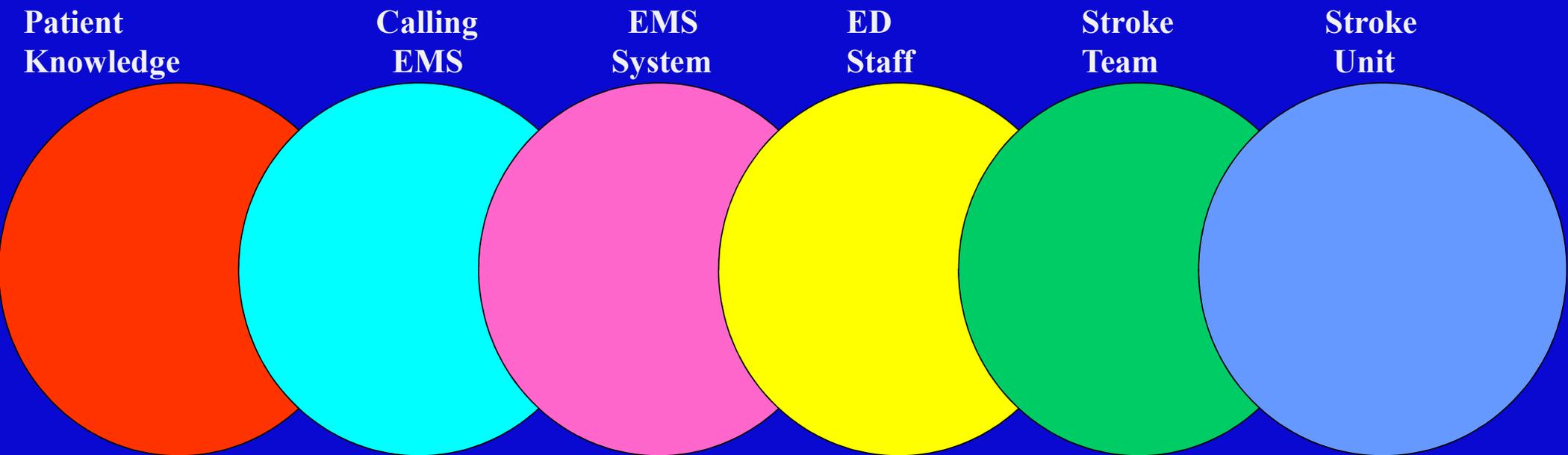
Primary Stroke Center

**Wide range of hospitals;
standard stroke care; stroke unit;
use TPA**

Acute Stroke Ready Hospital

**Rural hospitals; basic care;
drip and ship;
use tele-technologies**

Emergent Stroke Care and the Chain of Survival



Door to treatment <60 min



0 min

Suspected stroke patient arrives at ED



≤ 10 min

Complete initial Pt evaluation, including patient history and time last known well/symptom onset lab work assess using NIHSS



≤ 15 min

Notify stroke team (including neurologic expertise)



≤25 min

Initial CT scan



≤45 min

Interpret CT scan and labs review patient eligibility for Alteplase



≤60 min

Give Alteplase bolus and initiate infusion in eligible patients

Pre hospital Assessment

When Stroke Strikes, Act F.A.S.T.



FACE

Smile.

Does one side of the face droop?



ARMS

Raise both arms.

Does one arm drift downward?



SPEECH

Repeat a sentence.

Are they able to speak clearly?
Can they repeat the sentence?



TIME

Time is critical.

Call 911. Get to the hospital immediately. Brain cells are dying. **Every Minute Counts!**

Stroke Mimics

Structure Stroke Mimics

- 1) Primary & Metastatic Bone Tumors
- 2) Extradural or subdural haematoma
- 3) Demyelination
- 4) Cerebral abscess

Functional Stroke Mimics

- 1) Todd's paresis
- 2) Hypoglycemia
- 3) Migrations aura
- 4) Focal seizures
- 5) Meniere's disease
- 6) Conversion disorder
- 7) Encephalitis

Neurological Examination and Stroke Scale Scores

- A useful tool in quantifying neurological impairment is available by **the National Institutes of Health Stroke Scale (NIHSS)**.
- This scale easily used, is reliable and valid, provides insight to the location of vascular lesions, and is correlated with outcome in patients with ischemic stroke.
- It focuses on **6 major areas** of the neurologic examination and **42 points**
 - (1) level of consciousness
 - (2) visual function
 - (3) motor function
 - (4) sensation and neglect
 - (5) cerebellar function and
 - (6) language.

