

IN THE NAME OF GOD



KEY NURSING ELEMENTS FOR MONITORING AND TREATMENT IN FIRST 72 HOURS OF ACUTE STROKE

DR POORSAADAT NEUROLOGIST

WHAT IS A STROKE?

A STROKE IS A MEDICAL EMERGENCY!

A STROKE OCCURS WHEN THE BLOOD FLOW TO A PART OF THE BRAIN IS INTERRUPTED

LACK OF BLOOD SUPPLY MEANS THAT NOT ENOUGH OXYGEN OR NUTRIENTS REACH THE BRAIN AND THE BRAIN CELLS BECOME DAMAGED OR PERMANENTLY DESTROYED

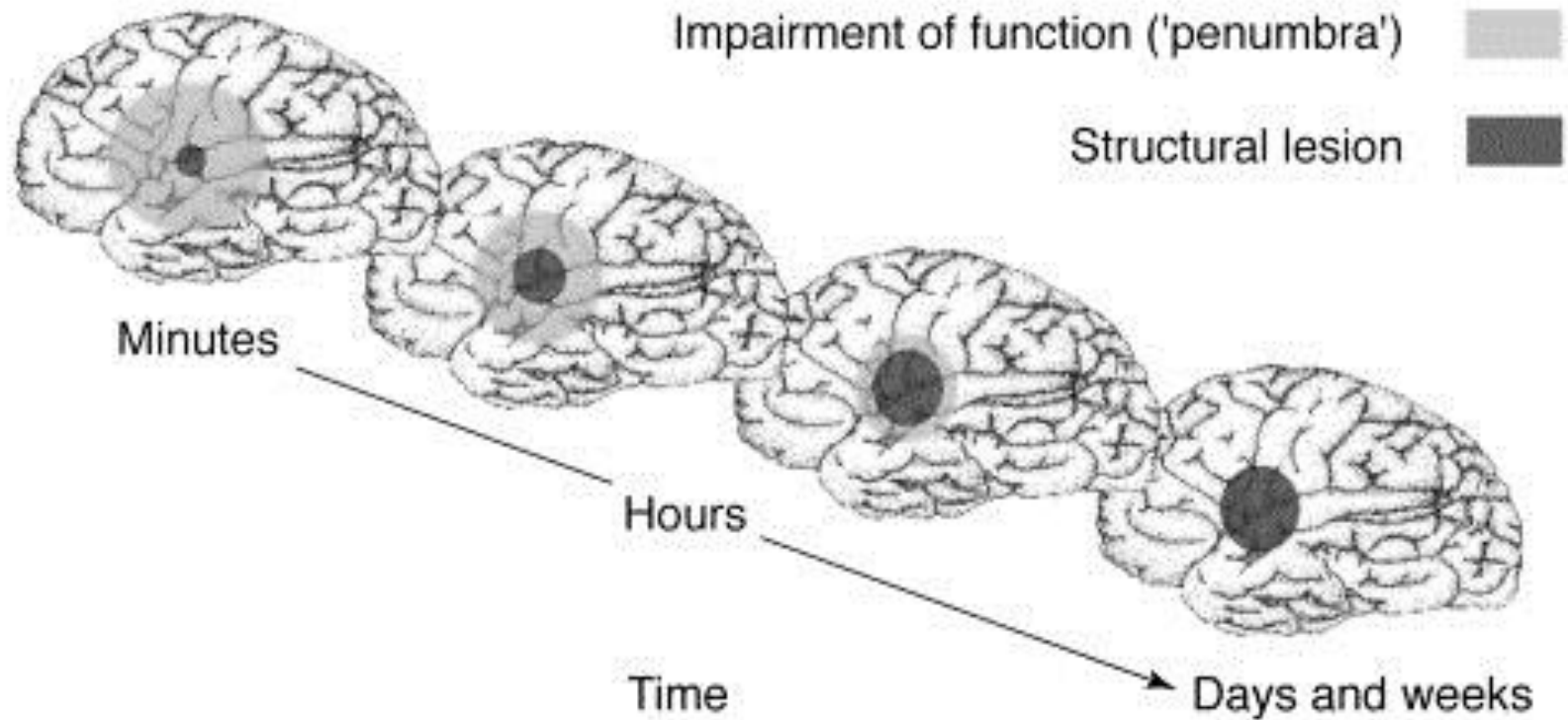
DEPENDING ON WHICH PART OF THE BRAIN IS AFFECTED, DIFFERENT SYMPTOMS CAN OCCUR

IF NOT TREATED IN TIME, A STROKE CAN HAVE EMOTIONAL, PHYSICAL OR EVEN FATAL CONSEQUENCES



ACUTE ISCHAEMIC STROKE TREATMENT

GOAL: A RAPID VESSEL RECANALISATION WITH SUBSEQUENT RESTORATION OF BLOOD PERFUSION INTO THE ISCHAEMIC AREA AIMING TO SALVAGE THE PENUMBRA (PORTION OF VIABLE TISSUE SURROUNDING THE INFARCTED CORE).



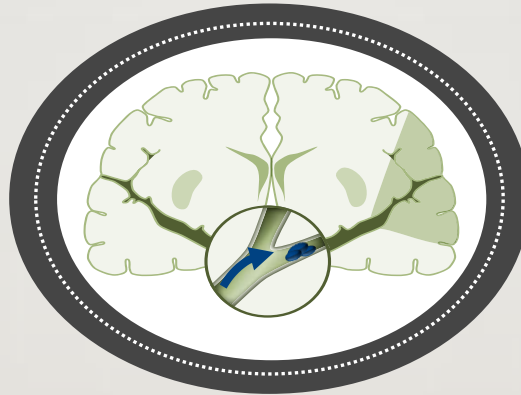
HOW ARE STROKES CLASSIFIED?

