Worcestershire Acute Hospitals NHS Trust

Guideline for thrombolytic therapy (Thrombolysis) and Mechanical Thrombectomy in Acute Ischaemic Stroke

This guidance does not override the individual responsibility of health professionals to make appropriate decision according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

INTRODUCTION

Patients who present with sudden onset focal neurological symptoms suggestive of ischaemic stroke and who are independent may benefit from intravenous thrombolytic therapy (thrombolysis). Stroke patients who present and are fully assessed within 4.5 hours of symptom onset will be eligible for thrombolytic therapy (thrombolysis), provided a CT brain has been done to exclude intracerebral bleeding.

This guideline is for use by the following staff groups :

Medical and nursing staff directly involved in the management of acute stroke patients and with the necessary competencies (see page 2)

Lead Clinician(s)

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This is the most current document and is to be used until a revised version is available:

Key amendments to this guideline

Date	Amendment	By:
13/03/07	Guideline approved by	Medicines Safety Committee
18/05/07	Approved by Dr Pitcher (C.D) on behalf of	Directorate Executive Committee
18/05/10	Guideline approved by	Medicines Safety Committee
May 10	Change to competencies required section	Dr P Sanmuganathan
May 10	Change to primary indications and absolute contraindications	Dr P Sanmuganathan
May 10	Additional information added to treatment of complications or deteriorations section (anaphylaxis/suspected haemorrhage/cerebral oedema and elevated intracranial pressure/uncontrolled hypertension/hypotension)	Dr P Sanmuganathan
May 10	Change to nursing protocol for all patients who have suffered an acute ischaemic stroke receiving thrombolysis with alteplase	Dr P Sanmuganathan
May 10	Additional references added	Dr P Sanmuganathan
May 13	Discussed at Stroke Centralisation meeting and agreed to continue use whilst under review. Extend to the end of July 2013	Dr P Sanmuganathan
July 13	Amendment of Labetalol dosage to reflect network guidelines	Caroline Gibson (pharmacist)
August 2015	Document extended for 12 months as per TMC paper approved on 22nd July 2015	TMC
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June 2018	Document extended for 3 months as per TLG recommendation	TLG
October 2021	Document reviewed – amended times for thrombolysis and the operational procedure to send patients for thrombectomy.	Nuno Riberio and Chantelle Chadwick
19th January 2022	Document extended for 4 months to allow for thorough review	Stroke Specialty Meeting/ Divisional Governance
March 2022	Amendment to AIS, mechanical thrombectomy, and neurosurgical referral pathways	Dr Girish Muddegowda

November 2024	Addition of appendix 2 which details the use of tenecteplase for thrombolysis as a first line agent due to nationwide stock restrictions lifted.	Dr Girish Muddegowda and Mohima Akhtar

Guideline for Thrombolytic Therapy (Thrombolysis) in the Treatment of Acute Ischaemic Stroke

The reader should also make themselves aware of the entries within the latest edition of the British National Formulary (BNF) or Summary of Product Characteristics. If necessary consult a clinical pharmacist for advice.

Introduction

Stroke is a medical emergency. Thrombolytic therapy (thrombolysis) increases the chances of an independent existence after stroke by a third in patients who present early. Treatment has to be initiated within 4.5 hours of symptom onset and a CT brain is mandatory to exclude haemorrhage prior to treatment. Intravenous thrombolytic therapy (thrombolysis) in stroke patients can lead to systemic bleeding complications as well as haemorrhagic transformation of cerebral infarction if appropriate patients are not selected. Hence, it is important to adhere to strict selection criteria and close monitoring is essential to allow immediate identification and treatment of any complications.

Currently patients can also be considered suitable for Thrombectomy. These patients need to be referred to the Queen Elizabeth Hospital (QE) and this is done by the on-call doctor contacting the consultants at the QE to make a decision whether Thrombectomy is appropriate or not. If the patient is for transfer, the doctor should follow the instructions provided by the Stroke Consultant at the QE and state “emergency transfer for escalation of care” when calling the ambulance.

Competencies Required

Treatment will only be initiated by a clinician who has undertaken specific training in the delivery of thrombolytic therapy to acute stroke patients and trained to use National Institute of Health Stroke Scale (NIHSS) assessment tool.

Nursing staff will initiate the infusion once the dose is calculated and the 10% bolus dose is given intravenously by the clinician deciding to thrombolyse. The remainder of the infusion is then administered as an intravenous infusion over 60 minutes.

