Mercy University Hospital

Stroke Service

Thrombolysis Pack – June 2009

Remember!!

Time is Brain

Patients with suspected acute stroke need to be identified immediately in Emergency Department

Stroke thrombolysis is a Class 1, Level A recommendation for acute ischaemic stroke

For all Strokes & Transient Ischaemic Attacks

For any possible stroke, if the patient was last seen normal (or at baseline level of functioning) < 6 hours before ED arrival always consider thrombolysis to be an issue & have reviewed immediately

Any patients presenting to Emergency Department with a possible stroke should have symptoms identified at triage based on clinical presentation (ROSIER Score).

If ROSIER score between 1 and 5 but thrombolysis not an issue direct review by medical SHO on-call is expected. For potential thrombolysis see below

If ROSIER score < 1, alternative diagnosis for stroke & TIA should be considered

Guideline For Stroke Thrombolysis

- If the patient was last seen normal (or at baseline level of functioning) < 6 hours before ED arrival always consider thrombolysis to be an issue

The first point of contact is often the **Triage Nurse in the ED**. They will

- If it is between 0900 and 1700 and the patient was last seen normal (or at baseline level of functioning) < 6 hours before ED arrival, immediately contact the "Stroke Doctor" for immediate review.
    - **Registrar/SpR in Neurology - when MUH on neuro-call**
    - **Registrar/SpR in Geriatric Medicine – on other days**
- If it is outside 0900 and 1700 and the patient was last seen normal (or at baseline level of functioning) < 6 hours before ED arrival, contact the Medical Registrar
- Check Capillary Blood Glucose
- Send for labs as follows:
    - FBC, ESR , Group and Hold. Coag screen, Bioprofile, LFTs, CPK, troponin
    - Inform lab of **urgency** and need for results to be phoned.
- Obtain Acute Stroke Protocol documentation pack:
    - Document vital signs
    - Document time of onset of symptoms
    - If patient cannot speak, obtain contact details of potential witness urgently
- Send patient to Resus Room and notify ED physician to review

The **ED Physician** will see patient immediately. They will

- Ensure resuscitation and stabilisation of patient
- Ensure that Stroke Team has been paged
- Place 18 gauge canula in large vein in both arms and ensure bloods sent
- Rapid evaluation of patient
- Inform senior ED nurse if thrombolysis is a possibility

The **ED Nurse**

- Acquire 12-lead ECG
- Document vital signs every 15 minutes
- Start oxygen at 2-10 litres/minute to maintain SpO2 >= 95%
- Prepare for patient to travel to CT with portable monitor and oxygen (contact Porter if necessary), inform CT radiographer that thrombolysis possible
- Inform bed management that an ICU or CCU may be needed as thrombolysis a possibility
- Have alteplase ready to be drawn up if required

The **Stroke Doctor** will immediately attend the ED

- Examine patient, document NIHSS, establish time of onset, review inclusion and exclusion criteria and document reasons for non-treatment if contraindicated
- Notify CT (5270) of Acute Stroke Patient for urgent CT if not already done – patient should go next on table for non-contrast CT Brain scan
- Notify relevant consultant – Neurologist or Geriatrician – that thrombolysis is possible
- Discuss risks and benefits of tPA with family/patient
- Fill out admission proforma

The Doctor and ED Nurse travel with the patient to CT scanner

They will go straight to CT for a **Non-Contrast CT Brain.** The **consultant radiologist** will be available for interpretation and discussion. If there is

- No high Density lesion consistent with Intracerebral Haemorrhage
- No hypodensity in >1/3 of the Middle Cerebral Artery (MCA) Territory or equivalent
- Signs of acute stroke,

thromboysis maybe appropriate.

Bolus of tPA can be given while the patient is still on the scanner.

The Stroke physician and ED nurse will then travel with the patient to ICU / CCU. If an ICU / CCU bed is not available they will return to ED. Following the bolus the infusion of tPA will be administered over 1 hour. The physician will stay with the patient throughout this time.

The ideal door to needle time should be <60 minutes.

Governance

Stroke thrombolysis is a Class 1, Level A recommendation for acute ischaemic stroke within 3 hours of onset. There is clear evidence that intravenous rtPA is also beneficial if given between 3 and 4.5 hours after stroke onset (Class I, Level A)**.** It is recommended that treatment is considered in patients who otherwise meet the licence criteria.

