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?

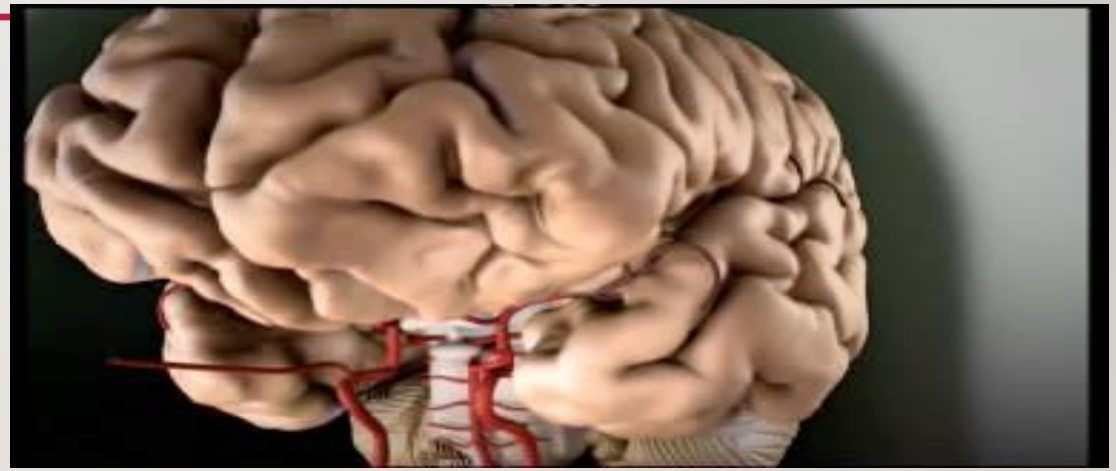
A STROKE IS A MEDICAL EMERGENCY!

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

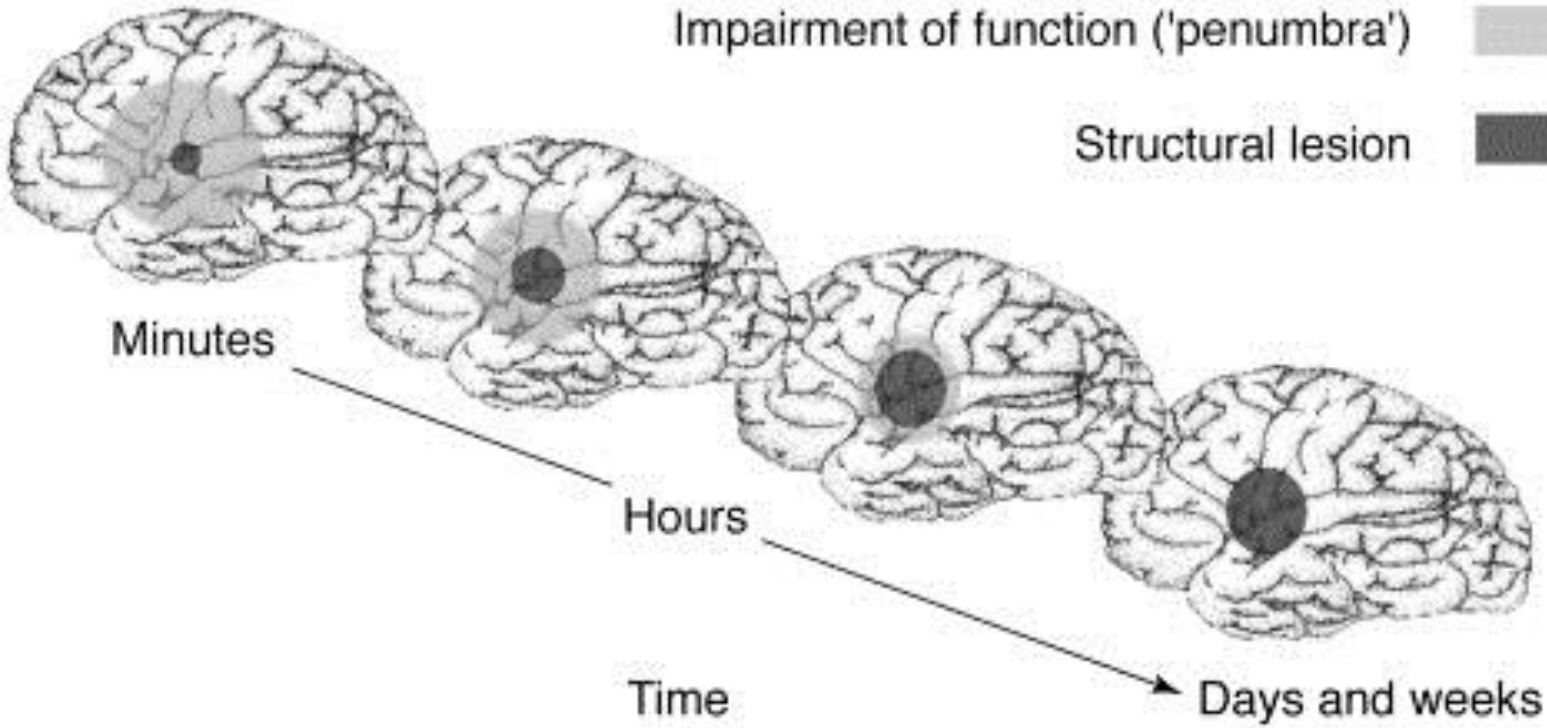
IF NOT TREATED IN TIME, A STROKE CAN HAVE EMOTIONAL, PHYSICAL OR EVEN FATAL CONSEQUENCES