Neurological and cardiovascular monitoring will be done according to nursing protocol set out in the after care for thrombolysis (See Appendix 1).

Patient Consent

The Consultant Physician initiating thrombolytic therapy (thrombolysis) will discuss the benefits and harm from bleeding complications with the patient to obtain consent. Where appropriate the planned treatment will be explained to relatives/carers, assent will be required

in aphasic patients. Patients with receptive dysphasia without relatives present will be thrombolysed by the, clinician if benefits of doing so is in the best interest to the patient.

Patients Covered

Patients who present within 4.5 hours of onset of symptoms of acute ischaemic stroke with intra-cranial haemorrhage excluded by CT scan.

Guideline for Thrombolysis 1. Indications

1.1 Primary indication

- All Ischaemic strokes presenting within 4.5 hours of symptom onset.

2. Absolute Contraindications

- Evidence of intracranial haemorrhage on CT scan
- Previous history of intra-cranial haemorrhage SAH or arteriovenous malformation (AVM)
- Warfarin or chronic liver disease, DOACs, or LMWH with INR $\geq$ 1.7
- Known Intracranial neoplasms or AVM
- Systolic BP > 185 or diastolic BP > 110 mmHg, in-spite of intravenous antihypertensive therapy
- Hypo or hyperglycaemia with blood glucose < 3 or > 22.0 mmol/L
- Active clinically apparent bleeding (oesophageal varices, peptic ulcer, colitis, etc.)

3. Cautions / Relative Contraindications

- Non-ischaemic pathology (e.g. functional, migraine, brain tumour likely)*
- Stroke within the preceding 3 months*
- Rapidly resolving symptoms*
- Head injury within 3 months
- GI bleed / trauma / surgery- within previous 1 month
- Endocarditis, recent MI, aortic aneurysm or ventricular aneurysm
- Pregnancy, or childbirth within the previous 4 weeks or breastfeeding
- Haemorrhagic retinopathy (e.g. untreated proliferative diabetic retinopathy)
- Prolonged, traumatic CPR (more than 15 min +/- rib fractures, more than one attempt at central line insertion)
- Platelet count < 100 000/mm^3
- History of recent bleeding or any bleeding problem/ blood disorder*
- Abnormal INR* [a]

Risk of haemorrhagic complication must be assessed and weighed against the potential benefit of using thrombolytic therapy.

If any of the above applies, discuss without delay with a stroke physician.

4. Other Warnings

- Aspirin or any antiplatelet agent should not be given within 24 hours of thrombolysis

5. Decision to Give Thrombolytic Therapy

Thrombolytic treatment with alteplase should only be given provided that:

- It is administered within 4.5 hours of onset of stroke symptoms
- Haemorrhage has been excluded by CT scan

Stroke patients who present early are most likely to benefit from thrombolytic therapy up to 4.5 hours of symptom onset.

6. Management of Severe Hypertension before initiation of Thrombolytic Therapy

- If systolic >185mmHg or diastolic >110 mmHg, give labetolol 10-20mg as intravenous bolus over 1 to 2 minutes, or
- administer intravenous GTN infusion in a syringe pump at a rate of 1.5ml/hr up to a maximum of 10 ml/hr. Titrate the dose according to patient response.

- If asthma, CCF or second degree heart block only use GTN infusion.
- Repeat labetolol once - 10 minutes later if BP is still elevated >185/110mmHg.

Acute lowering of BP in the presence of an ischaemic stroke can reduce cerebral reperfusion and increase the risk of ischaemia.

7. Choice of Thrombolytic Agent

Tenecteplase is the first line thrombolytic agent licensed for use in ischaemic strokes (see. Alteplase is the also licensed for use in ischaemic strokes.

8. Dose

The recommended dose is 0.9mg/kg of alteplase (maximum of 90mg). 10% of the total dose should be administered as an initial intravenous bolus and the remainder infused intravenously over 60 minutes.

Reconstitute the contents of an alteplase vial (20 or 50mg) with water for injection according to the following table to obtain a final concentration of either:

- 1mg alteplase/ml or
- 2mg alteplase/ml

Alteplase vial and strength	***Volume of water for injection to be added to dry powder***	***Final concentration***
20mg vial	20ml	1mg alteplase/ml
50mg vial	50ml	

Alteplase vial and strength	***Volume of water for injection to be added to dry powder***	***Final concentration***
20mg vial	10ml	2mg alteplase/ml
50mg vial	25ml	

The reconstituted solution may be further diluted with 0.9% sodium chloride up to a minimal concentration of 0.2mg/ml.