It is therefore important that the Mercy University Hospital consider this treatment if appropriate in patient with acute stroke presenting to the hospital. All patients irrespective of age need to be considered for stroke thrombolysis if they present to the Mercy University Hospital with an acute ischaemic stroke. As in most centres out of hours stroke thrombolysis is logistically difficult because of the short time available to respond.

Consultants in Emergency Medicine, Geriatric Medicine or Neurology may have the responsibility to oversee stroke thrombolyis. However, in all cases consultant staff in Geriatric Medicine or Neurology should be informed before thrombolyis is given in acute ischaemic stroke as they will be providing the ongoing care following stroke.

Appendix 1: ArT-PA (Alteplase) Dosing Schedule

BODY WEIGHT/DOSE CHART FOR rTPA-Alteplase(Actilyse)
PATIENT DETAILS

DRUG DOSAGE AND ADMINISTRATION.

**** Prescribe in Patient Medication Sheet ****

Body Weight (Stones)	Body Weight (Kg)	Total rTpa Dose (mg)	10% Bolus (ml)	90% IV Infusion (ml/hr)	No. of 50mg rt-PA vials needed
6st 4	40	36	4	32	1
6st 8	42	38	4	34	1
7st	44	40	4	36	1
7st 3	46	41	4	37	1
7st 7	48	43	4	39	1
7st 12	50	45	5	40	1
8st 2	52	47	5	42	1
8st 6	54	49	5	44	1
8st 12	56	50	5	45	2
9st 1	58	52	5	47	2
9st 6	60	54	5	49	2
9st 10	62	56	6	50	2
10st	64	58	6	52	2
10st 5	66	59	6	53	2
10st 9	68	61	6	55	2
11st	70	63	6	57	2
11st 4	72	65	6	59	2
11st 9	74	67	7	60	2
12st	76	68	7	61	2
12st 3	78	70	7	63	2
12st 8	80	72	7	65	2
12st 12	82	74	7	67	2
13st 3	84	76	8	68	2
13st 7	86	77	8	69	2
13st 12	88	79	8	71	2
14st	90	81	8	73	2
14st 6	92	83	8	75	2
14st 11	94	85	8	77	2
15st 2	96	86	9	77	2
15st 7	98	88	9	79	2
15st 10	100	90	9	81	2

PATIENTS MUST BE *CONTINUOUSLY MONITORED* PRIOR TO AND DURING DRUG ADMINISTRATION, and for at least 12 hours following administration.

1. **Total dose: 0.9mg/kg. *MAXIMUM DOSE IS 90 MG.*** (See weight/dose chart)
2. **Should be prescribed by, and administration supervised by, a Doctor from the stroke team.**
3. **10% of total dose given as an I.V push over 2 minutes by a Doctor from the responsible team.**
4. **Give remaining 90% of dose I.V over 60 minutes via infusion pump.**
5. **Observe patient for any deterioration during infusion.**

Appendix 2: THROMBOLYSIS : INCLUSION/EXCLUSION CRITERIA

INCLUSION CRITERIA. ANSWER TO THE FOLLOWING QUESTIONS MUST BE *YES.*

		YES	NO
1.	Clinical Diagnosis of Stroke		
2.	CT appearance consistent with schaemic stroke		
3.	Onset of symptoms less than 3 hours ago. Benefit has been shown up to 4.5 hours but this is not currently licensed but should be considered		
4.	Risks and benefits explained to patient or relative.		

