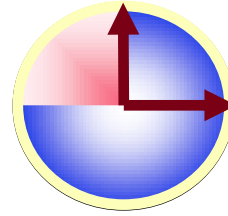


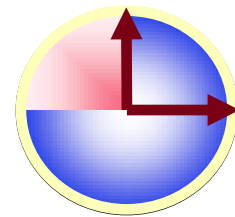
Emergency Room Procedure

The first few hours in hospital...



ER

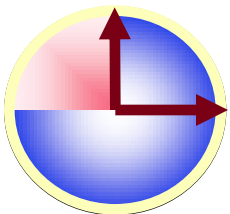
- 5 level Emergency Severity Index
- SOP's for Stroke – Stroke = Level 2
- Target Time = 1 Hour
 - 10 min from door 2 Doctor
 - 25 min from door 2 CT
 - 60 min from door 2 Needle
- Nurse is first contact!



ER Procedure: History

Ask or confirm with EMS, family members:

- Time of onset?
- Evolution of symptoms?
- Concomitant illnesses/drugs?
- Fluctuation in symptoms?
- Recent operations/traumas?



ER Procedure: Critical Functions

Examine cardiac function using:

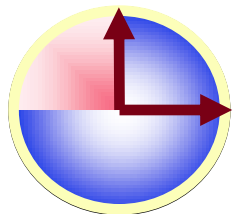
- continuous BP when needed
- continuous ECG when needed
- chest x-ray at admission

Monitor body temperature:

- (treat with antipyretic at $> 37.5^{\circ}\text{C}$)

Monitor blood gases/pH:

- (maintain $\text{pCO}_2 < 4.0 \text{ kPa}$)



ER Procedure: Immediate i.v. Therapy

Vomiting:

- anti-emetic

Hyperglycaemia (blood glucose > 12 mmol/l):

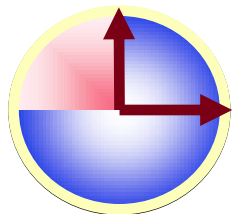
- insulin

Very high BP (systolic > 220 , diastolic > 130 mm Hg):

- consider use of short-acting antihypertensive

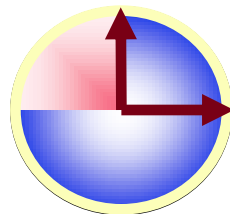
Agitation:

- short-acting sedative



ER Procedure: Differential Diagnosis

- Syncope
- Partial epileptic seizure with Todd's paresis
- Migraine attack (aura)
- Hypoglycaemia
- Hysteria
- Intoxication
- Subarachnoid haemorrhage
- Neuroinfection
- Neoplasm
- Brain injury
- Multiple sclerosis
- Peripheral vertigo



ROSIER

BOX 2 Recognition of Stroke in the Emergency Room (ROSIER)²³

	Yes	No
Has there been loss of consciousness or syncope?	-1	0
Has there been seizure activity?	-1	0
Is there a NEW ACUTE onset (or on awakening from sleep)		0
I. Asymmetric facial weakness	+1	0
II. Asymmetric arm weakness	+1	0
III. Asymmetric leg weakness	+1	0
IV. Speech disturbance	+1	0
V. Visual field defect	+1	0
Total score	(-2 to +5)	
Stroke is unlikely but not completely excluded if total score is ≤ 0 .		

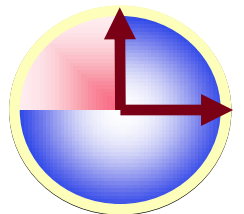
Florence Nightingale (1820 — 1910)



ER Procedure: CT Examination

Look for:

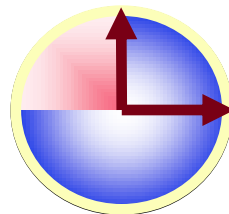
- Evidence of bleeding (= haemorrhagic stroke)
- Hyperdense MCA (= MCA occlusion)
- Early infarct signs
 - Hypodensity of grey or white matter
 - Obliteration of cortical sulci
 - Obscured basal ganglia
 - Loss of insular ribbon



ER Procedure: Ultrasound Diagnosis

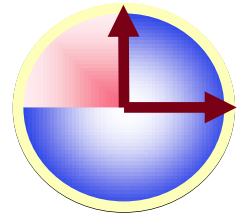
In skilled hands, ultrasound may show:

- Carotid occlusion or stenosis
- MCA occlusion or stenosis
- Vertebrobasilar occlusion
- Extracranial dissection



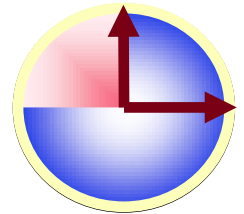
ER Procedure: Eligibility Criteria for Thrombolytic Therapy

- Acute ischaemic stroke
- Age < 80, previously independent
- Onset < 4.5 hours before thrombolysis
- CT normal or indicates focal infarction with no evidence of haemorrhage (patients with extended signs of infarction are not eligible)
- NIH - SS score 4-23



ER Procedure: Exclusion Criteria for Thrombolytic Therapy

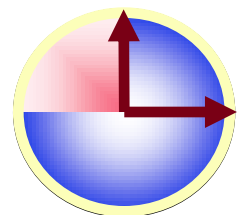
- Minor/improving stroke signs
- CT signs of haemorrhage
- History of intracranial haemorrhage
- Seizure at stroke onset
- Stroke/Head injury in previous 3 months
- Major surgery/trauma in previous 2 weeks
- GI or urinary haemorrhage in previous 2 weeks
- Arterial puncture / LP in previous 1 week
- Systolic BP >185mmHg and Diastolic BP >110mmHg
- Glucose level < 50 mg/dL or > 400 mg/dL
- Heparin therapy within 48 hours(↑PTT)
- Oral anticoagulants (INR >1.7), platelet count < 100 000
- Don't give if major infarct signs present early
- Done by experienced stroke physician/team



Diagnosis

NIH-Stroke Scale

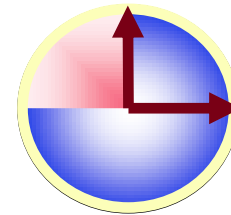
- 0-1 normal or near normal examination .
- 1-4 minor stroke though.
- 5-15 moderate stroke
- 15-20 moderately severe stroke
- > 20 severe stroke

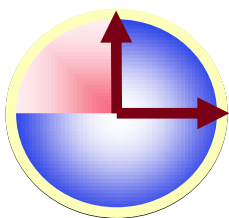


NINDS rtPA Trial

National Institute of Neurological Disorders and Stroke

- This was a double blind ,
- randomized ,
- placebo-controlled trial of
- IV rtPA at 0.9 mg /kg (10% a bolus ,and the rest as a 1 hour infusion , 90 mg maximum)

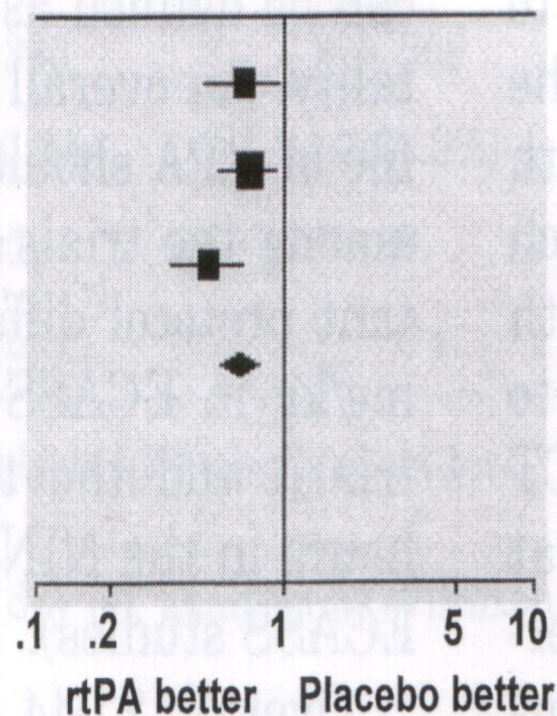




Outcome: Benefit - Death or dependency at the end of follow-up

Study	rtPA n/N	Placebo n/N	OR (95% CI Fixed)	OR (95% CI Fixed)
ECASS I	198 / 313	220 / 307		0.68 (0.49,0.95)
ECASS II	187 / 409	211 / 391		0.72 (0.55,0.95)
NINDS	179 / 312	229 / 312		0.49 (0.35,0.69)
Subtotal (95%CI)	564 / 1034	660 / 1010		0.63 (0.53,0.76)