A STROKE CAN BE DUE TO A BLOCKAGE IN ONE OF THE ARTERIES (ISCHAEMIC STROKE) OR BLEEDING IN THE BRAIN (HAEMORRHAGIC STROKE)



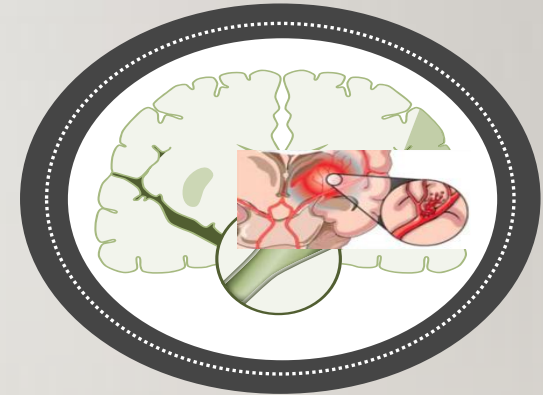
TRANSIENT ISCHAEMIC ATTACK (TIA)

THE BLOOD SUPPLY TO AN AREA OF THE BRAIN IS TEMPORARILY INTERRUPTED BUT IS RESTORED WITHIN 60 MIN AND THE PATIENT RETURNS TO NORMAL



ISCHAEMIC STROKE

THE BLOOD SUPPLY TO AN AREA OF THE BRAIN IS COMPLETELY BLOCKED, CAUSING TISSUE DEATH AND NEUROLOGICAL DAMAGE



HAEMORRHAGIC STROKE

BLEEDING IN THE BRAIN CAN PREVENT THE NORMAL FLOW OF BLOOD TO THE TISSUE BEYOND THE DAMAGE AND CAUSES NEUROLOGICAL SYMPTOMS

ISCHAEMIC STROKE IS THE COMMONEST FORM OF STROKE (88%)

MARKET UNDERSTANDING- **STROKE**

01/08/2020

There are over **17 million strokes each year** and **six million lives lost**, **per 100,000 population 200 have stroke** (ref. WHO).

Stroke is a **huge financial burden for the health systems** and the societies.

Actilyse is the only thrombolytic for the treatment in acute AIS.