ANSWER TO *ALL* OF THE FOLLOWING QUESTIONS MUST BE *NO.*

		YES	NO
1.	Severe stroke as assessed clinically (e.g. National Institute of Health Stroke Score >25) (NIHSS)		
2.	Minor neurological deficit (NIHSS $\leq$ 4)		
3.	Symptoms rapidly improving before start of infusion		
4.	Unconscious patient		
5.	Fixed head or eye deviation.		
6.	Pre- stroke Rankin > 3. Life expectancy less than one year from another cause		
7.	Seizure at onset of stroke		
8.	Symptoms suggestive of subarachnoid haemorrhage, even if the CT scan is normal.		
9.	Infective endocarditis, or acute pericarditis		
10.	Recent (< 10 days) traumatic external heart massage		
11.	Recent (< 10 days) puncture of a non-compressible blood vessel (e.g. subclavian or jugular vein puncture, arterial puncture, or lumbar puncture within 7 days). 24 hrs may suffice if min trauma from arterial puncture		
12.	Trauma with internal injuries, surgery or visceral biopsy within previous 4 weeks.		
13.	Serious head trauma or C.N.S surgery within the previous 3 months.		
14.	Any history of central nervous system damage (i.e. neoplasm, aneurysm, intracranial or spinal surgery)		
15.	Pregnancy, or childbirth within the previous 4 weeks.		
16.	Colitis, oesophageal varices, active peptic ulcer disease		
17.	Abdominal aortic aneurysm		
18.	Proliferative diabetic retinopathy		
19.	Acute pancreatitis		
20.	Severe liver disease, incl. hepatic failure, cirrhosis, portal hypertension, oesophageal varices and active hepatitis		
21.	Blood Glucose <3 mmols/l or >22 mmols/l		
22.	Hereditary or acquired bleeding disorder		
23.	Uncontrolled hypertension (systolic > 180mmHg or diastolic > 105mmHg)		
24.	Recent severe or dangerous bleeding		
25.	Known history of or suspected intracranial haemorrhage		
26.	Platelet count <100		
27.	Haematocrit <25%		
28.	Current anticoagulant therapy (excepting INR<1.4 whilst on warfarin)		
29.	Administration of heparin within the previous 48 hours and or an elevated thromboplastin time		
30.	Previous Stroke AND Diabetes		
31.	Previous stroke within 3 months (in EMEA licence but is a relative contraindication)		
32.	Age $\geq$ 80 yrs is out with EMEA provisional licence and a relative contraindication)		
33.	Peritoneal dialysis or haemodialysis		
34.	Caution if history of migraine and typical headache at symptom onset (note patients with migraine develop stroke)		
35.	Neoplasm with increased bleeding risk		

Appendix 3: Modified Rankin Scale

SCORE	DESCRIPTION
0	No symptoms at all
1	No significant disability despite symptoms; able to carry out all usual duties and activities
2	Slight disability; unable to carry out all previous activities, but able to look after own affairs without assistance
3	Moderate disability; requiring some help, but able to walk without assistance
4	Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance
5	Severe disability; bedridden, incontinent and requiring constant nursing care and attention
6	Dead

TOTAL (0–6):

Appendix 4: Recognition Of Stroke In the Emergency Room (ROSIER Test)

Date and time of assessment: _____
Date and time of symptom onset: _____

GCS: E = _____ M = _____ V = _____ Total: _____

BP: _____

Capillary Glucose: _____

	Yes		No	
1. Loss of consciousness or syncope	☐	(-1)	(0)	☐
2. Seizure activity	☐	(-1)	(0)	☐
Is there a <u>new acute onset</u> or on awakening from sleep of				
3. Asymmetric facial weakness	☐	(1)	(0)	☐
4. Asymmetric arm weakness	☐	(1)	(0)	☐
5. Asymmetric leg weakness	☐	(1)	(0)	☐
6. Speech disturbance (dysphasia or dysarthria)	☐	(1)	(0)	☐
7. Visual field defect	☐	(1)	(0)	☐

**Total Score _____ (- 2 to 5)

** Contact the Stroke-Service Registrar immediately if Rosier score is between 1 and 5 and patient < 6 hours since symptom onset

All other patients with score between 1 and 5 need urgent medical assessment and admission and transfer to the stroke-service next working day.

Appendix 5: Admission Proforma

The 4 pages are to be filled out and inserted in the patients medical notes

Mercy University Hospital Stroke Thrombolysis Proforma

- **Fill proforma for all suspected stroke patients considered for intravenous thrombolysis with alteplase (rt-PA).**
- **File in the medical notes.**

Name of person completing form:……

Designation:…… Signature……

Thrombolysis Timings	Time
Time of stroke onset	
Time arrival at hospital	
Time Stroke team called	
Time stroke team assessment	
Time of CT scan	
Time of start of infusion	
If no thrombolysis - reason	

Checklist

Capillary Blood Glucose Checked	
CT scanner aware (porter and lifepack for transfer)	
Green cannula both arms	
Bloods sent (FBC/ clotting/ u+e's/ glucose) + **Urgent** request to labs	
Stroke consultant aware	
Bed manager aware	
Withhold aspirin	
BP and Cardiac Monitor (BP check every 15 mins)	
ECG	
Check NIHSS score	
Patient consent	
Estimate patients' weight	
Check inclusion/ exclusion criteria	

Patient Details

NAME	
DOB	
AGE	
HOSPITAL NO.	