stroke foundation

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

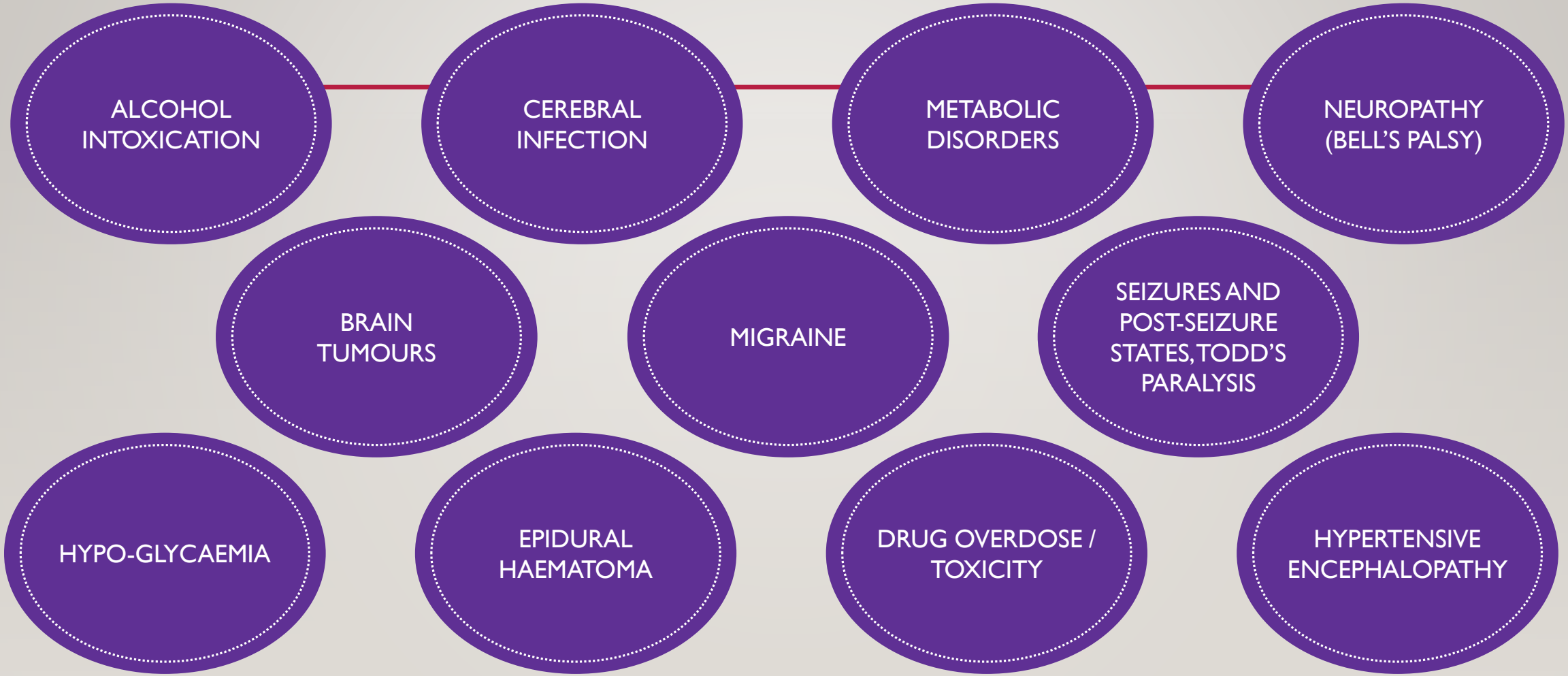
HAEMORRHAGIC STROKE

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%)

COMMON STROKE MIMICS

Summers D, et al. Am Heart Assoc Stroke 2009;2911-2944.



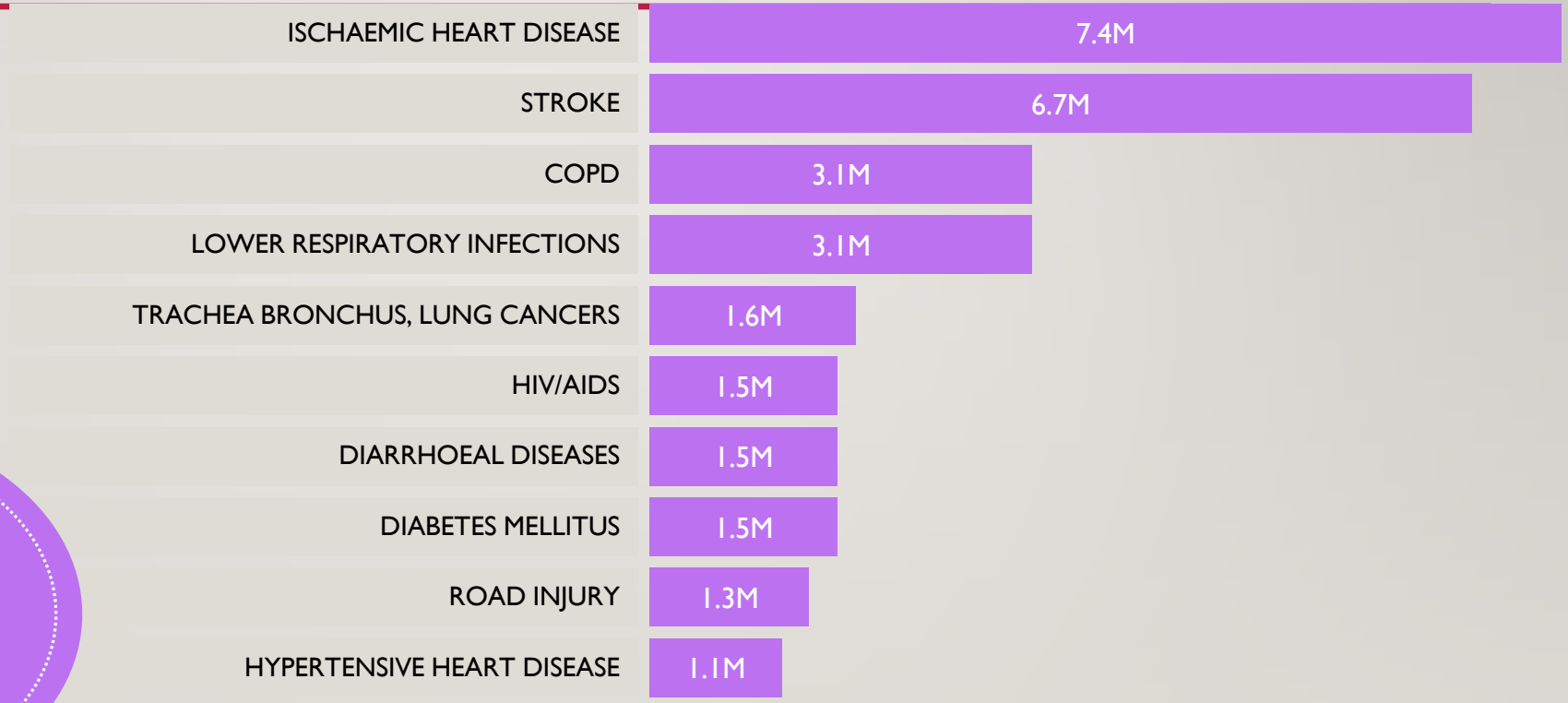
1. Lozano R, et al. Lancet 2012;380:2095-2128.
2. Hankey G. Lancet 2013;1:e239-e240.
3. Roger VL, et al. Circulation 2011;123:e18-e209.

GLOBAL BURDEN OF STROKE - MORTALITY

THE 10 LEADING CAUSES OF DEATH IN THE WORLD 2012

STROKE IS THE SECOND MOST COMMON CAUSE OF DEATH IN THE WORLD[1,2]

APPROXIMATELY ONE THIRD OF PATIENTS WITH A NEW STROKE WILL DIE[3]



www.who.int/mediacentre/factsheets/fs310/en

www.who.int/mediacentre/factsheets/fs310/en

MARKET UNDERSTANDING- STROKE

27/06/2008

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

Stroke prevalence in **Iran 150,000 patients***.

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

.

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

*Jones , UAE medical insurance , May 10th 2016.

Boehringer Ingelheim

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 LIFETIME[1]

EVERY 6 SECONDS

EVERY 6 SECONDS, SOMEONE DIES FROM A STROKE[1,2]

1. World Stroke Organization Campaign. http://www.world-stroke.org/advocacy/world-stroke-campaign
2. MacKay J, Mensah G. WHO. 2004. http://www.who.int/cardiovascular_diseases/resources/atlas/en/#