Diagnostic Tests

Evaluation of a Patient With Suspected Acute Ischemic Stroke

All patients:

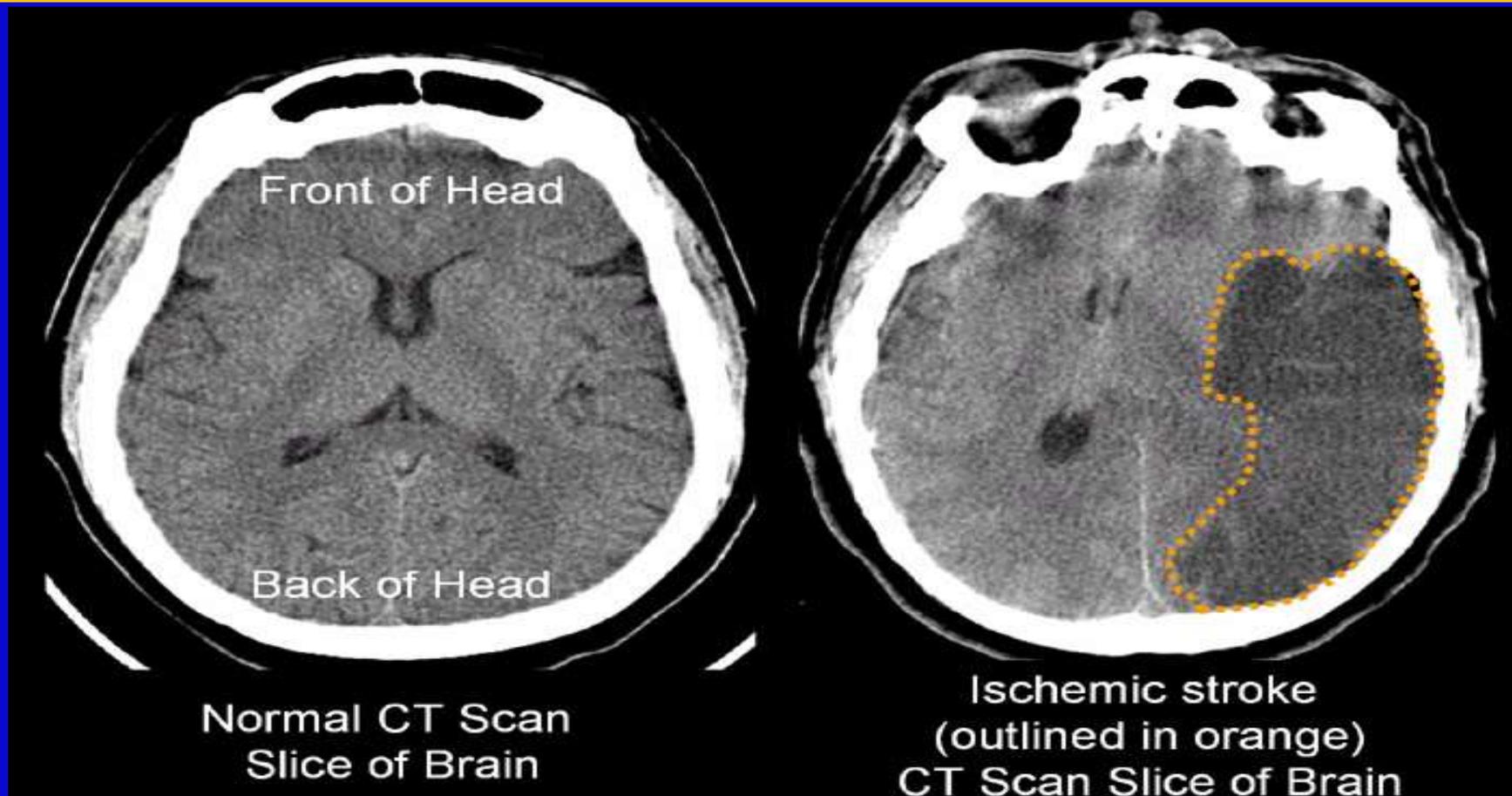
- Non contrast brain CT or brain MRI
- Blood glucose
- Serum electrolytes/renal function tests
- ECG
- Complete blood count

Diagnostic Tests (cont.)