Stroke is a Major Public Health Problem

STROKE CAN AFFECT ANYONE AT ANY TIME

6
MILLION
WORLDWIDE,
NEARLY
6 MILLION PEOPLE
DIE EACH
YEAR FROM
A STROKE^{1,2}

1 IN 6
WORLDWIDE, 1 IN 6
PEOPLE ON
AVERAGE WILL
SUFFER A STROKE IN
THEIR
LIFETIME¹

EVERY 6
SECOND
S
EVERY 6 SECONDS,
SOMEONE **DIES**
FROM
A STROKE^{1,2}

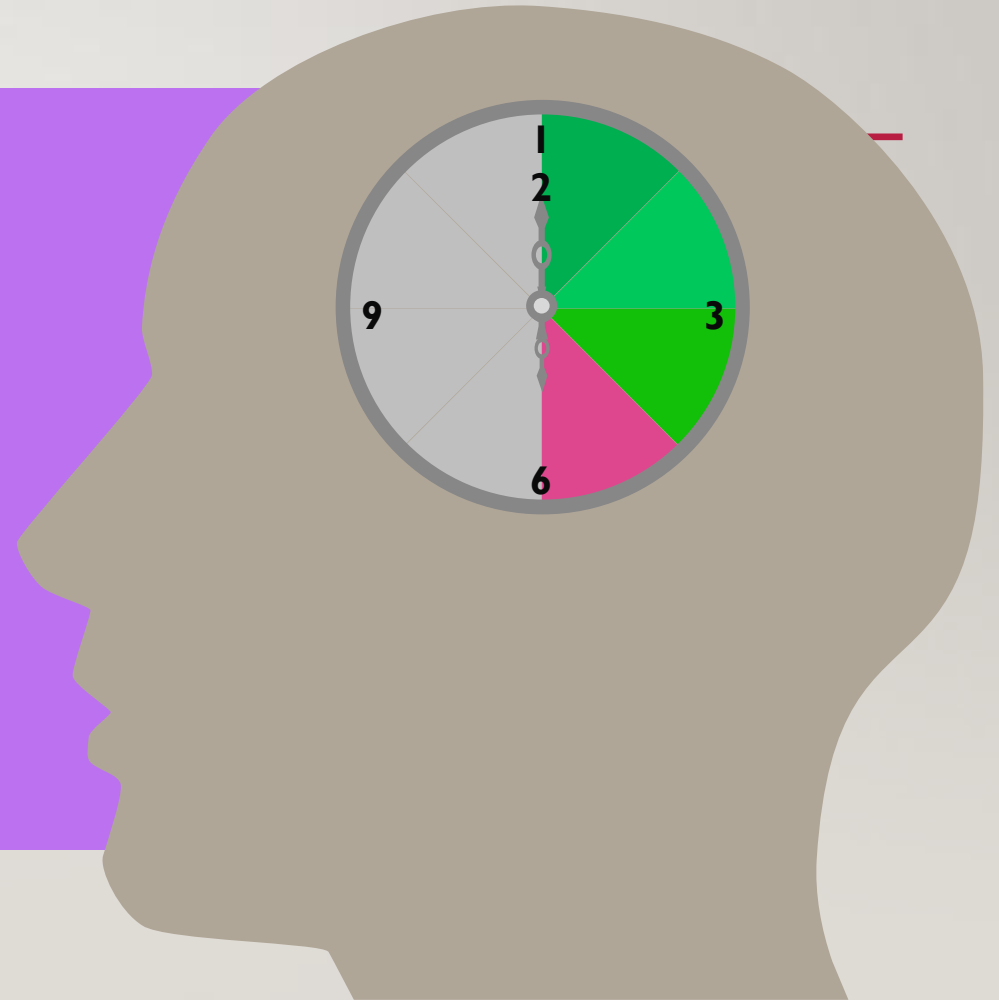
Stroke is a Major Public Health Problem

EVERY 30 MINUTES

A STROKE PATIENT WHO
COULD HAVE BEEN SAVED,

DIES

OR IS PERMANENTLY DISABLED,
BECAUSE HE WAS **NOT** TREATED
IN **THE RIGHT HOSPITAL**



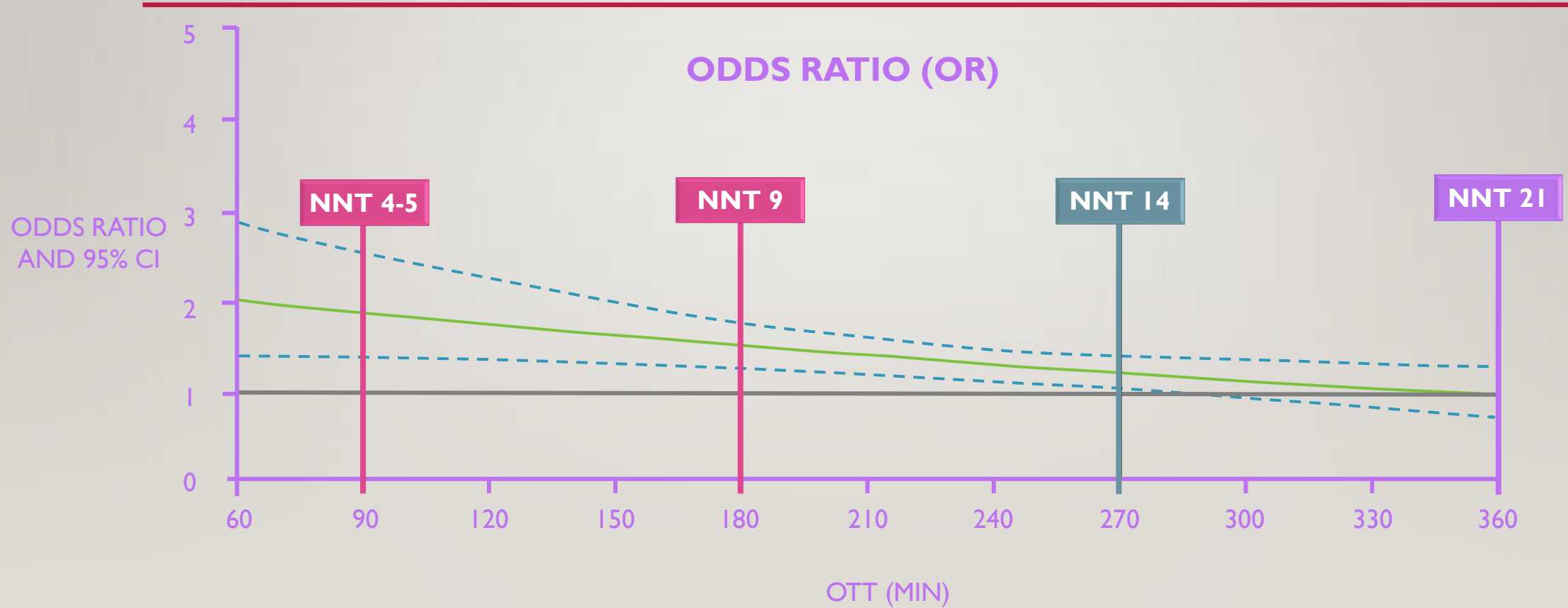
Objective

**“Setting
The Best Standard of Care
for acute stroke
management”**



EFFICACY OF ACTILYSE IS TIME DEPENDANT

FAVOURABLE OUTCOME (mRS 0-1) vs. TIME²



ACTILYSE:

IT IS A RECOMBINANT DNA-DERIVED VERSION OF A NATURALLY OCCURRING TISSUE PLASMINOGEN ACTIVATOR PROTEIN NORMALLY SECRETED BY HUMAN ENDOTHELIAL CELLS.

HIGH FIBRIN SPECIFICITY
(IS ACTIVATED WHERE FIBRIN IS I.E. AT THE CLOT)

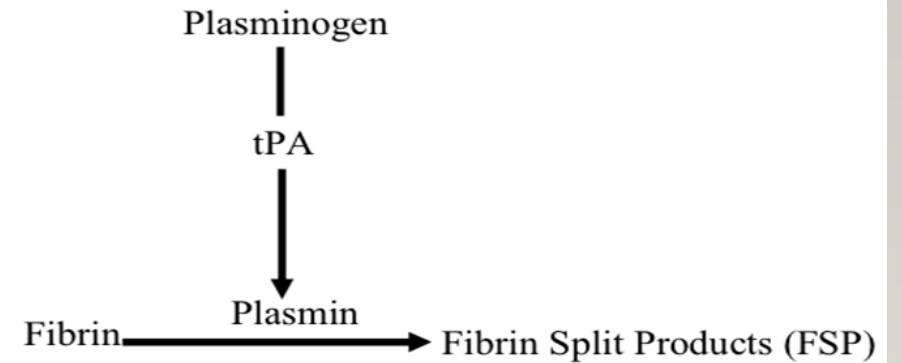
PURIFIED GLYCOPROTEIN WITH 527 AMINO ACIDS

SERINE PROTEASE: CONVERTS PLASMINOGEN IN THE PRESENCE OF FIBRIN TO PLASMIN

SHORT HALF-LIFE <5MIN

CLEARED BY THE LIVER

Fibrinolysis



ACTILYSE:

ACTILYSE IS SUPPLIED IN VIALS AS A DRY POWDER AND SOLVENT FOR INJECTION AND INFUSION.

THE RECONSTITUTED SOLUTION
CONTAINS

1 MG ALTEPLASE/1 ML.

1 VIAL WITH 467 MG POWDER CONTAINS:
10 MG ALTEPLASE, OR

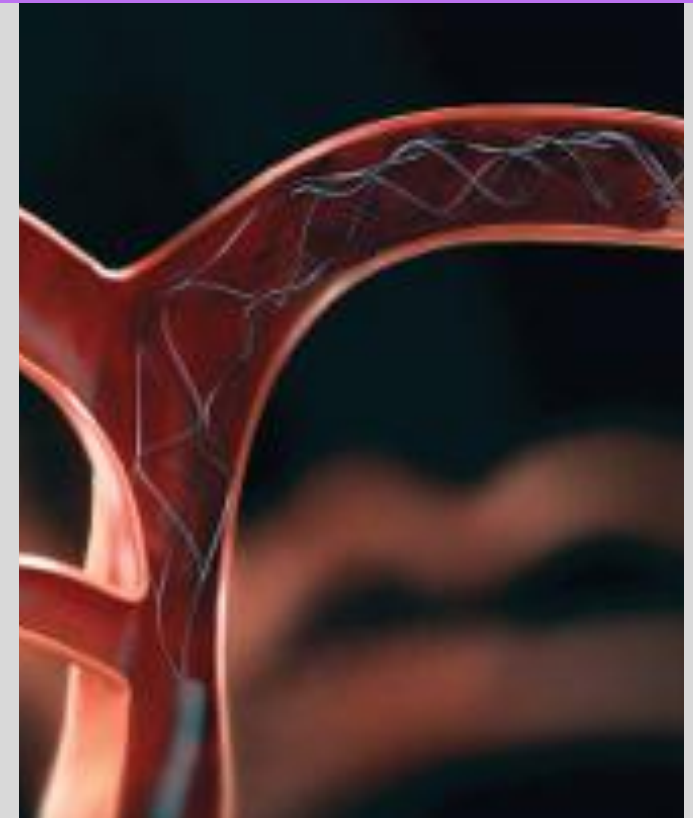
1 VIAL WITH 933 MG POWDER CONTAINS:
20 MG ALTEPLASE, OR

1 VIAL WITH 2333 MG POWDER CONTAINS:
50 MG ALTEPLASE.



FEW IMPORTANT CHANGES UPDATED GUIDELINES

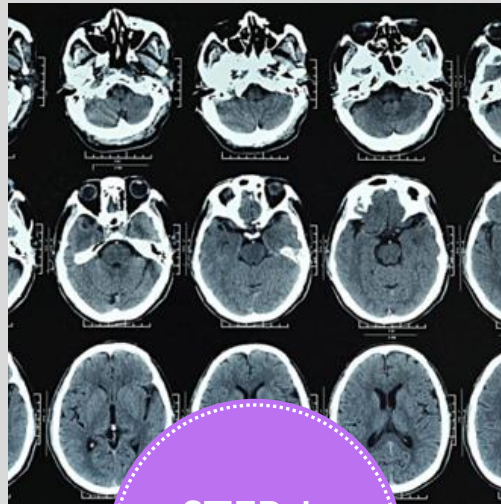
PATIENTS ELIGIBLE FOR INTRAVENOUS rt-PA SHOULD RECEIVE INTRAVENOUS rt-PA EVEN IF ENDOVASCULAR TREATMENTS ARE BEING CONSIDERED (CLASS I; LEVEL OF EVIDENCE A).