9. Adjunctive Therapy

Administration of aspirin, low molecular weight heparin or unfractionated heparin should be avoided in the first 24 hours after thrombolysis.

Other anti-platelet agents, including dipyridamole m/r and clopidogrel, should not be initiated within the first 24 hours following thrombolytic therapy due to an increased risk of haemorrhage.

10. Management After Thrombolytic Therapy

After administration of thrombolytic therapy:

- Admit the patient to HASU asap.
- Ensure close patient observation as per thrombolysis protocol
- Ensure vital signs and GCS are monitored every 15 minutes for 2 hours, then half hourly for 6 hours, then 4 hourly for 36 hours
- Ensure that no intramuscular injections are administered

- Monitor patient for potential problems, e.g.:

    - Haemorrhage (be aware of the risk of needles, especially arterial puncture or central venous cannulation)
    - Acute hypotension (suspect occult bleeding)
    - Allergy and anaphylaxis
    - Reperfusion cerebral oedema

If any of the above mentioned problems occur, contact the clinician that initiated thrombolytic therapy.

11. Treatment of Complications or Deterioration

Anaphylaxis

The incidence may be as high as 1.5% Indicated by:

- Rapid fall in blood pressure
- Urticarial rash
- New wheezing or breathlessness

Anaphylaxis is likely when all 3 of the following are met:

- sudden onset and rapid progression
- life threatening airway and/or breathing and/or circulation problem
- skin and/or mucosal changes (urticaria, flushing, angioedema)

Remember:

- skin or mucosal change alone are not signs of anaphylactic reaction
- skin or mucosal reactions can be subtle or absent in 20% of cases (some patients only have a drop in blood pressure)
- there can also be gastrointestinal problems (vomiting, abdominal pain and incontinence)

Management Plan

- **Stop** alteplase infusion
- **Call emergency medical team via switchboard - 2222**
- **Assess** airway, breathing and circulation and initiate appropriate intervention. Follow anaphylactic reaction guideline (WAHT-ANA-012) and administer:
  - **Oxygen** via high flow reservoir mask
  - **Adrenaline**
    - if possible avoid intramuscular route in thrombolysis patients consider:
    - Adrenaline nebuliser 1:1000 5mls (5 ampoules of 1ml 1:000) and/or
    - Adrenaline by slow intravenous bolus 1-5mls of 1 in 10 000 (held in the resuscitation drug box on the emergency trolley) with cardiac monitoring and full resuscitation facilities available.
    - Intravenous adrenaline needs to be given with caution.
    - Further doses of adrenaline may be necessary.
  - **Chlorphenamine** 10mg as slow intravenous injection
  - **Hydrocortisone** 200mg as slow intravenous injection
  - If clinical manifestations of shock do not respond to these drugs then give an IV fluid challenge of **500-1000ml 0.9% sodium chloride** (avoid hypotonic fluids such as Hartmann's, 0.45% sodium chloride and 5% glucose).
  - Nebulised therapy for bronchospasm may also be considered.
- If airway involvement is suspected, involve anaesthetic / ITU team early.

Suspected Haemorrhage

Intracranial

- Neurological deterioration – see box,
- New headache,
- Acute hypertension,
- Nausea,
- Vomiting

Neurological deterioration:
either
a drop of 2 points on the eye or motor GCS scale
or
worsening of stroke signs (NIHSS increased by 4 or more points)

Management Plan

- **Stop** alteplase infusion
- **Urgent CT brain** if suspected bleeding is intracranial
- Check INR, APTT, FBC, fibrinogen and G&S

CT brain scan shows haemorrhage

- Call Stroke consultant on call
- Consider consulting Neurosurgeon.

Evaluate blood results and consult haematologist to discuss giving platelets / cryoprecipitate / factor concentrates.
Tranexamic acid 1 gm intravenously three times a day in 100ml sodium chloride solution 0.9% over 15 minutes.

Extracranial haemorrhage

- Stop Alteplase infusion
- Evaluate blood results and consult haematologist to discuss giving platelets / cryoprecipitate / factor concentrates.
- Tranexamic acid 1 gm intravenously three times a day in 100ml 0.9% sodium chloride solution over 15 minutes.

Cerebral Oedema and Elevated Intracranial Pressure

The risk of cerebral oedema is highest following an occlusion of a large artery such as MCA (middle cerebral artery).
Peak oedema occurs between 48 and 72 hours post stroke; however a subset may deteriorate sooner.