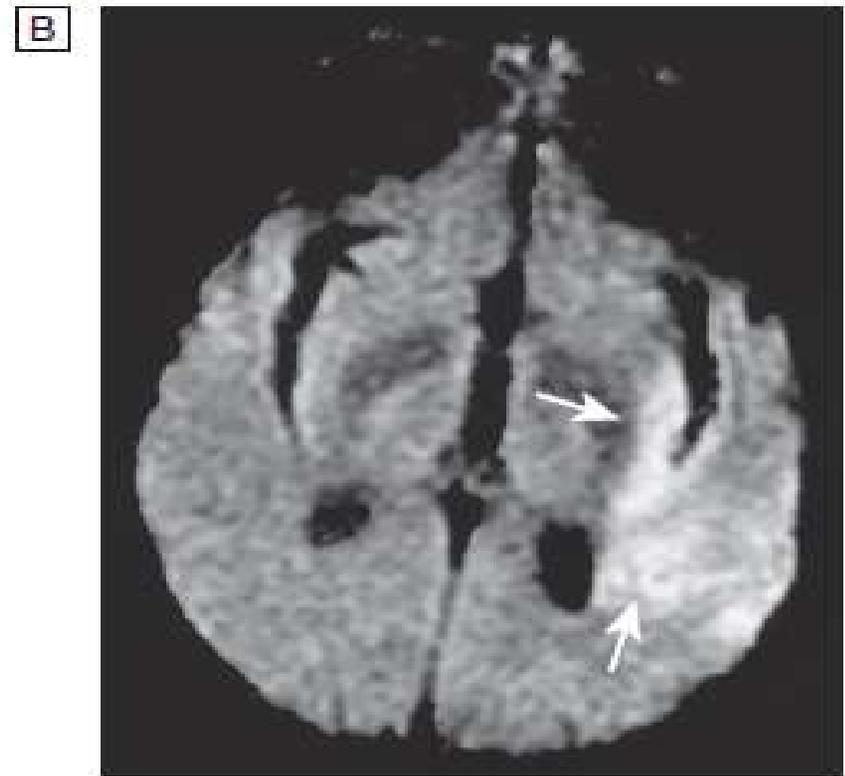
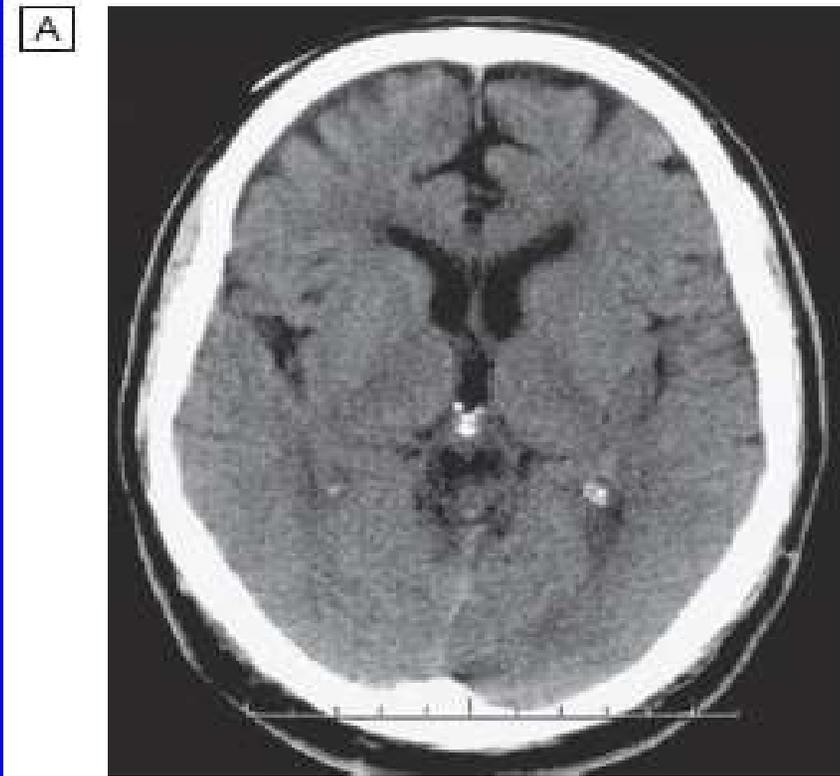
Selected patients

- Markers of cardiac ischemia
- Prothrombin time/APTT
- Hepatic function tests
- Toxicology screen
- Blood alcohol level
- Arterial blood gas tests (if hypoxia is suspected)
- Chest radiography (if lung disease is suspected)
- Lumbar puncture (if subarachnoid hemorrhage is suspected and CT scan is negative for blood)
- Electroencephalogram (if seizures are suspected)

CT Scan of Acute Ischemic Stroke (Left MCA territory)