UPDATED GUIDELINES

IF ENDOVASCULAR THERAPY IS CONTEMPLATED, A NON-INVASIVE INTRACRANIAL VASCULAR STUDY IS STRONGLY RECOMMENDED DURING THE INITIAL IMAGING EVALUATION OF THE ACUTE STROKE PATIENT BUT SHOULD NOT DELAY INTRAVENOUS rt-PA IF INDICATED.

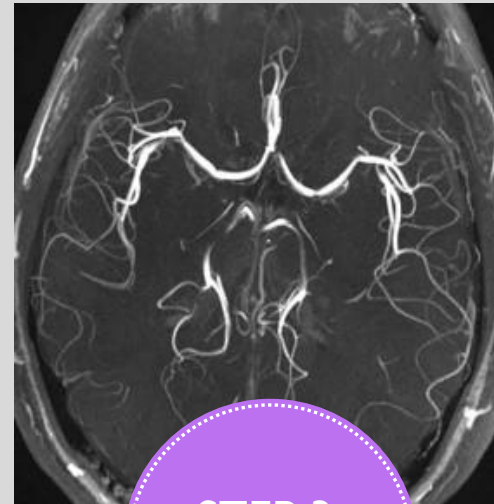
THE BENEFITS OF ADDITIONAL IMAGING BEYOND CT AND CTA OR MR AND MRA, SUCH AS CT PERFUSION OR DIFFUSION- AND PERFUSION-WEIGHTED IMAGING, FOR SELECTING PATIENTS FOR ENDOVASCULAR THERAPY ARE UNKNOWN (CLASS IIB; LEVEL OF EVIDENCE C)



STEP 1:
Plain CT



STEP 2:
rt-PA



STEP 3:
CT Angio



STEP 4:
Endovascular

CT ANGIO & ENDOVASCULAR
SHOULD NOT BE DONE
BEFORE RT-PA IN ELIGIBLE
PATIENTS

AIM:ORGANIZED STROKE CARE SYSTEM TO..





Time lost is Brain lost

HOW DO I KNOW IF SOMEONE IS HAVING A STROKE?

BE SUSPICIOUS OF A STROKE IF ANY OF THE FOLLOWING SYMPTOMS OCCUR

SEVERE,
SUDDEN-
ONSET
HEADACHE

UNCONCIOUSNESS

DIZZINESS

DIFFICULTY
TALKING,
FORMING
WORDS OR
SLURRING
WORDS

CONFUSION
AND/OR
PROBLEMS
UNDERSTANDI
NG WHAT IS
BEING SAID

DROOPING OF
THE MOUTH
ON ONE SIDE

WEAKNESS
OR COMPLETE
LOSS OF MOVEMENT
AND/OR SENSATION
IN ONE OR MORE
LIMBS

VISUAL
DISTURBANCE
OR LOSS OF
SIGHT IN ONE
OR BOTH EYES

IMPORTANT

NOTE THE TIME AT WHICH THESE SYMPTOMS
STARTED AND CALL THE EMERGENCY SERVICES

IMMEDIATELY

*112 is an emergency services call number that can be dialled free of charge from any telephone or mobile phone in numerous European countries, as well as several other countries in the world.

Adapted from: <http://strokeassociation.org>

FACE ARM SPEECH TEST (F.A.S.T.)

TO CHECK FOR STROKE SYMPTOMS, REMEMBER F.A.S.T.

FACE



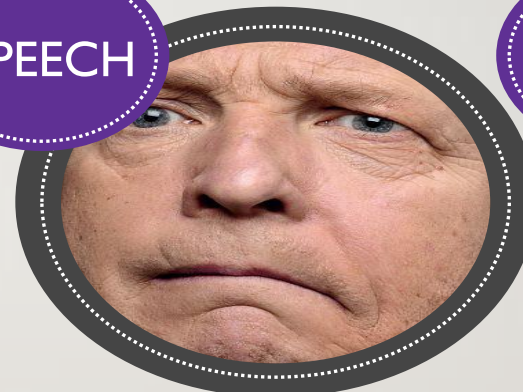
FACE DROOPING
or asymmetry
on smiling

ARMS



ARM WEAKNESS
or paralysis on
one side

SPEECH



SPEECH DIFFICULTY
or slurring of
speech

TIME



TIME TO CALL
the emergency
services*

THE OPTIMAL STROKE TEAM - ACUTE PHASE

- ✓ • Neurologist
- ✓ • Neuro-radiologist
- ✓ • Emergency physician
- ✓ • Stroke nurse
- ✓ • (Neurosurgeon)
- ✓ • Stroke unit/centre director
(experienced physician)



ALL STAFF MEMBERS
SHOULD HAVE ONGOING
TRAINING IN STROKE
MANAGEMENT AND
CERTIFIED MEDICAL
EDUCATION AT LEAST
ONCE A YEAR

THE OPTIMAL STROKE TEAM - REHABILITATION PHASE

- ✓ • Physiotherapist
- ✓ • Occupational therapist
- ✓ • Speech & swallowing therapist
- ✓ • Neuro-psychologist
- ✓ • (Nutrition specialist)



THESE PROFESSIONALS
MUST BE AVAILABLE ON-SITE
DURING EACH WORKING DAY,
EVEN IF THEY ARE NOT
DEDICATED TO THE STROKE
UNIT / STROKE CENTRE
FULL-TIME