Route of referral

	Paramedics
	GP
	Self-referral
	Others

Date/Time of assessment: _____

Date/Time of symptom onset: _____

BP / GCS: /15

NIHS Score: Pre morbid Rankin Score

Cap Blood Glucose: Weight (Estimate if necessary):

If BM < 3.5 mmol/l treat urgently and reassess once glucose normal

ANSWER TO THE FOLLOWING QUESTIONS MUST BE *YES.*

		YES	NO
1.	Clinical Diagnosis of Stroke		
2.	CT appearance consistent with schaemic stroke		
3.	Onset of symptoms less than 3 hours ago. Benefit has been shown up to 4.5 hours but this is not currently licensed but should be considered		
4.	Risks and benefits explained to patient or relative.		

ANSWER TO *ALL* OF THE FOLLOWING QUESTIONS MUST BE *NO.*

		YES	NO
1.	Severe stroke as assessed clinically (e.g. National Institute of Health Stroke Score >25) (NIHSS)		
2.	Minor neurological deficit (NIHSS ≤ 4)		
3.	Symptoms rapidly improving before start of infusion		
4.	Unconscious patient		
5.	Fixed head or eye deviation.		
6.	Pre- stroke Rankin > 3. Life expectancy less than one year from another cause		
7.	Seizure at onset of stroke		
8.	Symptoms suggestive of subarachnoid haemorrhage, even if the CT scan is normal.		
9.	Infective endocarditis or acute pericarditis		
10.	Recent (< 10 days) traumatic external heart massage		
11.	Recent (< 10 days) puncture of a non-compressible blood vessel (e.g. subclavian or jugular vein puncture, arterial puncture, or lumbar puncture within 7 days). 24 hrs may suffice if min trauma from arterial puncture		
12.	Trauma with internal injuries, surgery or visceral biopsy within previous 4 weeks.		
13.	Serious head trauma or C.N.S surgery within the previous 3 months.		
14.	Any history of central nervous system damage (i.e. neoplasm, aneurysm, intracranial or spinal surgery)		
15.	Pregnancy, or childbirth within the previous 4 weeks.		
16.	Colitis, oesophageal varices, active peptic ulcer disease		
17.	Abdominal aortic aneurysm		
18.	Proliferative diabetic retinopathy		
19.	Acute pancreatitis		
20.	Severe liver disease, incl. hepatic failure, cirrhosis, portal hypertension, oesophageal varices and active hepatitis		

21.	Blood Glucose <3 mmols/l or >22 mmols/l		
22.	Hereditary or acquired bleeding disorder		
		YES	**NO**
23.	Uncontrolled hypertension (systolic > 180mmHg or diastolic > 105mmHg)		
24.	Recent severe or dangerous bleeding		
25.	Known history of or suspected intracranial haemorrhage		
26.	Platelet count <100		
27.	Haematocrit <25%		
28.	Current anticoagulant therapy (excepting INR<1.4 whilst on warfarin)		
29.	Administration of heparin within the previous 48 hours and or an elevated thromboplastin time		
30.	Previous Stroke AND Diabetes		
31.	Previous stroke within 3 months (in EMEA licence but is a relative contraindication)		
32.	Age > 80 yrs is out with EMEA provisional licence and a relative contraindication)		
33.	Peritoneal dialysis or haemodialysis		
34.	Caution if history of migraine and typical headache at symptom onset (note patients with migraine develop stroke)		
35.	Neoplasm with increased bleeding risk		

C.T CAUTION CRITERIA
ATTENDING STROKE DOCTOR AND CONSULTANT RADIOLOGIST SHOULD CHECK THE FOLLOWING C.T CAUTIONS.

		YES	**NO**
1.	High density lesion consistent with intracranial haemorrhage		
2.	Hypodensity in >1/3 M.C.A. territory or equivalent (difficulty with reproducibility and reliability – patients with seemingly hypodense areas were included in the NINDS trial within 3 hours)		
3.	Extensive CT changes of evolving infarction or mass effect on CT		

Information to give to patients / relatives before administration of Alteplase

If the criteria above are met then Alteplase is a licensed treatment for acute ischaemic stroke and so written consent is not required. If possible there should be agreement from the patient and / or relative.