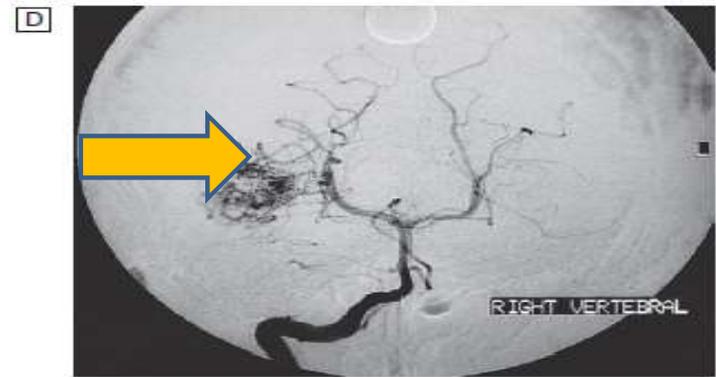
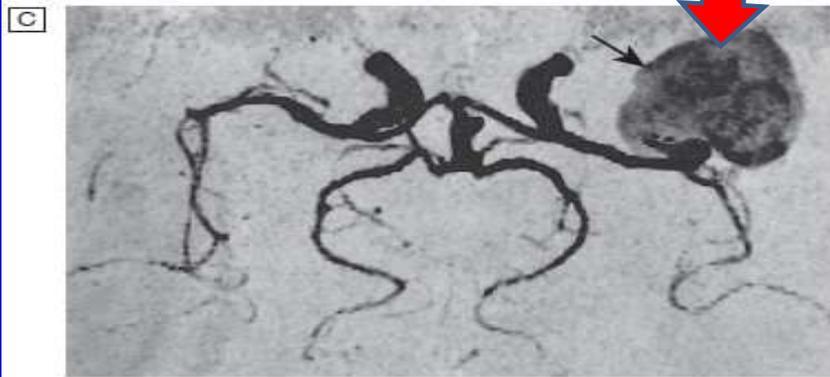
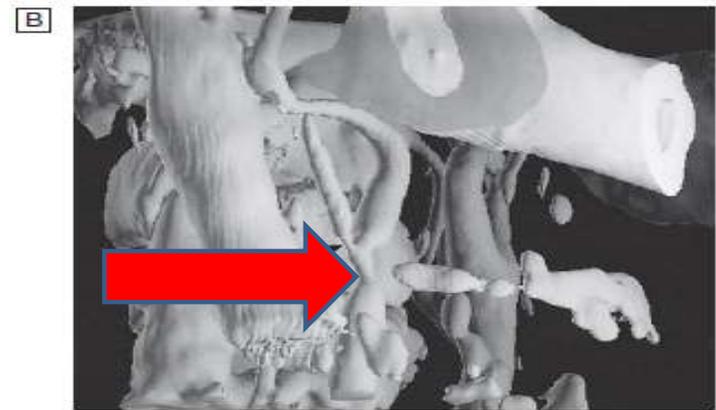
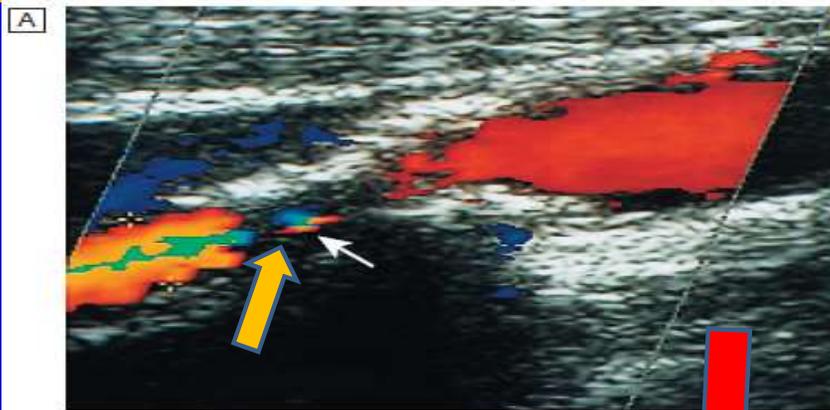
Acute stroke seen on CT scan with corresponding MRI appearance.



A) CT may show no evidence of early infarction.

B) Corresponding image seen on MRI diffusion weighted imaging (DWI) with changes of infarction in middle cerebral artery (MCA) territory (arrows).

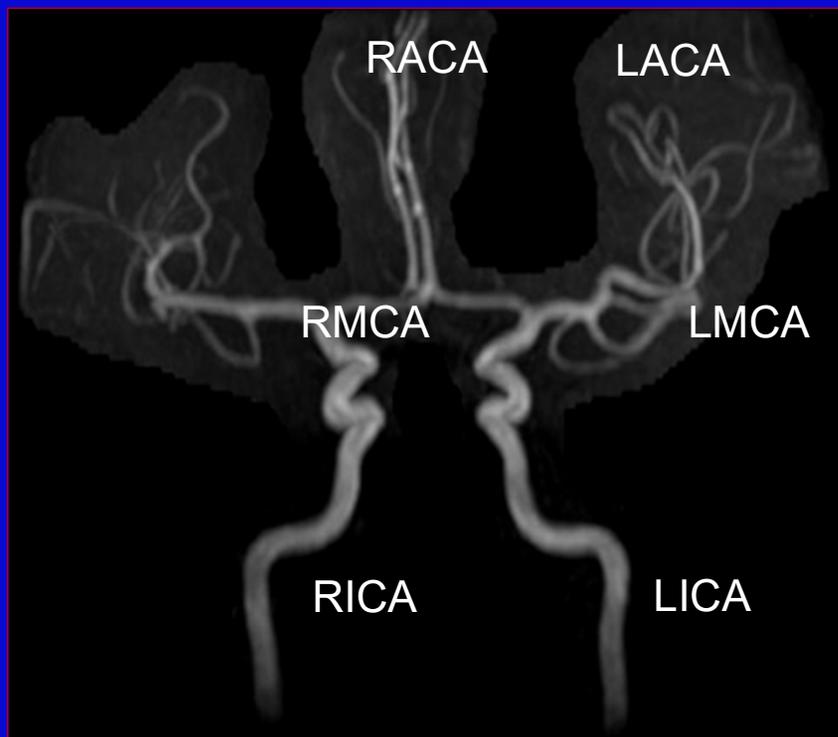
Different techniques of imaging blood vessels.