Chi-square 3.22 (df=2) Z=4.99



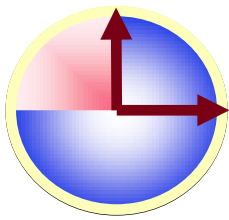
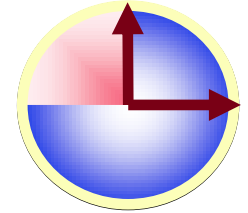


Table 1—Data From the Four Major Trials of IV tPA for Stroke, Comparing Dose, Therapeutic Window, Mortality, and OR for Benefit of tPA in the Incidence of Death and Dependency

Study	Patients, No.	Dose, mg (Maximum)	Window h	Symptomatic ICH		Mortality		Benefit
				tPA, %	Placebo, %	tPA, %	Placebo, %	Death or Dependency OR (95% CI)
NINDS ¹	624	0.9 (90)	≤ 3	6.4	0.6	17.4	20.6	0.49 (0.35–0.69)
ECASS-I ²	620	1.1 (100)	≤ 6	19.8*	6.5*	22	15.6	0.68 (0.55–0.95)
ECASS-II ³	800	0.9 (90)	≤ 6	8.8	3.4	10.5	10.7	0.72 (0.55–0.95)
ATLANTIS-B ⁷	547	0.9 (90)	3–5	7.0	1.1	11.0	6.9	1.04 (—)

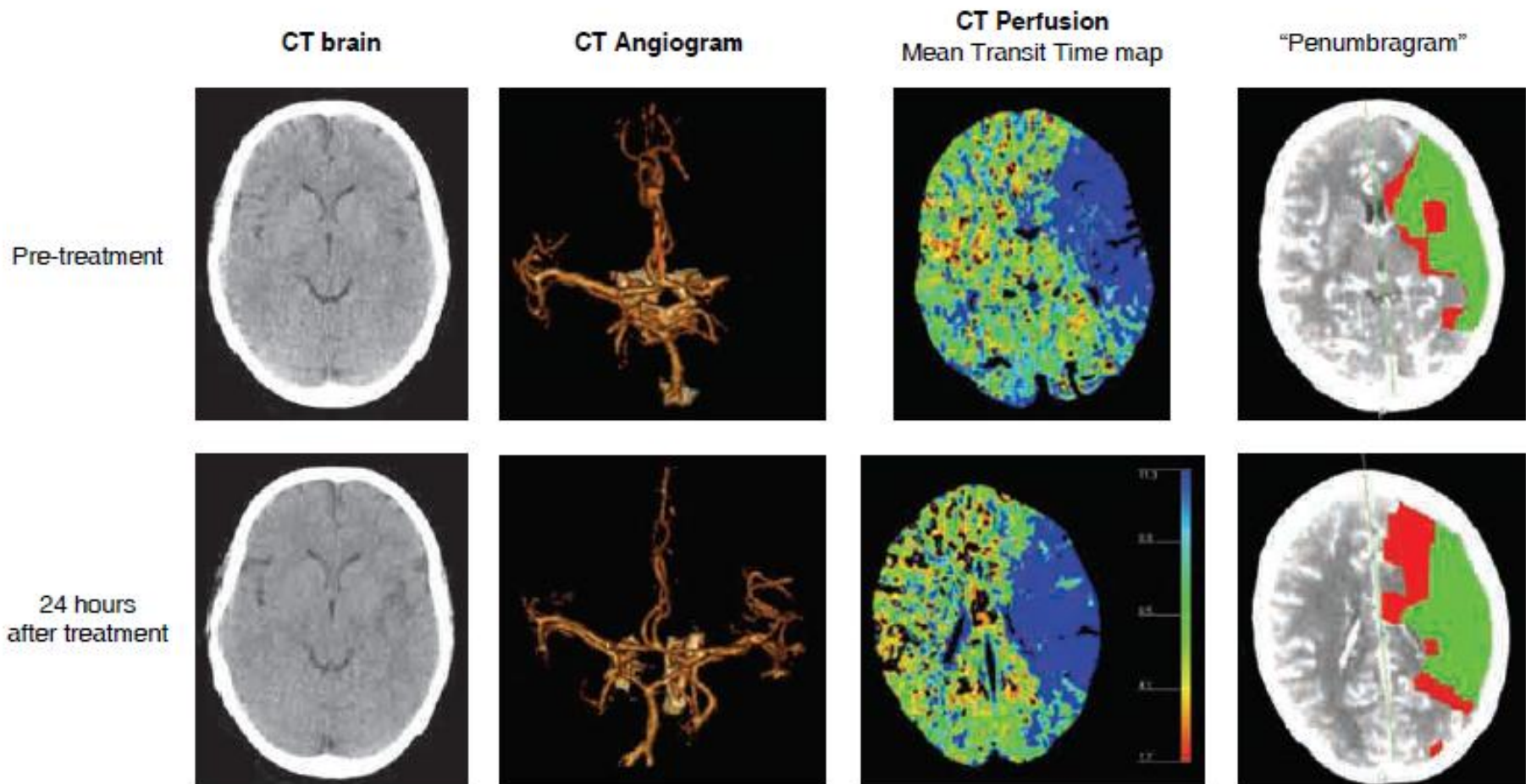
*Parenchymal hematoma (symptomatic ICH not reported in ECASS-I).