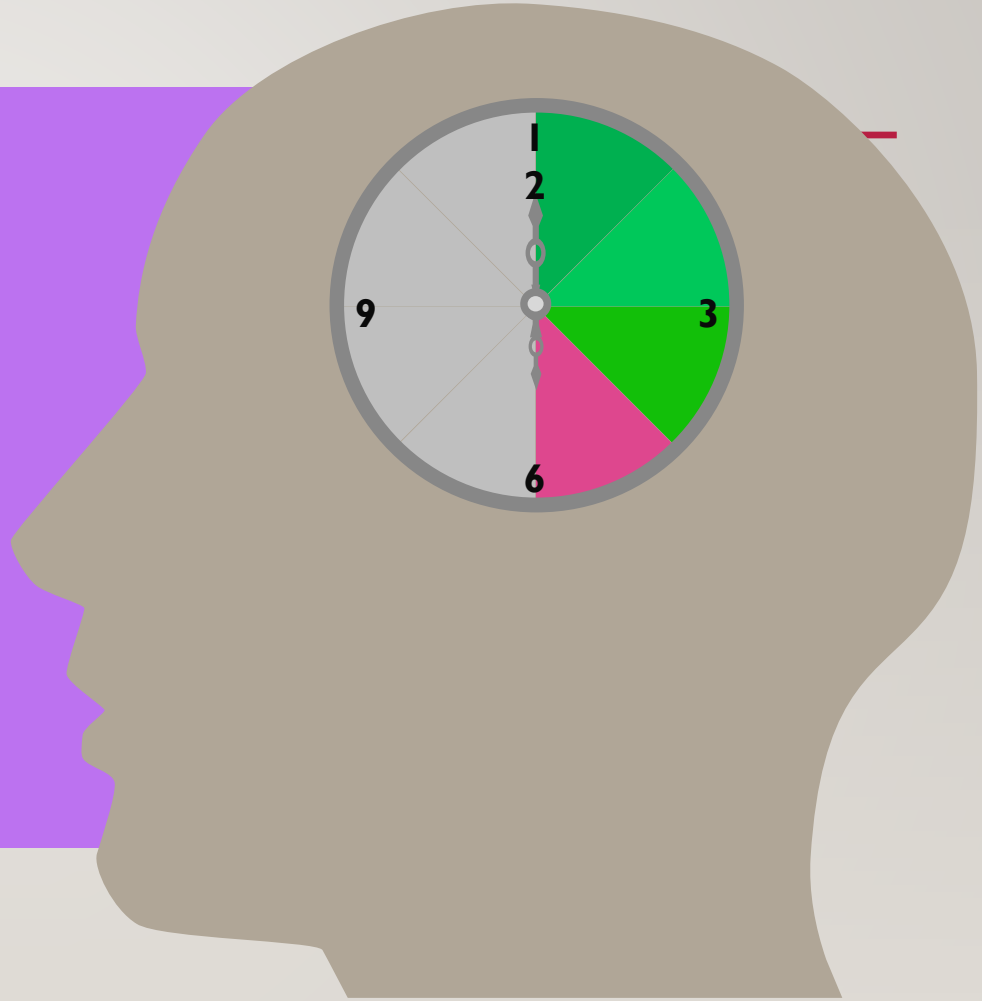
Stroke is a Major Public Health Problem

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**



2. Feigin V, et al. Lancet 2014;383:245-255.
3. Hankey G. Lancet 2013;1:e239-e240.
* See notes for more details
** CADASIL, cerebral autosomal dominant arteriopathy with sub-cortical infarcts and leukoencephalopathy

RISK OF STROKE - UNCHANGEABLE RISK FACTORS

AGE

RISK OF STROKE MORE THAN DOUBLES IN EACH SUCCESSIVE DECADE AFTER 65 YEARS

3 OUT OF 4 STROKES OCCUR IN PEOPLE OVER 65 YEARS OF AGE*

GENDER

INCREASING RISK OF STROKE IN WOMEN

PROBABLY RELATED TO LATE PREGNANCY, GESTATIONAL DIABETES, ORAL CONTRACEPTIVE USE, HORMONE-REPLACEMENT THERAPY & SMOKING

FAMILY HISTORY

RISK MAY BE HIGHER WITH A POSITIVE FAMILY HISTORY

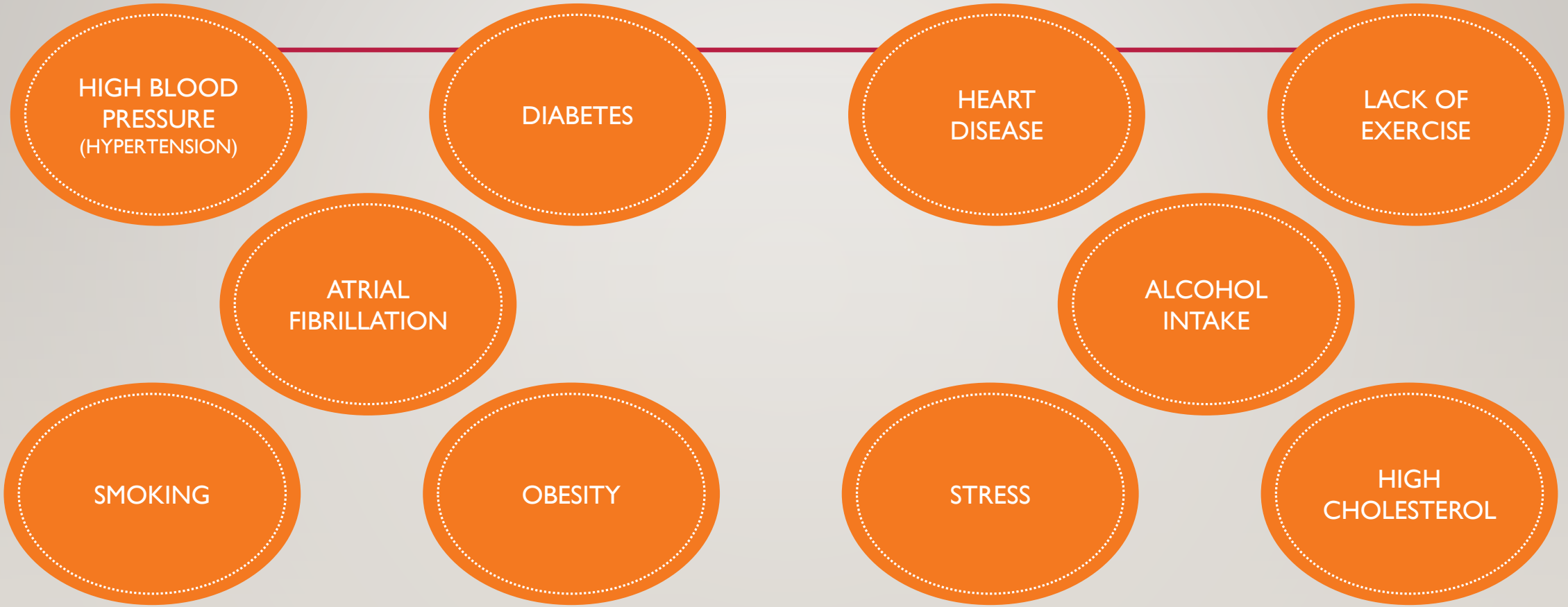
SOME CAUSES ARE HEREDITARY, E.G. CADASIL**

RACE

INCREASED RISK OF STROKE IN AFRICAN-AMERICANS

PROBABLY DUE TO INCREASED RISK OF HYPERTENSION, DIABETES & OBESITY

RISK OF STROKE - MODIFIABLE RISK FACTORS



Objective

"Setting
The Best Standard of Care
for acute stroke
management"

Boehringer Ingelheim

TREATMENT STRATEGIES

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).

SYSTEMIC REPERFUSION THERAPIES:

NO EVIDENCE OF BLEEDING

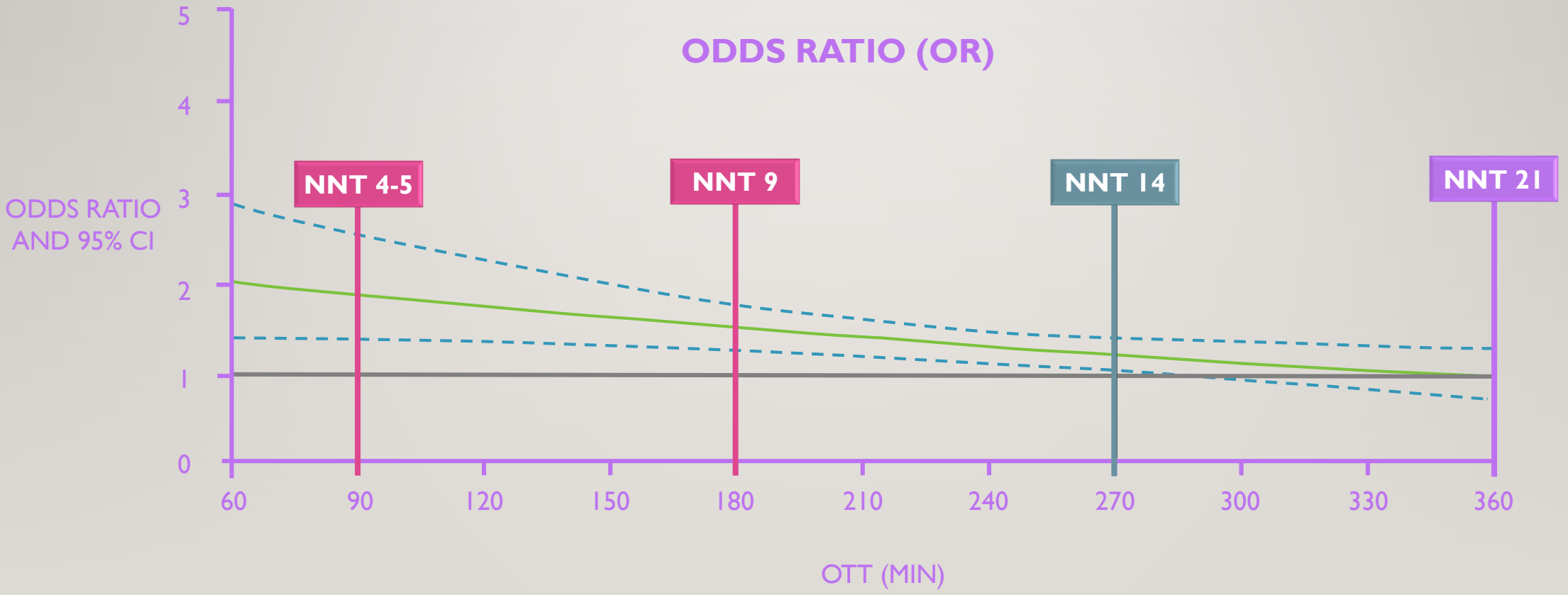
ENDOVASCULAR TREATMENT

INTRA-ARTERIAL (IA) THROMBOLYTICS ADMINISTRATION

MECHANICAL THROMBECTOMY WITH MEDICAL DEVICES

EFFICACY OF ACTILYSE IS TIME DEPENDANT

FAVOURABLE OUTCOME (mRS 0-1) vs. TIME[2]



Lees et al. Lancet 2010;375:1695-1703-1
NNT, Number needed to treat; OTT, Time from stroke onset to start of treatment; mRS, modified Rankin Scale

ACTILYSE:

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

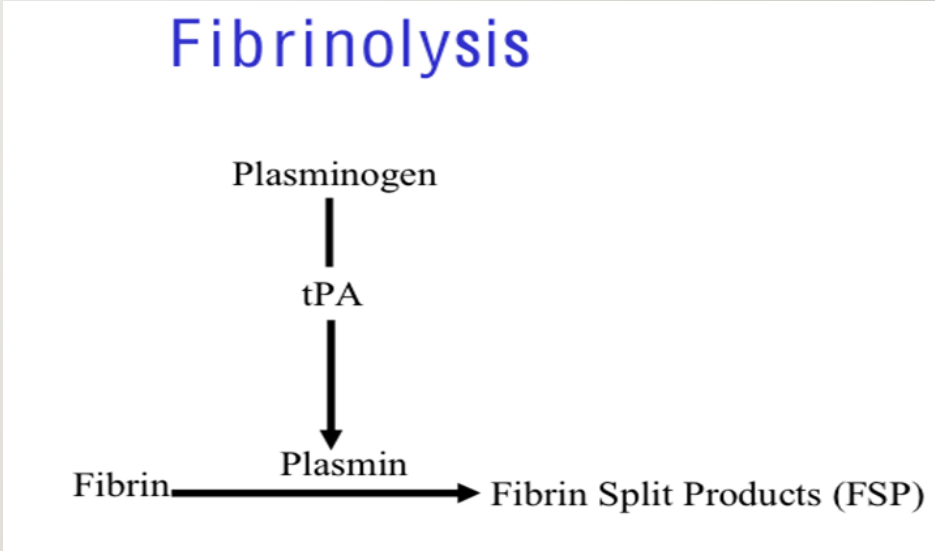
HIGH FIBRIN SPECIFICITY
(IS ACTIVATED WHERE FIBRIN IS I.E. AT THE CLOT)

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



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.

ACTILYSE SHOULD NOT BE GIVEN TO…

PATIENTS WHOSE SYMPTOMS OF ISCHAEMIC STROKE BEGAN MORE THAN 3-4.5 HOURS*
PRIOR TO INFUSION START OR THOSE IN WHOM TIME OF SYMPTOM ONSET IS UNKNOWN

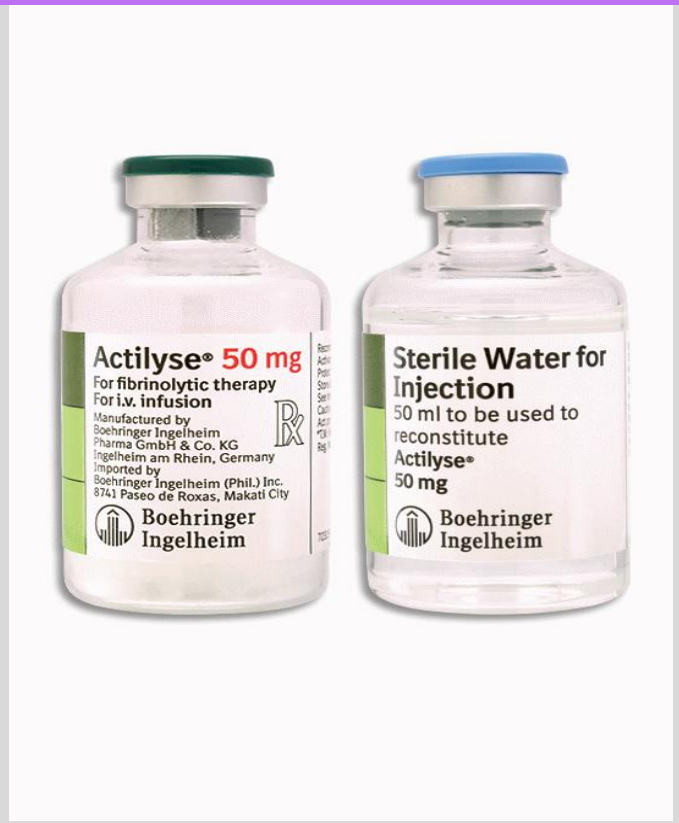
- MINOR NEUROLOGICAL DEFICIT OR SYMPTOMS RAPIDLY IMPROVING BEFORE START OF INFUSION
- SEIZURE AT ONSET OF STROKE
- SYMPTOMS SUGGESTIVE OF SUBARACHNOID HAEMORRHAGE, EVEN IF CT-SCAN IS NORMAL
- A PLATELET COUNT OF BELOW 100,000/mm^3
- A BLOOD GLUCOSE 400 mg/dl.
- PRIOR STROKE WITHIN THE LAST 3 MONTHS
- SEVERE STROKE AS ASSESSED CLINICALLY (E.G. NIHSS>25) AND/OR BY APPROPRIATE IMAGING TECHNIQUES
- EVIDENCE OF INTRACRANIAL HAEMORRHAGE (ICH) ON THE CT-SCAN
- ADMINISTRATION OF HEPARIN WITHIN THE PREVIOUS 48 HOURS AND A THROMBOPLASTIN TIME EXCEEDING THE UPPER LIMIT OF NORMAL FOR LABORATORY
- SYSTOLIC BLOOD PRESSURE >185 OR DIASTOLIC BP >110 mmHg, OR AGGRESSIVE MANAGEMENT (IV MEDICATION) NECESSARY TO REDUCE BP TO THESE LIMITS
- A HIGH RISK OF HAEMORRHAGE DUE TO A COMORBID