BASIC REQUIREMENTS FOR ACUTE STROKE UNIT CARE

**TRAINED, MULTIDISCIPLINARY STROKE TEAM, INCLUDING STROKE NURSE,
NEUROLOGIST, NEURORADIOLOGIST**

24-HOUR ACCESS TO BASIC INVESTIGATIONS

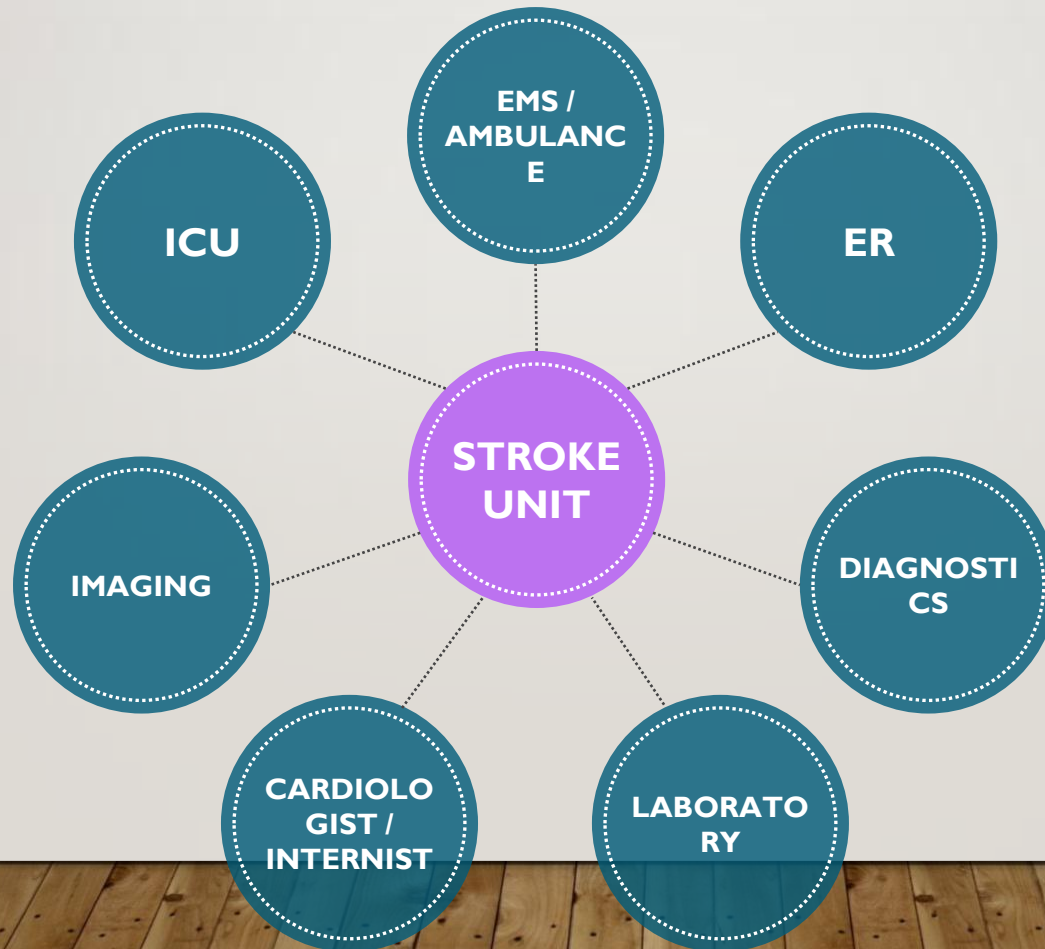
**CT (OR MRI)
ECG
BP MONITORING
TEMPERATURE
BLOOD GASES
GLUCOSE
STANDARD LABORATORY TESTS**

ACCESS TO OTHER INVESTIGATIONS WITHIN 24H

ECHOCARDIOGRAPHY

NETWORK REQUIRED FOR EFFICIENT ACUTE STROKE TREATMENT

ALL ELEMENTS IN THE THERAPEUTIC CHAIN NEED TO BE PART OF AN **EFFECTIVE NETWORK**



MONITORING

- Neurological assessment with the **NIHSS** to determine deterioration or improvement in neurological condition
- **Continuous oxygen saturation** monitoring to identify hypoxia and early development of complications (eg, aspiration; GPP)⁶
- **Cardiac monitoring for at least the first 24 h** to determine possible stroke pathogenic mechanism (eg, atrial Fibrillation) and monitor for possible arrhythmias (class I: level of evidence B)
- **BP monitoring** every 15 min for 2 h, then every 30 min for 6 h, and then every hour for 16 h in patients undergoing reperfusion therapy (GPP); ongoing BP assessment to manage titration of antihypertensive medications and identify patients for improved stroke risk factor management
- **Temperature monitoring** at least every 4 h (class I: level of evidence B) to determine the need for treatment of hyperthermia
- **Glucose monitoring** on arrival to ED and every 6 h thereafter for the initial 72 h of care to determine the need for implementation of glucose control measures (GPP) (class I: level of evidence B)

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- **Dysphagia screening** using a valid and reliable tool by a trained non–SLP or swallowing assessment by a SLP should occur before administration of food, drink, or oral medications (class I: level of evidence B)⁶ within 4 to 24 h of hospitalization. The presence of a gag reflex does not indicate safety with swallowing
 - **Fluid balance monitoring** is recommended to identify dehydration and concurrent conditions seen in vascular patients (class I: level of evidence C)
 - Comprehensive assessment in 4 h of admission for nutritional and hydration needs, positioning and mobilization needs, bladder and incontinence management, pressure ulcer risk, cognitive and language capacity, hearing and visual needs, and family/carer needs

TREATMENT

- Airway and breathing support as required with provision of oxygen for hypoxic patients (<94% oxygen saturation; class I: level of evidence C)
- **Thrombolysis**: Delivery of prompt intravenous r-tPA treatment for eligible patients with ischemic stroke ≤ 4.5 h from symptom onset (class I: level of evidence A) with a door-to-needle time (time of bolus administration) target of <60 minutes
- **Hypertension management**: Prethrombolysis (potentially eligible patients): SBP <185 mm Hg and DBP <110 mm Hg (class I: level of evidence B)
- **Post-r-tPA bolus**: target <180 mm Hg SBP, <105 mm Hg DBP

-
- Ongoing monitoring and reporting of BP control to identify need of medication additions or dose adjustments
 - Temperature: Treatment of temperature $>37.5^{\circ}\text{C}$ with antipyretics (class I: level of evidence B)
 - glucose levels of 140–180 mg/dL class IIa: level of evidence C). Avoidance of hypoglycemia (bs <60 mg/dL)
 - Head positioning: some evidence to support improved blood flow when lying at (0°) for large artery strokes,
 - provision of accurate information about stroke, emotional and practical support
 - Rehabilitation: Early assessment and rehabilitation where relevant