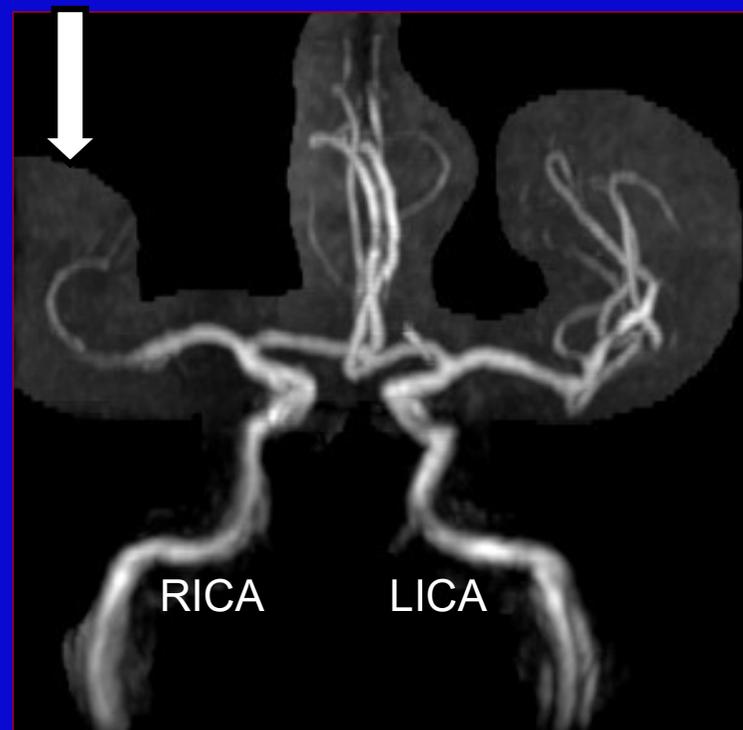
- A. Doppler scan showing 80% stenosis of the internal carotid artery (arrow).
- B. Three-dimensional reconstruction of CT angiogram showing stenosis at the carotid bifurcation (arrow).
- C. MR angiogram showing giant aneurysm at the middle cerebral artery bifurcation (arrow).
- D. Intra-arterial angiography showing arteriovenous malformation (arrow).

INTRACRANIAL MRA: AP VIEWS OF ANTERIOR CIRCULATION

Normal

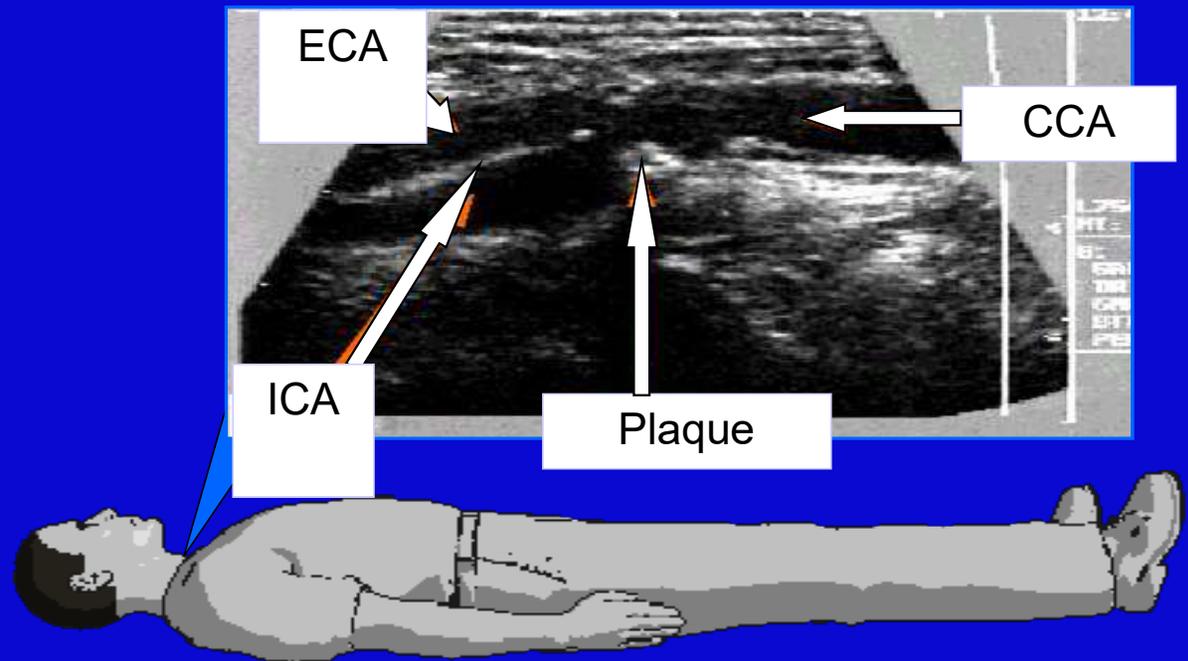


Paucity of R MCA Branches
Emboic Occlusions



CAROTID DUPLEX

- Evaluates carotid arteries in neck (operable area)
- Excellent screen in the right hands
- Need contrast angiography for clinically relevant stenosis measurement
- **Carotid duplex** = Doppler (velocities) + B-mode ultrasound (echo picture)