ACTILYSE® IS NOT INDICATED FOR THE TREATMENT OF ACUTE STROKE IN:

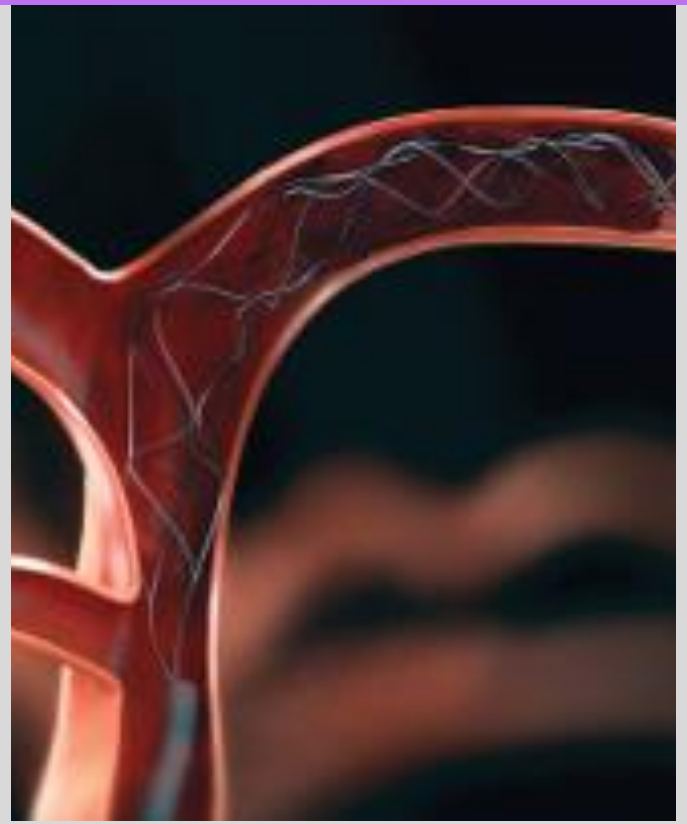
- PAEDIATRIC PATIENTS UNDER 18 YEARS
- ADULTS OVER 80 YEARS OF AGE*

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).



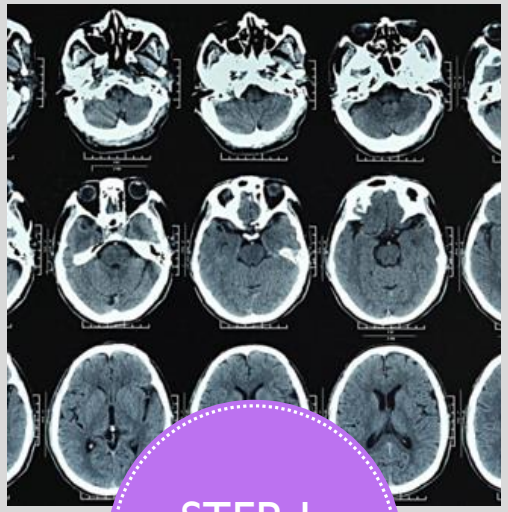
PLUS



UPDATED GUIDELINES

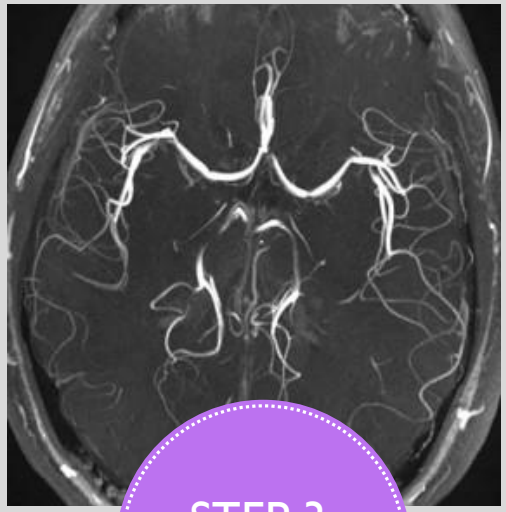
IF ENDOVASCULAR THERAPY IS CONTEMPLATED, A NON-INVASIVE INTRACRANIAL VASCULAR STUDY IS STRONGLY RECOMMENDED DURING THE INITIAL IMAGING EVALUATION OF THE ACUTE STROKE PATIENT BUT SHOULD NOT DELAY INTRAVENOUS rt-PA IF INDICATED.

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

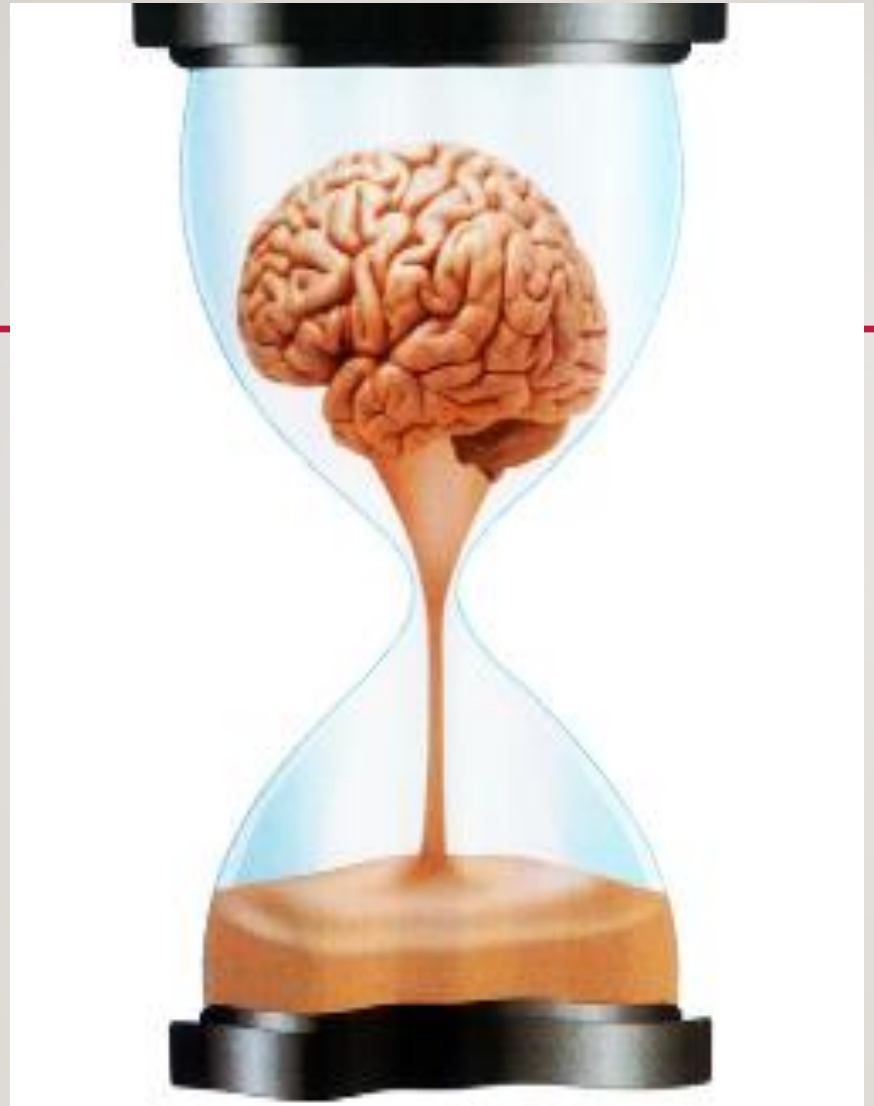


STEP 3: CT Angio

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
- CONFUSSION AND/OR PROBLEMS UNDERSTANDING WHAT IS BEING SAID
- DROOPING OF THE MOUTH ON ONE SIDE
- DIZZINESS
- WEAKNESS OR COMPLETE LOSS OF MOVEMENT AND/OR SENSATION IN ONE OR MORE LIMBS
- DIFFICULTY TALKING, FORMING WORDS OR SLURRING WORDS
- 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*

AIMS OF STROKE UNIT CARE

1. Minimize the volume of Brain tissue that is irreversibly interacted.
2. Prevent Stroke Recurrence
3. Prevent Complications
4. Reduce Disability and Handicap

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

* Echocardiography may be required in case of suspected endocarditis - Ringelstein EB, et al. Stroke 2013;44:828-840.