PREVENTION OF COMPLICATIONS

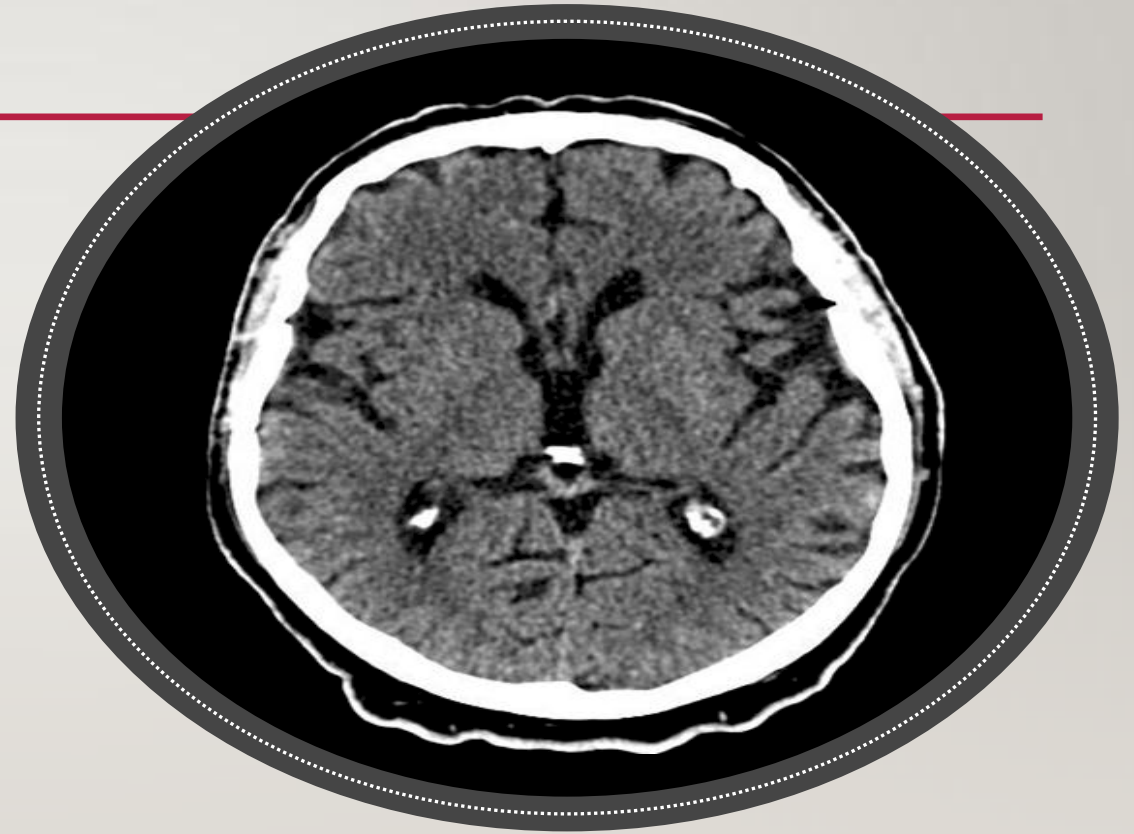
- **Antiplatelets:** antiplatelet medications within 48 h of stroke (class I: level of evidence A)
- antiplatelet should be withheld for 24 h in r-tPA–treated patients
- **Anticoagulants:** best timing for initiation of anticoagulation after an acute stroke unknown
- **VTE:** The use of anticoagulation provides superior VTE prophylaxis in patients with acute ischemic stroke (class I: level of evidence A). The use of intermittent pneumatic compression for immobile patients reduces the risk of VTE and possibly death
- **Incontinence:** Routine use of indwelling urinary catheters is not recommended because of infection risk

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- **Early mobilization:** Within the First 24 h for neurologically and hemodynamically stable patients is safe and feasible (class IIa: level of evidence B). Patients with stable neurological and hemodynamic presentation can be mobilized to out of bed chair sitting even if level of consciousness is depressed
 - **Hydration:** Euvolemia should be maintained.
 - **Treatment of hypovolemia should include the use of isotonic intravenous normal saline**
 - **Pressure area care:** high risks should be placed on a high-specification foam mattress

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- **Nutrition:** Ensure adequate nutrition. The use of nasoenteric tube feeding in patients unable to swallow for the first 2 to 3 w after stroke is preferred over use of PEG
 - patients unable to safely swallow and those incapable of meeting their nutrition and hydration needs, consider initiating nasoenteric feeding within 24 h
 - **Oral hygiene:** Oral hygiene should be provided to reduce the risk of aspiration pneumonia (GPP). At least 3×/d and immediately after meals are recommended (GPP).
 - **Antibiotics:** Patients with suspected pneumonia, sepsis, or urinary tract infections should receive antibiotics that target the relevant pathogen (class I: level of evidence A)

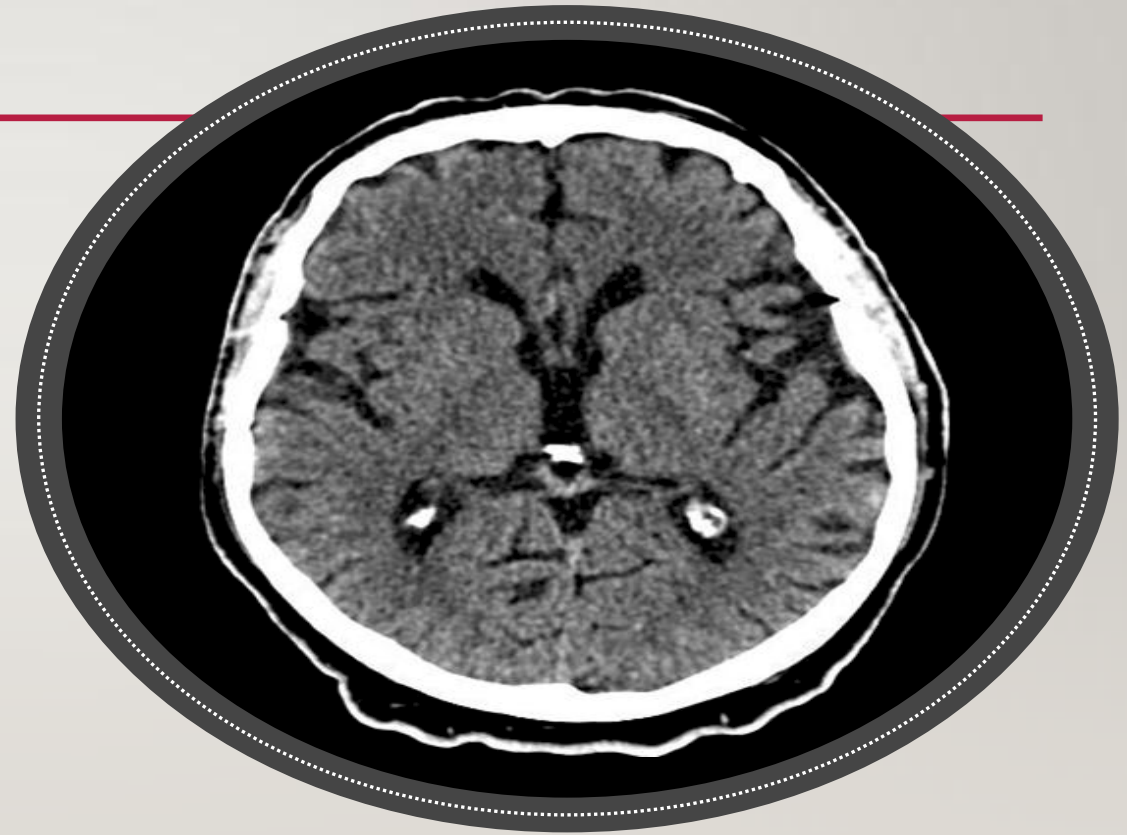
CT IMAGING - RECAP

- X-ray attenuation of any given tissue type is relatively constant
- Attenuation coefficient is measured in Hounsfield Units (HU)
- Viewing software converts a range of HU values to shades of grey