Early management of acute stroke

General Supportive Care

- 1) Airway
- 2) Breathing
- 3) Circulation
- 4) Hydration
- 5) Nutrition
- 6) Temperature

General management a patient with acute stroke

Airway

- Perform bedside screen and keep patient nil by mouth if swallowing unsafe or aspiration occurs

Breathing

- Check respiratory rate and give oxygen if saturation < 95%

Circulation

- Check peripheral perfusion, pulse and blood pressure, and treat abnormalities with fluid replacement, anti-arrhythmics and inotropic drugs as appropriate
- Unless there is heart or renal failure, evidence of hypertensive encephalopathy or aortic dissection, do not lower blood pressure abruptly in first week as it may reduce cerebral perfusion. Blood pressure often returns towards patient's normal level within days

Hydration

- If signs of dehydration, give fluids parentally or by nasogastric tube

Nutrition

- Assess nutritional status and provide supplements if needed
- If dysphagia persists for >48 hrs, start feeding via nasogastric tube
- If dysphagic, consider other routes for essential medications

Temperature

- If pyrexia, investigate and treat underlying cause
- Control with antipyretics, as raised brain temperature may increase infarct volume

Pressure areas

- Reduce risk of skin breakdown:
 - Treat infection
 - Maintain nutrition
 - Provide pressure-relieving mattress
 - Turn immobile patients regularly

Incontinence

- Check for constipation and urinary retention; treat these **appropriately**
- Avoid urinary catheterization unless patient is in acute urinary retention or incontinence is threatening pressure areas

Mobilization

- Early movement

Specific Management

- 1) Reperfusion by rt-PA
- 2) Anti Platelet
- 3) Anti Coagulant

Intravenous Recombinant Tissue Plasminogen Activator: Thrombolysis

- Intravenous administration of rt-PA is the only FDA-approved medical therapy for treatment of patients with acute ischemic stroke.
- Its use is associated with improved outcomes for a broad spectrum of patients who can be treated within 3.5 hours of stroke onset.
- Treatment with rt-PA is associated with symptomatic intracranial hemorrhage, which may be fatal.

American Heart Association/ American Stroke Association (AHA/ASA) inclusion guidelines for the administration of rt-PA are as follows:-

- Diagnosis of ischemic stroke causing measurable neurologic deficit
- Neurologic signs not clearing spontaneously to baseline
- Neurologic signs not minor and isolated
- Symptoms not suggestive of subarachnoid hemorrhage
- No head trauma or prior stroke in past 3 months
- No myocardial infarction (MI) in past 3 months

- No gastrointestinal/genitourinary hemorrhage in previous 21 days
- No arterial puncture in a noncompressible site during the past 7 days
- No major surgery in past 14 days
- No history of prior intracranial bleeding
- Systolic blood pressure under 185 mm Hg, diastolic blood pressure under 110 mmHg
- No evidence of acute trauma or bleeding

- Not taking an oral anticoagulant, or if so, international normalized ratio (INR) under 1.7
- If taking heparin within 48 hours, a normal activated prothrombin time (aPT)
- Platelet count of more than 100,000/ μ L
- Blood glucose greater than 50 mg/dL (2.7 mmol)
- CT scan does not show evidence of multilobar infarction (hypo density over one third hemisphere) or intracerebral hemorrhage
- The patient and family understand the potential risks and benefits of therapy.

rT-PA Dosing

- **Dosing - 0.9 mg/kg (max 90 mg), 10% as bolus over 1 minutes and remainder over 60 min**

Time- 0- 4.5 HOURS

Antiplatelet Agents

- The oral administration of aspirin (initial dose is 300mg) within 24 to 48 hours after stroke onset is recommended for treatment of most patients with acute ischemic stroke.
- Initial dose is 300mg within 24 to 48 hours after stroke onset and continue daily for 14 days.
- Maintenance dose then continued indefinitely by 75-150 mg daily

Noncardioembolic Ischemic stroke or TIA

Aspirin
Class I
Level A

**Aspirin plus
dipyridamole**
Class I
Level B

Clopidogrel
Class IIa
Level B

**Aspirin plus
clopidogrel**
Class IIb
Level B

Indication of Anticoagulants

- Valvular Thrombosis
 - MS/ Endocarditis
 - Prosthetic Valve
- Mural Thrombosis- MI, AF, DCM, Severe CCF
- Atrial Myxoma