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

Ringelstein EB, et al. Stroke 2013;44:828-840.

BASIC REQUIREMENTS FOR ACUTE STROKE UNIT CARE

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

24-HOUR ACCESS TO BASIC INVESTIGATIONS

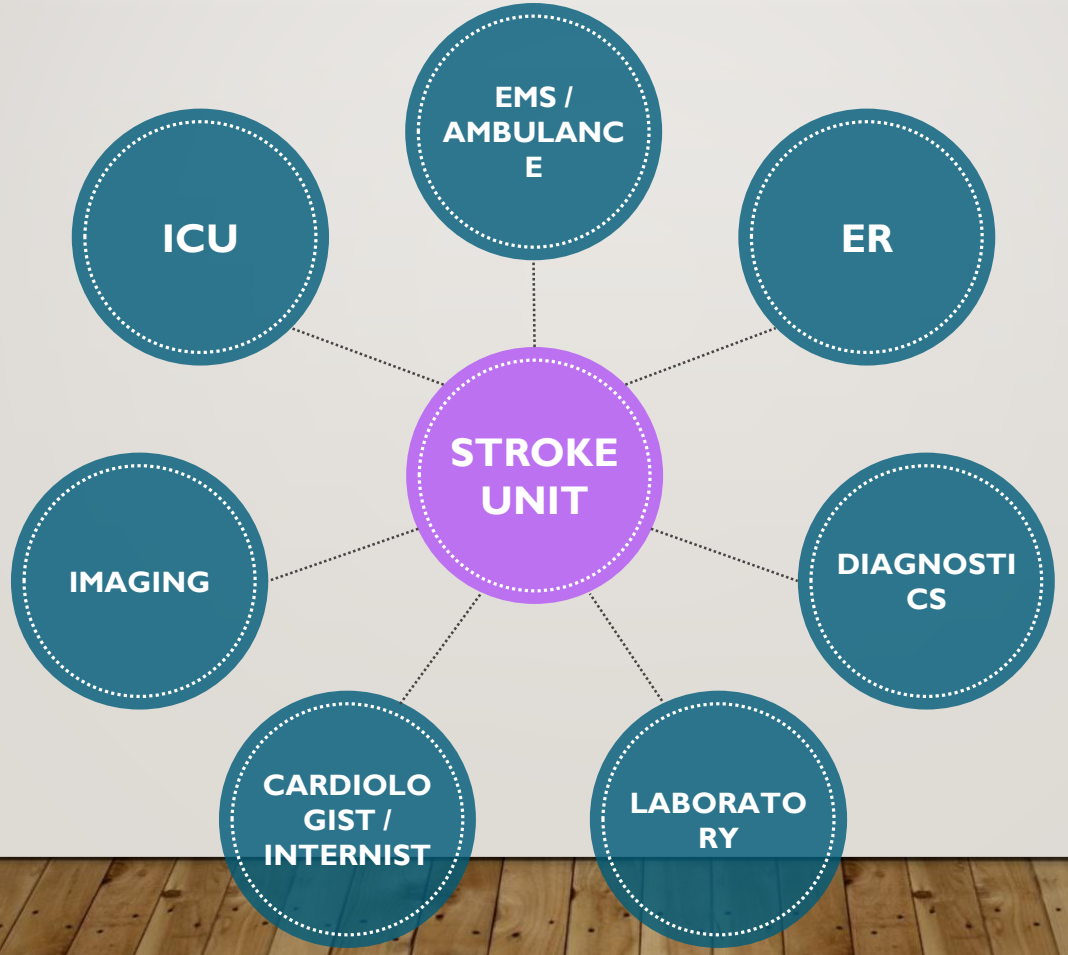
CT (OR MRI)
ECG
BP MONITORING
TEMPERATURE
BLOOD GASES
GLUCOSE
STANDARD LABORATORY TESTS

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)

- 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)65 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°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,
- Palliativ care: Identificate patient goals & patients with poor prognosis Education for stroke survivors and family
- provision of accurate information about stroke, emotional and practical support
- Rehabilitation: Early assessment and rehabilitation where relevant

PREVENTION OF COMPLICATIONS

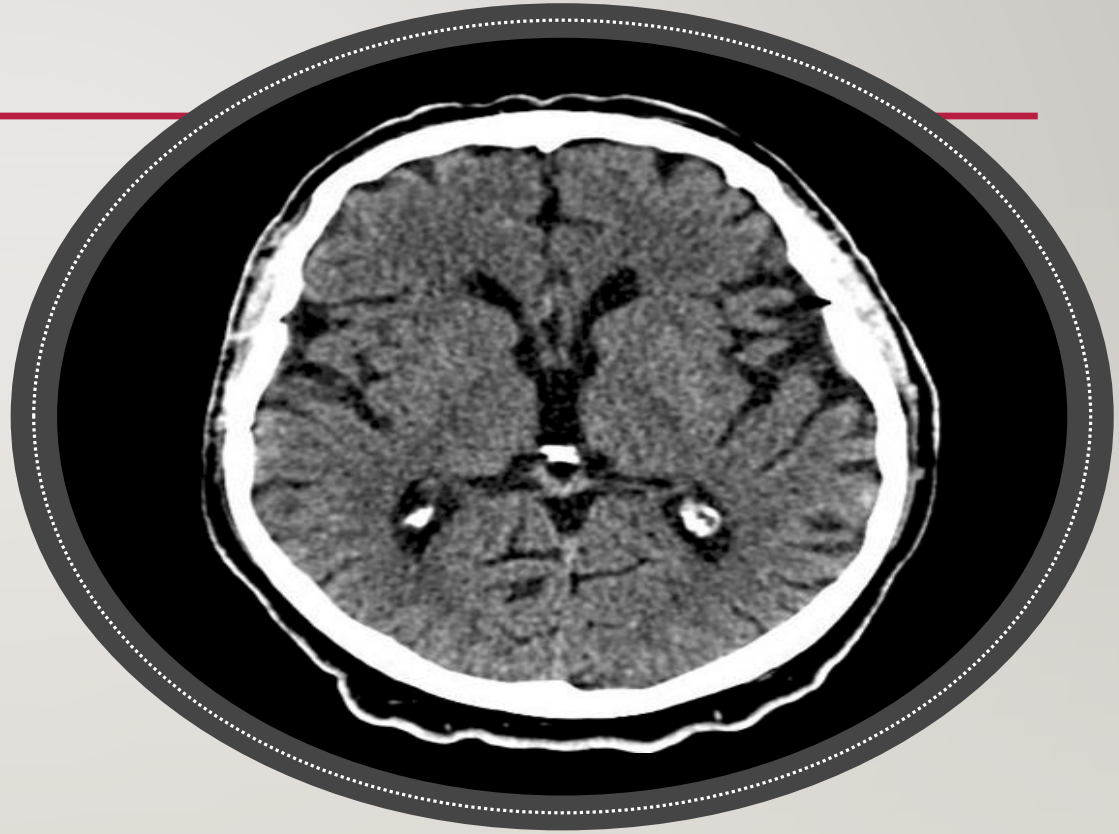
- Antiplatelets: antiplatelet medications within 48 h of stroke (class I: level of evidence A)
- antiplatelet should be withheld for 24 h in r-tPA–treated patients
- Anticoagulants: best timing for initiation of anticoagulation after an acute stroke unknown
- VTE: The use of anticoagulation provides 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