CT IMAGING - RECAP

TISSUE	TYPICAL HU VALUE
CSF	8
WHITE MATTER	30
GREY MATTER	45
FRESH BLOOD	60
CALCIFICATIONS	100+
BONE	1000+



When looking for a clot (Hyper dense artery sign) > 45 HU
Calcifications > 100 HU

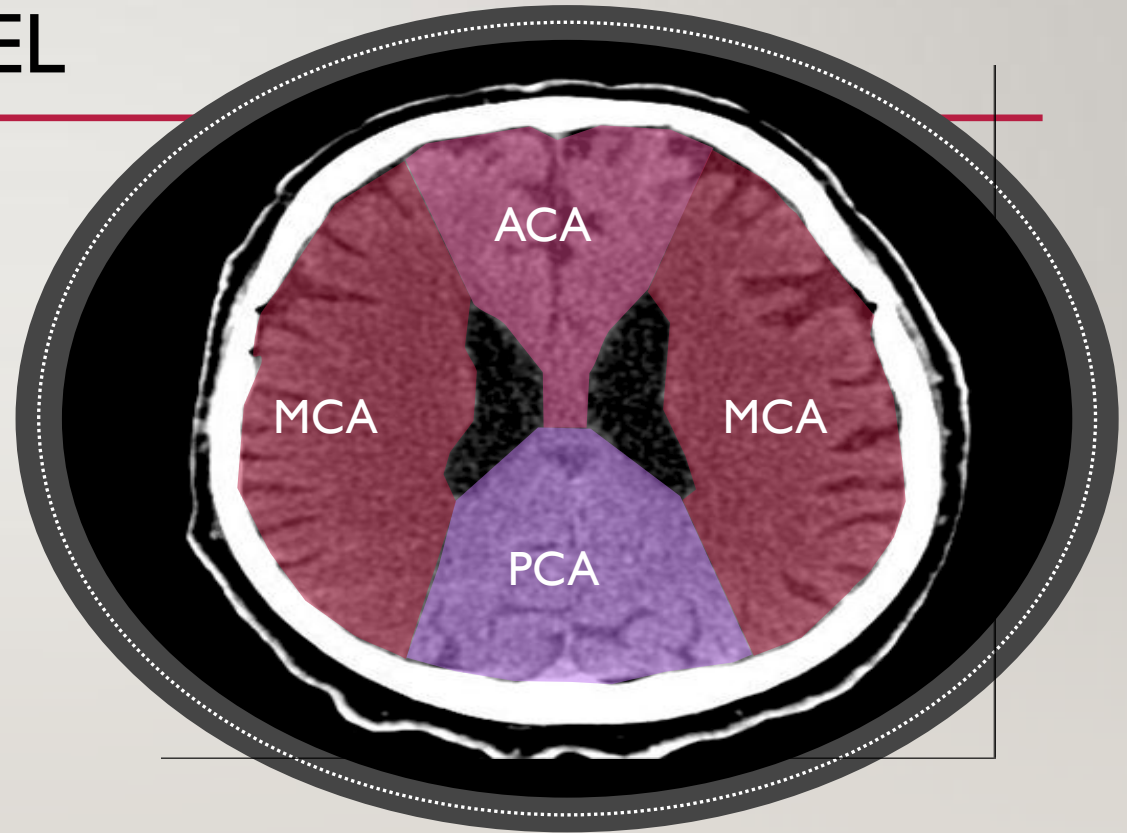
Note: we are not considering strokes in ACA or PCA territories

CEREBRAL VASCULAR TERRITORIES - SUPERIOR LATERAL VENTRICLE LEVEL

MCA – MIDDLE CEREBRAL ARTERY

PCA – POSTERIOR CEREBRAL ARTERY

ACA – ANTERIOR CEREBRAL ARTERY

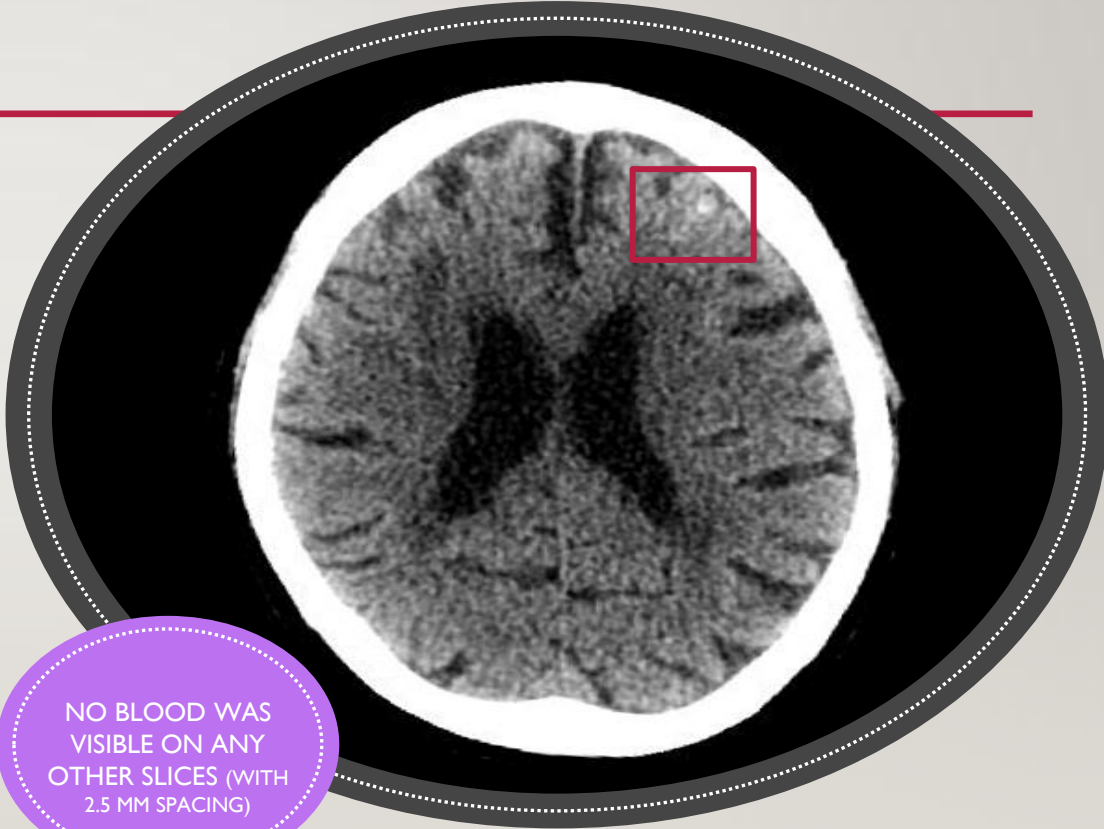


INTRA-CEREBRAL HAEMORRHAGE

- This scan shows an **intra-cerebral haemorrhage (ICH)**
- The “bright” area measures 60-70 HU
- Blood was visible on other slices covering >40 mm axially