NINDS rtPA Trial



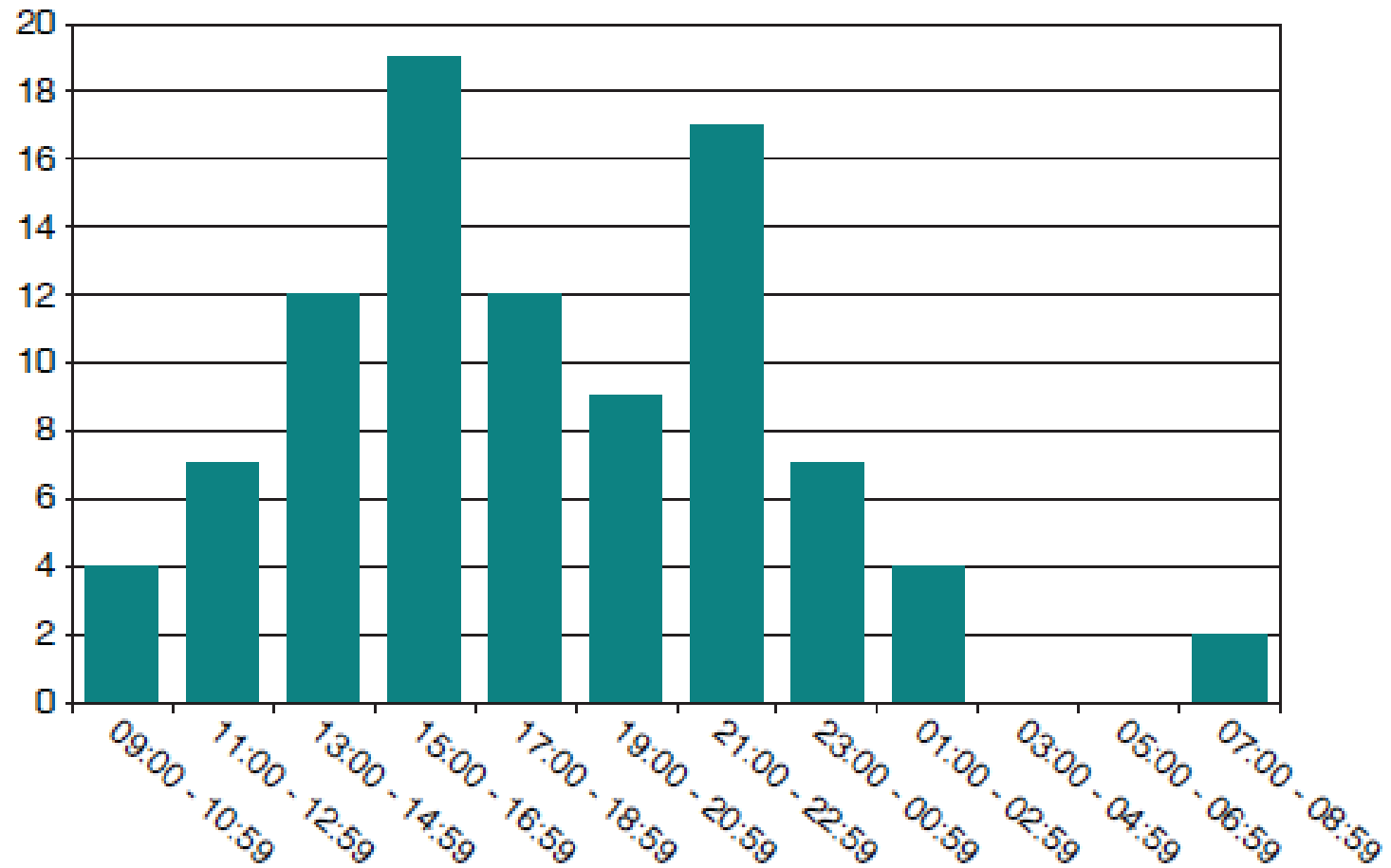
- Conclusion :