Agents Used

- 1) Heparin & LMW Heparin
- 2) Oral Anticoagulant
 - Warfarin
 - Dabigatran
 - Apixaban
 - Rivaroxaban

Management -Comorbid Conditions

- 1) Blood Pressure
- 2) Hyperglycemia
- 3) Dyslipidemia

Blood Pressure Categories



BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

Blood Pressure

- Lowering of BP during the first day after stroke does not improve functional outcome
- There is no urgency to restart the pre existing anti hypertensive drugs except comorbid disorders like- ICH, MI, CCF, aortic dissection, encephalopathy.
- Only treatment to be started if BP > 180/110
- BP often fall spontaneously when patient is in quiet room, bed rest, bladder is empty & pain & headache is control
- The optimal range for BP is undetermined & might be 120-128 mm of Hg systolic & 65-15mm hg diastolic of stroke patient

Indications for acute antihypertensive treatment

- Intracerebral hemorrhage
- Hypertensive encephalopathy
- Acute myocardial infarction
- Congestive heart failure
- Aortic / arterial dissection
- Thrombolytic with BP >185/110

Blood glucose

- Check blood glucose and treat when levels are ≥ 11.1 mmol/L (200 mg/dL) by insulin infusion or glucose/potassium/insulin (GKI)
- Blood glucose to be maintain between 140 -180 mg
- Monitor closely to avoid hypoglycemia <60mg

Station Therapy

Lowering of LDL cholesterol concentration by about one mmol/l with station reduces the risk of recurrent stroke by 12%

Management of Complications

- 1) Anti Neurological Complication
 - Cerebral Edema
 - Hemorrhagic Transformation
 - Seizure Disorder
- 2) Depression & Anxiety
- 3) Chest & Urinary infection
- 4) Constipation
- 5) Pressure Sore
- 6) DVT & P. embolism
- 7) Correction of Electrolyte Imbalance

Complications, Prevention and Treatment acute stroke

Complications	Prevention	Treatment
Epileptic seizures	Maintain cerebral oxygenation Avoid metabolic disturbance	Anticonvulsants
Depression and anxiety	Maintain positive attitude and provide information	Antidepressants
Painful shoulder	Avoid traction injury shoulder/ arm supports physiotherapy	Physiotherapy Local glucocorticoid injections
Chest infection	Nurse semi-erect Avoid aspiration (nil by mouth, nasogastric tube, possible gastrostomy)	Antibiotics Physiotherapy

Complications	Prevention	Treatment
Constipation	Appropriate aperients and diet	Appropriate aperients
Urinary infection	Avoid catheterization if possible Use Penile sheath	Antibiotics
Pressure sores	Frequent turning Monitor pressure areas Avoid urine damage to skin	Nursing care Pressure-relieving mattress
Deep vein thrombosis/pulmonary embolism	Maintain hydration Early mobilization Heparin (for high-risk patients only)	Anticoagulation (exclude hemorrhage first)

Mechanical Thrombectomy

- 1) Mechanical Clot disruption is an alternative to patient in whom rt-PA is ineffective or contraindicated.
- 2) 2018 AHA/ASA guideline recommended thrombectomy in eligible patient 6 to 16h
- 3) Current 4 devices are approved by the FDA
 - Merci Retriever
 - Penumbra System
 - Solitaire FR Revascularization device
 - Trevo stent-retriever system