SUB-ARACHNOID HAEMORRHAGE



NO BLOOD WAS
VISIBLE ON ANY
OTHER SLICES (WITH
2.5 MM SPACING)

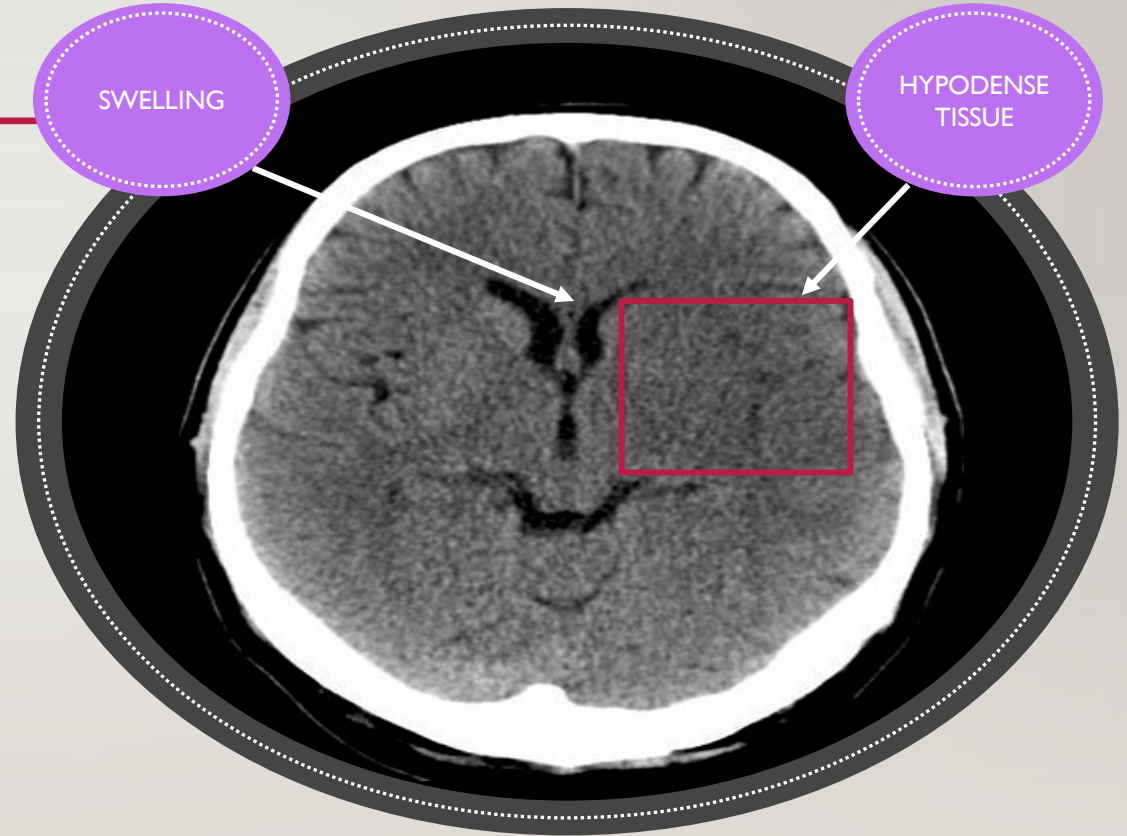
SWELLING - COMPRESSED VENTRICLES

THERE IS ALSO EXTENSIVE HYPODENSITY AND LOSS OF GREY/WHITE MATTER DIFFERENTIATION

THE LEFT ANTERIOR HORN OF THE LATERAL VENTRICLE IS COMPRESSED COMPARED TO THE RIGHT IN THIS SCAN

BEWARE

A TILTED SCAN CAN MAKE VENTRICLES APPEAR TO BE SMALLER ON ONE SIDE



SCU DEFINITION

A hospital unit that cares for stroke patients exclusively or almost exclusively, with specially trained staff and a multidisciplinary approach to treatment and care.

SCU COST-BENEFIT

- Stroke unit care **reduces the likelihood of death and disability** by as much as **30 percent** for men and women of any age with mild, moderate, or severe stroke.
- Stroke unit care is characterized by a coordinated interdisciplinary team approach for **preventing**
- stroke **complications**
- stroke **recurrence**
- accelerating **mobilization**
providing early **rehabilitation** therapy.

GOALS OF A STROKE UNIT

- Improve chances of survival
- Reduce disability
- Shorten length of hospital stay
- Shorten length of rehabilitation

STROKE UNIT ORGANIZATION

- 4 to 8 beds

- Cranial computerized tomography (available 24 hours)
- Angiography (available 24 hours)
- Ultrasound (continuous-wave, TC Duplex, transthoracic echocardiogram; transesophageal echocardiogram)
- Monitoring (RR, Respiration, Holter, O₂ saturation)
- Emergency laboratory
- Monitoring: Holter, blood pressure, EKG holter, O₂ saturation, respiration, temperature 2.
Special – Transcranial Doppler, embolus detection, electroencephalography, central breathing patterns (sleep apnea)

INDICATIONS FOR ADMISSION TO THE STROKE UNIT

- Acute stroke (< 24 hours)
- Awake, somnolent patient
- Symptoms fluctuating or progressive
- TIAs with high stroke risk (non-valvular AF, stenosis)
- Vital parameters unstable
- Thrombolysis, Anticoagulation
- New investigational treatment or procedure

ADMISSION TO ACUTE STROKE UNIT **NOT** INDICATED

- Patients with severe consciousness impairment (should be admitted to intensive care unit instead)
- Severely disabled patients by previous strokes
- Very old patients or those with multiple comorbidities

PATIENTS SHOULD BE ADMITTED TO ICU INSTEAD OF SCU

- Stupor and coma
- Central respiratory disorders requiring artificial ventilation
- Space-occupying cerebral infarctions with risk of herniation
- Severe cardiopulmonary insufficiency
- Hypertensive-hypervolemic treatment

THANKS FOR
YOUR ATTENTION



Together

Everyone

Achieves

More