When the patient cannot agree because of their impairments and no relative is available, then treatment can still be given if it is judged to be in the best interests of the patient. Any explanation should include:

- There has been a significant stroke cause by a blocked artery preventing blood from getting to a part of the brain and causing permanent damage. With or without treatment there may be some recovery or things could get worse.
- Only one treatment has been shown to prevent damage to the brain. This treatment, alteplase, dissolves the blood clot blocking the artery and allows blood to get back to the brain. It can work up to 4.5 hours after a stroke starting
- There is a risk that the treatment will cause bleeding in the brain, causing a worsening stroke. This occurs in 7 out of 100 patients treated and is fatal in 3 of these.
- Despite this, overall the treatment is much more likely to help than to cause harm.
- Without treatment of 100 people with a stroke, 26 will survive with minimal or no disability – with treatment of 100 people with a stroke, 40 will survive with minimal disability
- Alteplase increases the chance of bleeding in the brain in the short term but increases the chance of recovery from the stroke in the long term

Consent

Consent obtained for possible treatment with thrombolysis? Yes No

If consent unavailable, is thrombolysis judged to be in the patient's best interest?
Yes No

Alteplase (RT-PA) Administration

Final check list

T-PA given within 3 hours of stroke*	
Inclusion /exclusion criteria	
Systolic BP< 185	
Diastolic BP<110	
Consent/best interest of patient unable to consent	
Consultant agreement for thrombolysis (Name)	

rtPA (Alteplase) dose:
0.9mg/kg (maximum dose 90mg). See dosing sheet

Give 10% as bolus over 2 minutes followed by 90% infusion over 60 minutes

Time Given:

* It is recommended that treatment is considered between 3-4.5 hours otherwise meet the criteria

Post STROKE Thrombolysis Care

General management

- Bed rest for 24 hours.
- Pulse oximetry - maintain O2 saturations above 95%.
- Maintain normal temperature. Paracetamol if temp > 37.5^0C.
- Blood Glucose: Maintain blood glucose < 10 mmol/l using IV insulin if necessary.
- No arterial punctures, NG tubes or central lines for 24 hours.
- No urinary catheters for at least 1 hour after infusion ended.
- Falls Risk Assessment & Prevention measures.
- Avoid suctioning whenever possible, caution giving mouthcare.
- No aspirin, clopidogrel, dipyridamole or anticoagulant (heparin or warfarin) for 24 hours.
- Repeat CT head at 24-36 hours.
- Hydration / Nutrition
- No rehabilitation assessments for 24 hours

STOP the rt-PA infusion IF:

- Anaphylaxis
- BP systolic <100
- BP systolic rises to >180/105 mmHg sustained after 5 minutes, or associated with neurological deterioration of any sort
- Major systemic bleeding
- Neurological deterioration of 2 points on GCS eye/motor scale

Appendix 6: Management of Complications

General considerations : ALL Stroke patients

This document outlines the action to take in the event of an abnormal reading/parameter while monitoring a patient in the acute phase after stroke.

Any unexpected fall in GCS or increased drowsiness

Immediately check and document
-Pulse, temp, BP, O2 sats, capillary glucose and ECG
-Ask for medical review
-Consider seizures, sepsis, dehydration, drug reaction, cardiac failure, dysrythmia, MI, DVT/PE, metabolic derangement, urinary retention etc.

Hypoxia (O2 saturation <95%)

-Check airway, reposition and suction if needed.
-Give O2 by mask or nasal cannulae and titrate to achieve sats >95%.
-If persistent and/or needing >24% O2, ask for medical review.

Rapid fall in blood pressure or systolic <100
Stop TPA infusion if running

Ensure accurate reading (caution in AF-needs repeating)
- Check manually if in any doubt.
- Raise foot of bed.
- Administer 24% O2 even if normal sats.
- Medical review.
- Consider drug effects and may need IV 0.9% saline or colloid.