Despite an increased risk of symptomatic ICH,
treatment with rtPA provided a consistent benefit
in functional outcome at 3 months
without increasing mortality



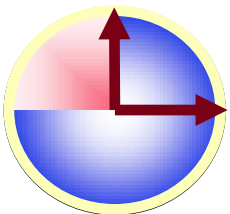
Thrombolysis does what is intended: acute middle cerebral occlusion associated with severe clinical deficit and a large volume of hypoperfused but predominantly viable brain tissue (more prolonged transit time on the transit time map; still viable tissue coloured in green and non-viable in red on the "penumbrogram"); treatment results in recanalisation and salvage of most of the tissue at risk, with resultant minimal infarction and clinical improvement (and discharge home very quickly).

Time of arrival

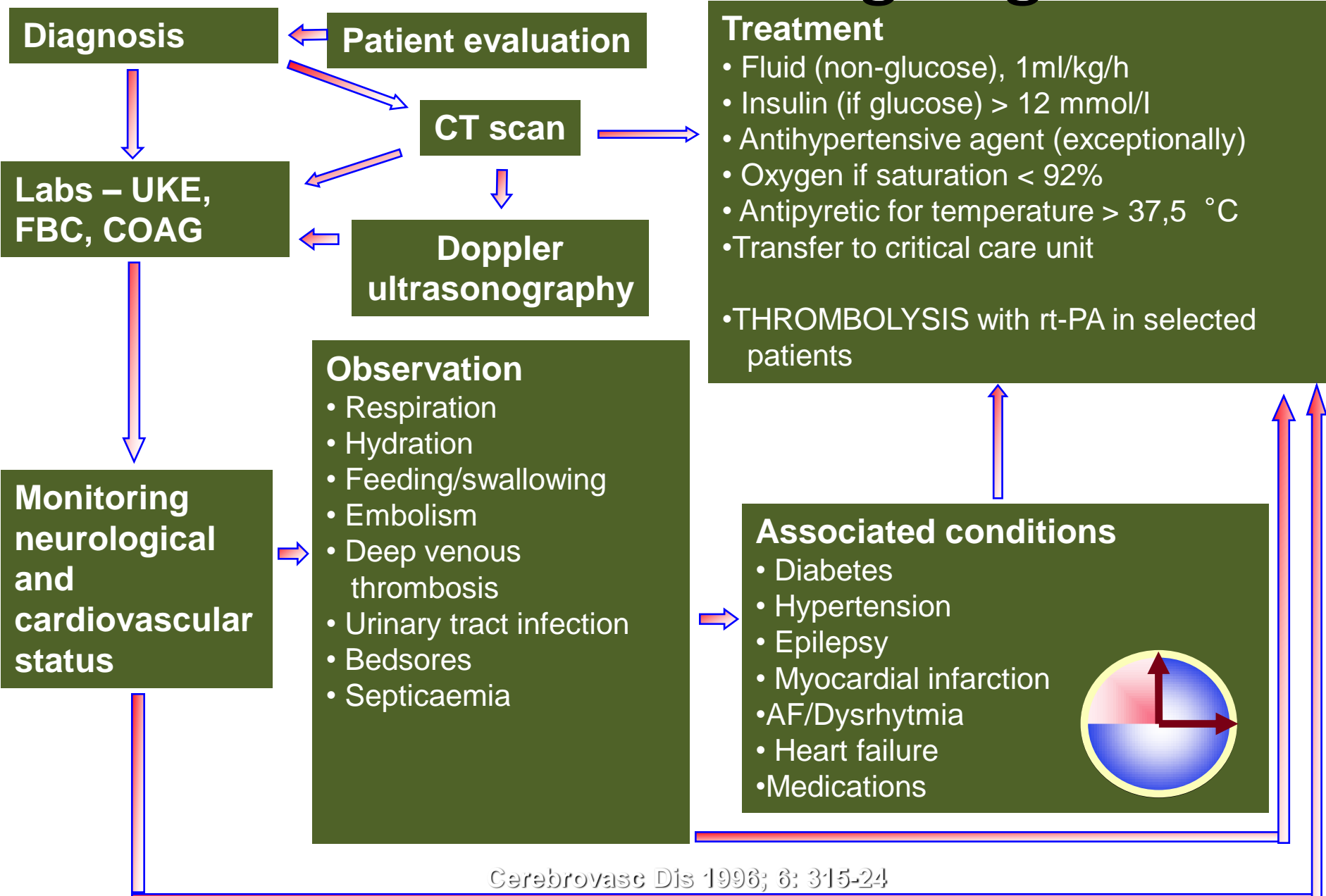


Figure

Time of arrival of 92 consecutive thrombolysis cases treated in South Glasgow, 2008-2009.



ER Procedure: Ongoing Measure



Blood pressure in Acute Stroke

- $CPP = MAP - ICP$
- Leave BP if below 220/120!!!
- Treat BP if signs of end-organ damage
- Use Labetalol or Nicardipine
(*CHEST Guideline 2011*)