- 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

- 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)

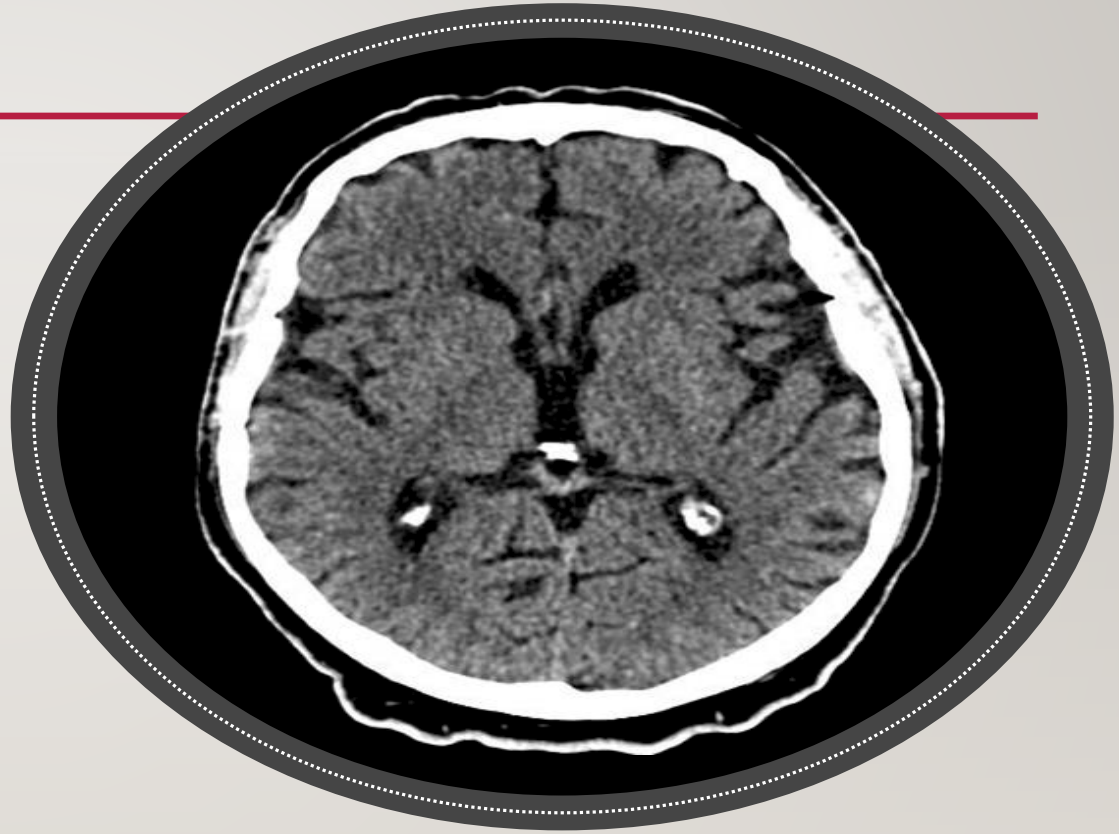
CT IMAGING - RECAP

- 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

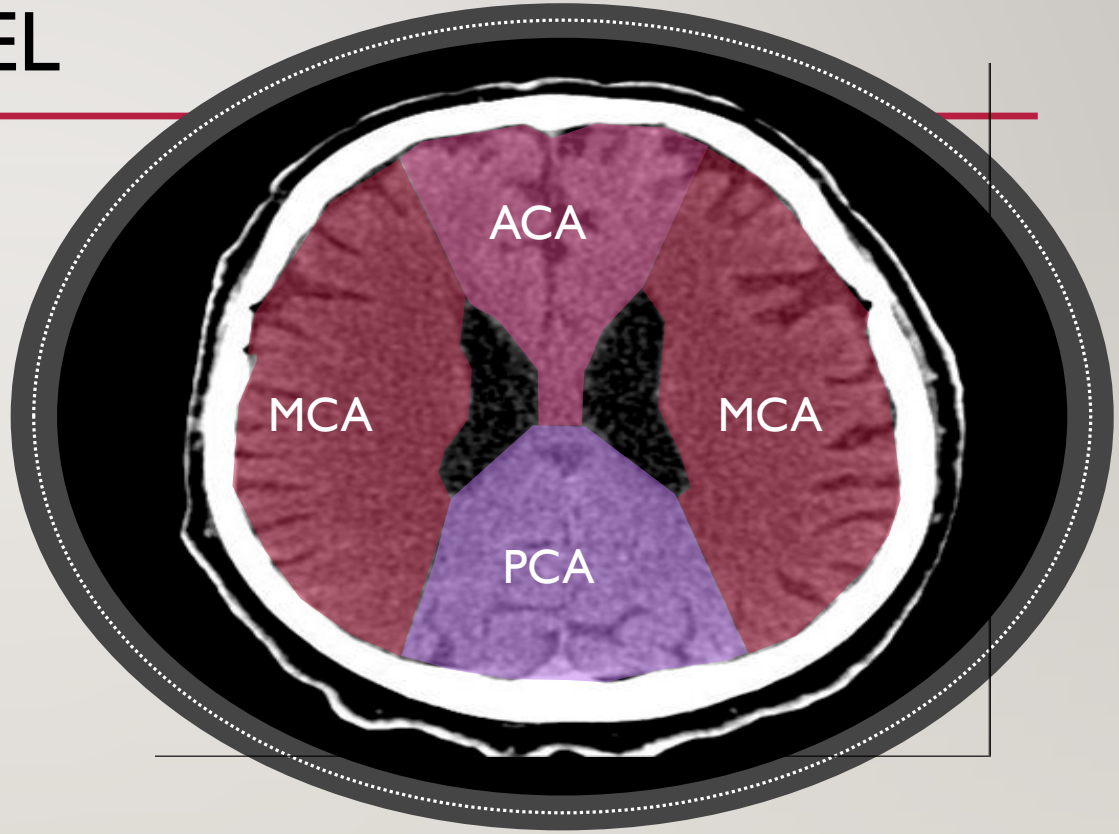
Note: we are not considering strokes in ACA or PCA territories