Coil retriever

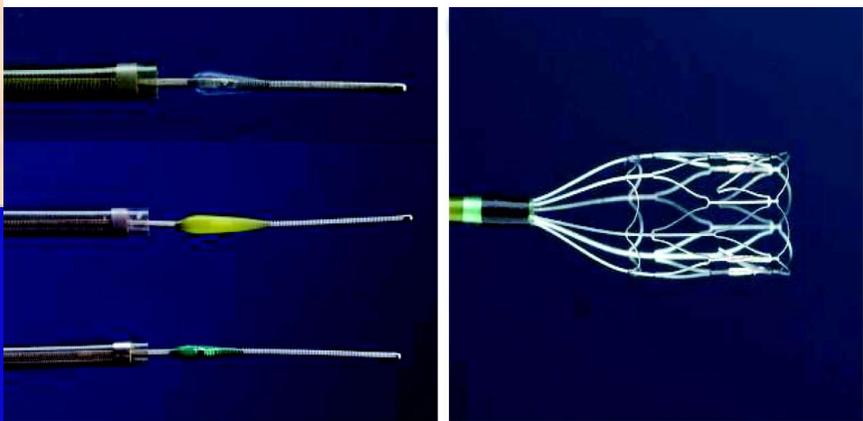
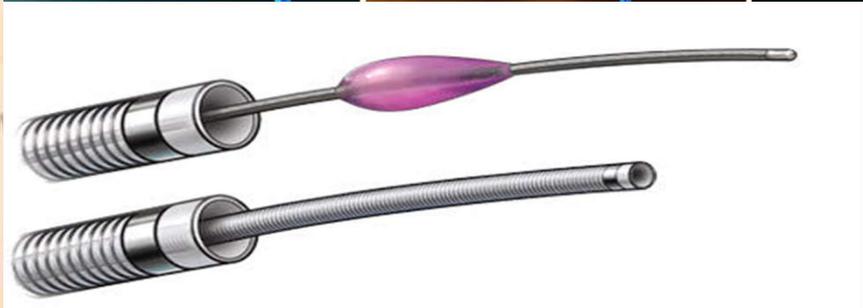
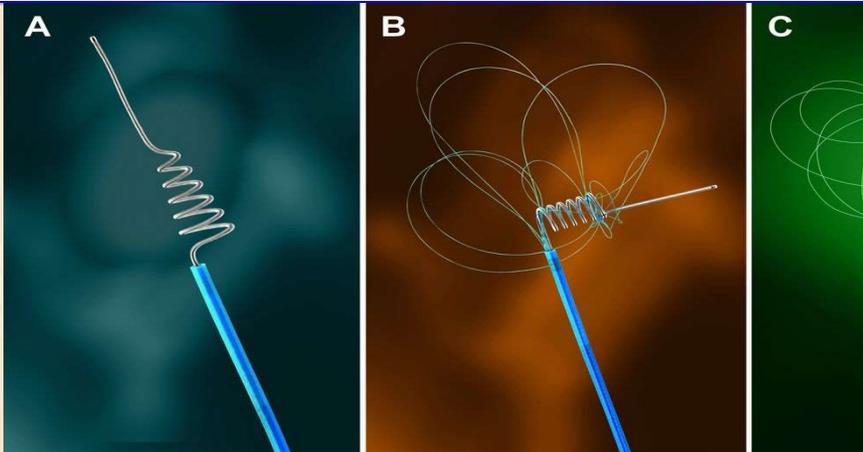


Aspiration device



www.minclinic.ru www.minclinic.ru www.minclinic.ru www

Stent retriever



Stent retrievers

Rehabilitation

Stroke Rehabilitation is a progress dynamic, goal oriented process aimed at enabling a person with impairment to reach their optimal physical cognitive, emotional, communicative, social and functional activity level.

Physical Rehabilitation improve functional recovery after stroke, & incorporates functional task training : active and passive musculoskeletal, Neuro physiological and cardiopulmonary intervention and assistive devices and modalities



Prevention

1) Primary stroke prevention

- Antiplatelet
- Statin
- Exercise
- Life style intervention

2) Secondary Prevention

- Anti platelet
- Anti Hypertension
- Strict control of hyperglycemia
- Statin
- Life style changes

TIME IS BRAIN

প্রতি ৪ জনের মধ্যে ১ জনের স্ট্রোক হতে পারে
সেই একজন যেন আপনি না হন



স্ট্রোক সনাক্ত করুন **F.A.S.T** পদ্ধতিতে

FACE : মুখ একদিকে ঝুলে পড়া

ARMS : হাত একদিকে ঝুলে পড়া

SPEECH : কথা জড়িয়ে আসা

TIME : অতি দ্রুত হাসপাতালে নেয়া

স্ট্রোক-এর লক্ষণ দেখা মাত্র সময় নষ্ট না করে অতি দ্রুত
স্ট্রোক সেন্টার আছে এমন হাসপাতালে নিয়ে আসুন



1 in 4 of us will have a stroke.

**DON'T BE
THE ONE**



World Stroke Day: October 29th

Conclusion

- Stroke is the 2nd most common cause of death globally.
- Most common cause of disability and dependence
- In our country- magnitude of problem is considerable
- Standardized stroke guidelines or integrated stroke management protocols can improve the treatment practice in all levels throughout the country.
- Let us work together to handle this dreadful disease to reduce the mortality, morbidity and disability.



Thank you

MULTUMESC
MAAKE
MATONDO
ASANTE
GRAZIE
OBRIGADO
NIRRINGRAZZJAK
GRAZIE
MATURNUWUN

MAAKE
GRAZIE
TERMAKASIH

SPASIBO
KIITOS
MATONDO

VINAKA
OBRIGADO
SPASIBO
MERCY

MOCHCHAKKERAM
WELALIN

CHOKRANE
RAIBHMAITHAGAT
MULTUMESC
NIRRINGRAZZJAK
GRAZIE
MATURNUWUN

THANK YOU

NIRRINGRAZZJAK
MULTUMESC
MATURNUWUN

MATONDO
KIITOS

WELALIN
VINAKA
MOCHCHAKKERAM

MAAKE
TERMAKASIH
MAAKE
BANA
SAMAT
TSAUGRAUKOJ

ARIGATO
MAAKE
SPASIBO
MATONDO