- *For tPa eligible patient BP must be 185/110*

ER Procedure: Aspirin

- Aspirin – IST + CAST + TOAST
 - 160mg – 300mg within 48hours p.o.
 - OR for recurrent stroke 30%
 - OR for death 8 %
 - OR for further stroke or death 11%

BUT Non significant 21% increase in symptomatic intracranial haemorrhage
- For every 1 000 acute strokes treated
9 deaths/stroke recurrences prevented

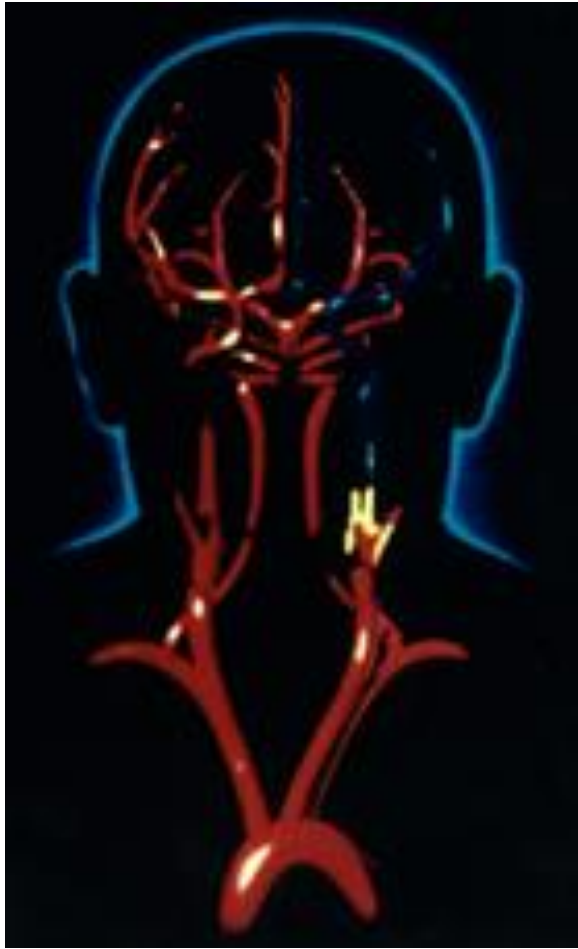
Specific Therapy

- Specific Therapy
 - Heparin, low molecular weight heparin
NO evidence of routine use, increased risk of haemorrhage
(level I)
 - Full-dose heparin may be used
 - Atrial fibrillation
 - Cardiac source with high risk or re-embolisation
 - Arterial dissection
 - High grade stenosis(level IV)

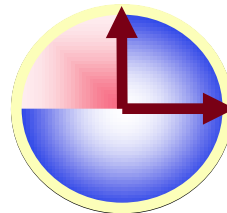
Specific Therapy

- Haemodilution therapy not recommended
(level I)
- Neuroprotective agents not recommended
(level I)

Brain Attack!



- Acute stroke = ‘brain attack’
- Every minute matters: ‘time is brain’
- Combat therapeutic nihilism



Florence Nightingale (1820 — 1910)