CEREBRAL VASCULAR TERRITORIES - SUPERIOR LATERAL VENTRICLE LEVEL

MCA – MIDDLE CEREBRAL ARTERY

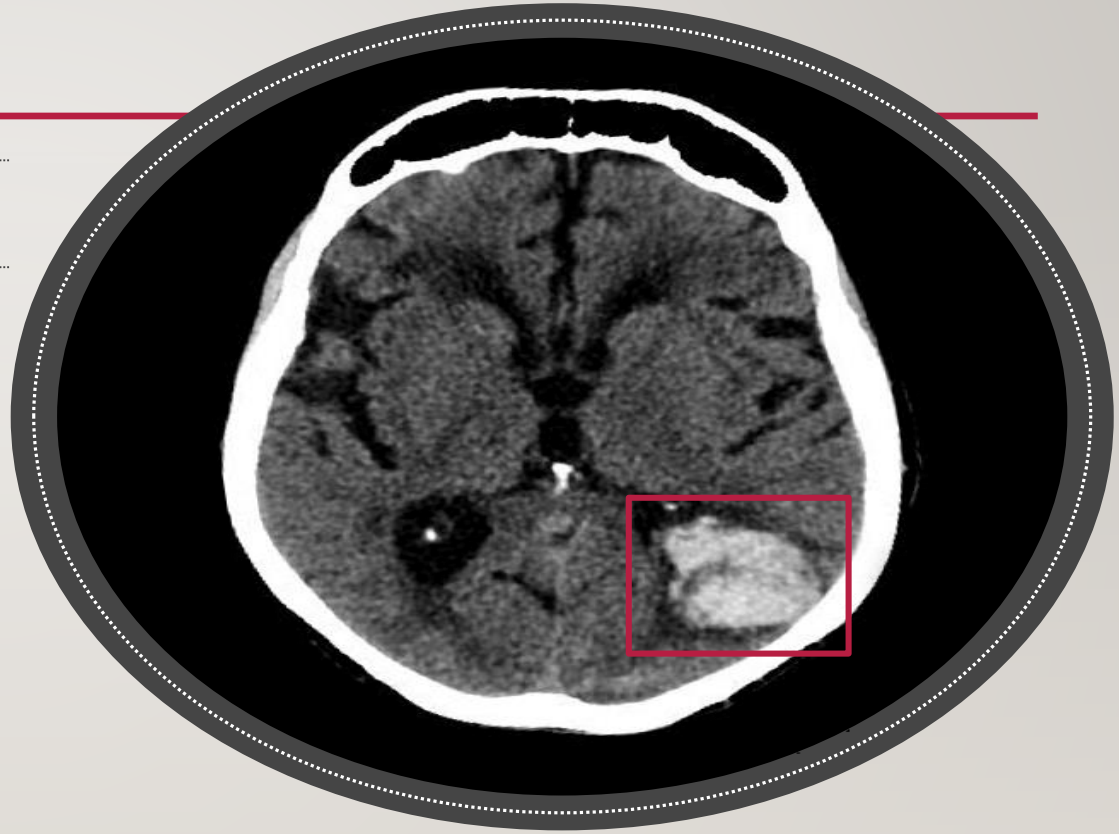
PCA – POSTERIOR CEREBRAL ARTERY

ACA – ANTERIOR CEREBRAL ARTERY

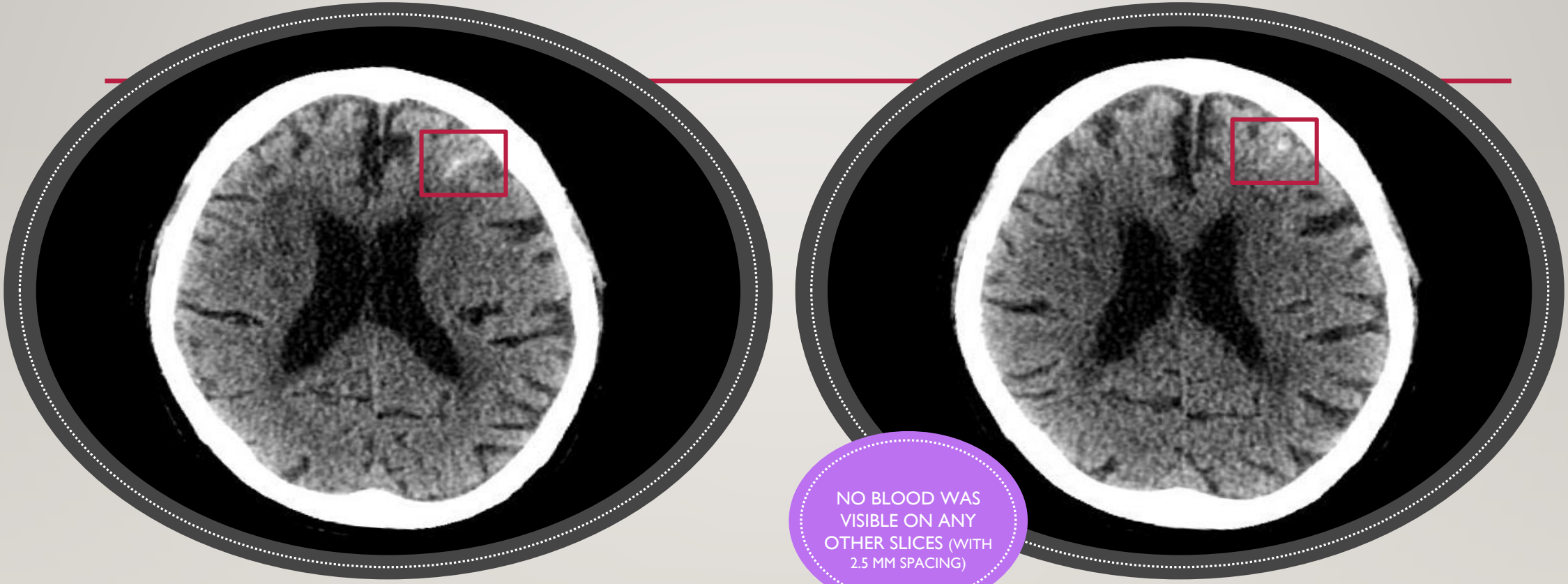


INTRA-CEREBRAL HAEMORRHAGE

- 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)

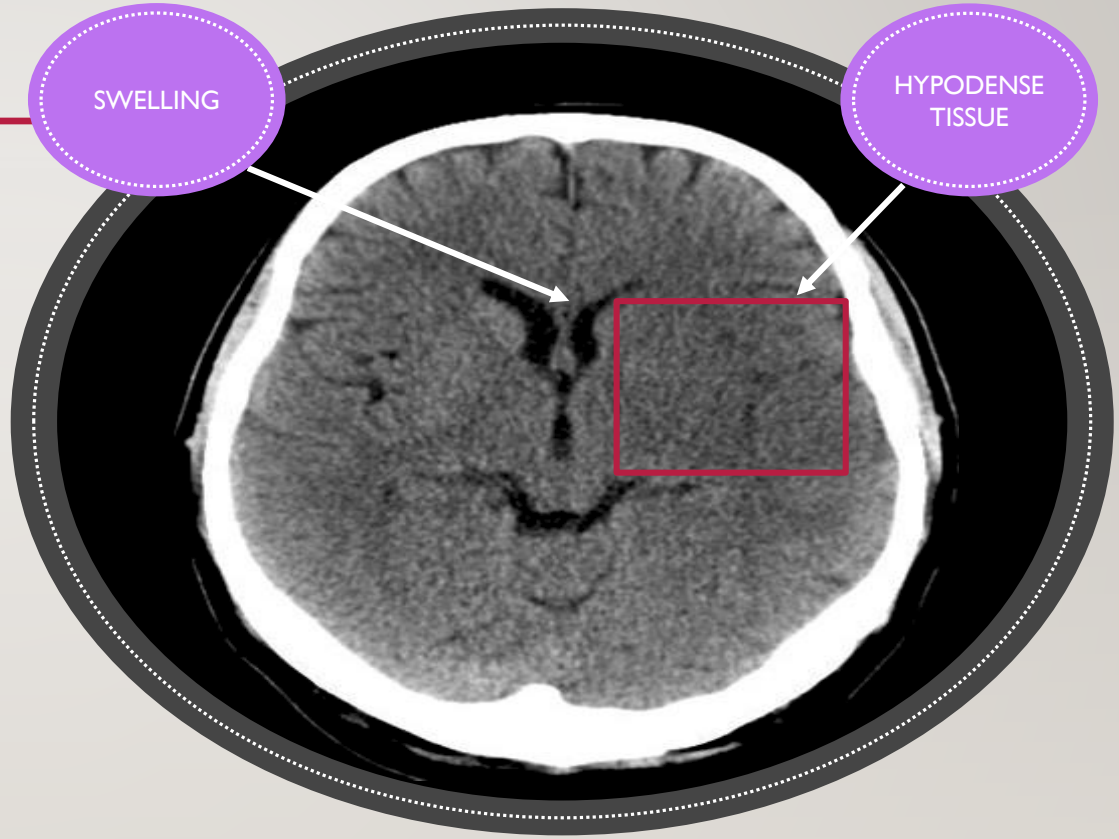
SWELLING - COMPRESSED VENTRICLES

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



THANKS FOR YOUR ATTENTION