Hypertension – Not eligible for thrombolysis

SysBP≤ 220 OR diaBP ≤120

Observe unless other end-organ involvement (eg, aortic dissection, acute myocardial infarction, pulmonary edema, hypertensive encephalopathy). Treat other symptoms of stroke (eg, headache, pain, agitation, nausea, vomiting). Treat other acute complications of stroke, including hypoxia, increased intracranial pressure, seizures, or hypoglycemia

Rise in blood pressure above 220 mmHg systolic or 120 mmHg diastolic

-Repeat and monitor every 15 minutes.
-Check if any distress or pain (eg may indicate urinary retention), which may be the underlying cause.
-If persists, consider Labetalol 10mg IV over 1-2 mins. May repeat or double every 10mins to max of 300mg; or give initial dose then infusion at 2-8 mg/min

Pyrexia

Cool and remove clothing/bedclothes. Use fans/sponging if necessary. Give paracetamol 1gm oral/pr/I.V
Ask for medical review if persists or >38.
Take cultures- urine sputum and blood.

Abnormal capillary glucose

- <3 - give glucose orally (50-100mls Lucozade).
- IV dextrose if unable to give orally
- 3-4 – check again in 10 minutes

- >12 - ask for medical review. Need to consider insulin infusion. Care to avoid hypoglycaemia if using iv insulin

Continue to monitor capillary glucose closely.

Abnormal heart rate/rhythm

<50 or >120, new irregular pulse. Perform immediate 12 lead ECG and ask for medical review.

Adverse events after thrombolysis

1. Haemorrhage

rTPA is rapidly cleared from the plasma. Fibrinogen is depleted in the first few hours (<40% at 4 hours) but is back to 80% of normal by 24 hours. Bleeding after 36 hours is rarely due to rTPA.

A. Cerebral Bleeding

The primary complication of this treatment occurring in 1 in 14 patients.
Suspect if headache, nausea and vomiting, fall in GCS, new focal neurological signs or acute hypertension.

Nursing action

IMMEDIATELY Discontinue tPA infusion if still running

- **Call for immediate Stroke Service team member/ medical review.**

Action by medical staff

-ABC
-Assess patient fully, including documenting new neuro deficit.
-Check fibrinogen, PT, APTT, FBC, group and save.
-Arrange urgent CT head scan
-Inform Stroke Service Consultant.

If bleed confirmed give:

-Consider cryoprecipitate or fibrinogen if fibrinogen <1.5 g/l.
-4-8 units of platelets, if count <100.
-Discuss with consultant haematologist on call and neurosurgery

B. Extracerebral Bleeding

Nursing action

- IMMEDIATELY Discontinue rTPA infusion if still running
  Perform full set of observations
- Administer O2 15 litres via non re-breathing mask
- Raise foot of bed if BP < 100 systolic.

Call for immediate Stroke-Service team member / senior medical review

Action by medical staff

-ABC; Assess for shock
-Use mechanical compression of haemorrhage wherever possible.
-Two large venflons; FBC, U+E, Cr, PT, PTT, fibrinogen, Crossmatch
-Administer:IV crystalloid 500 ml fluid challenges if simple measures have failed to improve BP.

If bleed confirmed:

Consider cryoprecipitate or fibrinogen if fibrinogen <1.5 g/l.
4-8 units of platelets, if count <100.
Discuss with Vascular or general surgery/Gastro (as appropriate).
Discuss with Consultant Haematologist on –call.

2. Anaphylaxis

Nursing action

Suspect if

- Rapid fall in BP.
- Urticarial rash (rapidly developing, red, blanching, often slightly raised i.e weals)
- ANGIOEDEMA, swelling of tongue or around mouth/ lips new wheezing or breathlessness

Action:

IMMEDIATELY Discontinue rt-PA infusion if still running.

- Assess and Protect Airway.
- Call for immediate senior review from Medical Reg.
- Elevate foot of bed if if Hypotensive and administer high flow oxygen – 15litres.
- Inform STROKE-SERVICE consultant/registrar

Action by medical staff

-ABC

- Hydrocortisone 200mgs stat. and chlorpheniramine 10 mg IV.

-Assess for shock, If shocked (Bp < 100mmHg systolic and not responding) give 100mcg (0.1ml) to 200mcg (0.2ml) of 1 in 10,000 Epinephrine then review response.

- IV volume replacement with crystalloid 500 ml fluid challenge.
- Two large venflons

-FBC, U+E, Cr, PT, PTT, fibrinogen, group and save.

1. Hypotension

Stop TPA infusion if running

More frequent occurrence than anaphylaxis and may be transient.

Nursing action

Administer oxygen 15litres and raise feet if BP <100 systolic.

Action by medical staff

ABC

Assess for shock.

FBC, U+E, Cr, PT, PTT, fibrinogen, group and save.

Administer: IV volume replacement with 500mls crystalloid challenge and monitor BP

Every 5 minutes.

4. Uncontrolled hypertension (Target BP is < 185/110)

Labetalol 10mg IV over 1-2 mins. May repeat or double every 10mins to max of 300mg, or give initial dose then infusion at 2-8 mg/min or

Glyceryl trinitrate by intravenous infusiom 10-200 micrograms/min

Indications for Urgent CT Scan following Thrombolysis in Acute Ischaemic Stroke patients

Any signs and symptoms suggestive of intracerebral haemorrhage:

- New acute headache or worsening severity of headache.
- Acute hypertension
- Nausea and vomiting
- Agitation
- Seizure

Neurological deterioration.
A deterioration in 2 points on the Glasgow Coma Score is classed as significant.
A drop in the NIHSS $\geq$ 4 points
NB. Take note of any potential motor signs on the opposite side to the patient's initial presenting weakness.

Discuss concerns immediately with Consultant Stroke Physician.

NOTE: Many causes of neurological deterioration following thrombolytic therapy are not due to intracerebral haemorrhage.

Independent risk factors for symptomatic Intracerebral haemorrhage post thrombolysis

- Elevated serum glucose
- History of diabetes
- Baseline symptom severity
- Advanced age
- Smoker
- Increased time to treatment
- Previous aspirin use
- High systolic blood pressure
- Low platelet count
- History of congestive cardiac failure
- Low plasminogen activator inhibitor activity
- National Institute Neurological Disease Severity (NINDS) protocol violations
- Large baseline diffusion weighted imaging (DWI) lesions on (MRI) with early reperfusion

Appendix 7 – Observation details

Thrombolysis Vital Observations Chart

Schedule from admission to hospital:

- Pulse, BP, Oxygen saturations and temperature and Glasgow Coma Scale.

ALL Strokes:
- Every 15 minutes for first hour;
- Hourly for 4 hours
- 4 hourly for 24 hours.
-

POST rt-PA:
- every 15 minutes for first hour.
- every 30 minutes x 6 hours
- every hour x 17 hours.

- Capillary glucose
  - Admission and 4 hourly if abnormal or diabetic.
  -12 hourly if normal and non diabetic.

- ECG -Continuously for 24 hours.

Appendix 8 – the evidence

Evidence for intravenous thrombolysis in Ischaemic stroke

Thromboembolic occlusion leading to ischaemia accounts for 80% of strokes. There is strong evidence [1-7] suggesting that administering the thrombolytic agent Recombinant Tissue Plasminogen Activator (rt-PA, Alteplase, Actilyse®) intravenously within 3 hours of symptom onset, to reperfuse blood vessels is effective in patients with acute ischaemic stroke. 19 RCT's have been conducted in ischaemic stroke, treating > 5000 patients, using different thrombolytic agents. The majority of the data comes from use of rt-PA used to treat nearly 3000 patients. Evidence from these trials suggest a net benefit from rt-PA with approx. **1 fewer patient dead or dependent at 3 months per 10 treated.** This is based on administering rt-PA **within 3 hours from symptom onset within strict clinical and laboratory criteria**. The recent ECASS-III trial found benefit in treating patients up to 4.5 hours [8] but is not currently licensed. A further trial (IST-3) is looking at extending the therapeutic window to 6 hrs and newer agents (e.g. desmoteplase) are showing promise at wider therapeutic windows.

Intravenous rt-PA has been licensed in Europe since 2002. It is subject to strict criteria to ensure safe administration as per the trial protocols which showed its benefit. The rate of cerebral haemorrhage is related, in part, to the frequency of incorrect administration. To ensure safe practice in the UK, enrolment in a prospective audit SITS-MOST www.acutestroke.org (closed Oct 2006) was a requirement for a centre to be able to deliver rt-PA under license. Enrolment in SITS-ISTR would be desirable in an Irish setting.

Numbers needed to Treat
NNT to benefit 2-3; NNT to 'cure' 10 [9].
NNT to do worse 35; NNT to kill or leave permanently disabled 100 [10].
NNT to avoid death or disability is 1 in 8 (Cochrane Analysis) if average time to treatment is 90 minutes. As most facilities do not manage treatment within 90 minutes 1 in 10 is more realistic.

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Appendix 9: NIH Stroke scale

Link