About 10% of AIS patients will have an MCA infarction that almost always leads to severe potentially fatal cerebral oedema.

Raised intracranial pressure can be indicated by:

- Unequal pupils
- Sudden drop in GCS
- Onset of drowsiness
- Onset of nausea and vomiting, sometimes photophobia
- Rising blood pressure and falling pulse

Management Plan

- Arrange urgent CT brain, if not already done.
- Urgent Neurosurgical advice for **Decompressive Hemicraniectomy** if MCA infarction is present and all of the criteria below are met: Age 65 yrs or under
- Signs on CT scan of at least 50% MCA territory, with or without additional infarction in the territory of the anterior or posterior cerebral artery, on the same side, or infarct volume greater than 145cm^3 as shown on a diffusion weighted MRI.
- Referral should be made asap within 24 hours of onset of symptoms and surgery within 48 hours.
- Neurosurgical advice may be appropriate in acute hydrocephalus (ventricular drain) in posterior fossa strokes.
- If patient for medical management-
- Administer initial bolus dose of 20% Mannitol 0.5-1.0g/kg intravenously over 30 – 60 minutes.
- Check serum osmolality after 1 hour then 4-6 hourly aiming for 300-320 mOsm/l
- Repeat bolus doses of 20% mannitol 0.25-0.5g/Kg can be given if the serum osmolality is below target range. Repeat if necessary once or twice after 4 – 8 hours.
- Monitor urine output and electrolytes during mannitol administration as profound diuresis may lead to hypovolaemia, renal failure and CVS collapse, if fluid and electrolytes are not carefully replaced.
- If refractory to above consider hypertonic saline or thiopentone in consultation with ICU team.
- **Neuroprotective measures** may help limit cerebral oedema and raised ICP
- monitor temperature and treat any pyrexia 37.0^{0}C or above with paracetamol
- control blood sugar and treat if above 11.0mmol/l – start insulin sliding scale
- keep head of the bed at 30^o tilt and neck in midline position

Uncontrolled Hypertension

 Avoid hypotonic fluids such as Hartmann's, 0.45% sodium chloride and 5% glucose.

Hypertension in the setting of stroke is common. It often resolves spontaneously / improves over time.

High blood pressures should not be treated within the first 24hours after ischaemic stroke, unless systolic >220, diastolic > 120, or mean >130mmHg.

However, there are two exceptions:

1. Use of alteplase: BP should be lowered and maintained at <185/110mmHg.

2. Presence of myocardial infarction, aortic dissection or heart failure.

Management Plan

Patients eligible for thrombolysis and systolic >185mmHg or diastolic >110mmHg

- Discuss with stroke consultant on call
- Start GTN infusion in a syringe pump at a rate of 1.5 to 10ml/hr and give labetolol 10mg IV over 1-2 minutes in interval of 10 minutes whilst monitoring heart rate.
- If asthma, CCF or second degree heart block use GTN infusion ONLY.

During thrombolysis and for 24 hours afterwards:

- Measure BP every 15 minutes for the first 2 hours and subsequently every 30 minutes for the next 6 hours then hourly till 24 hours. Increase frequency of BP measurement if systolic >180mmHg or diastolic ≥105mmHg.

- BP should be managed to below 185/110 using the instructions below as necessary

- If systolic 180-230mmHg or diastolic 105-120mmHg commence GTN infusion at a rate of 1.5 to 10 ml/hr and if needed administer labetolol 10mg iv over 1-2 minutes. This can be repeated every 10 minutes up to a maximum dosage of 200mg, care to be taken to monitor patient's heart rate.

Hypotension

This is often transient.

If the stroke patient presents with hypotension then these patients must be adequately hydrated (with 0.9% sodium chloride) to protect the ischaemic penumbra.

Consider other potential causes for hypotension:

- aortic dissection
- sepsis
- acute blood loss
- myocardial infarction or cardiomyopathy

Management Plan

- Head tilt if BP < 100 systolic
- Consider intravenous fluid challenge (with 0.9% sodium chloride) and monitor closely

Prescribe 0.9% sodium chloride 75-100ml/hour intravenously as routine hydration whilst patient does not have adequate oral intake.

Monitoring Tool

Consultant Stroke Physician will enter thrombolysed patients on to web based register – SITS-MOST

Guidelines for Thrombectomy

1.1 Indications

- Symptoms within 6 hours of onset
- CT head and CT Angiogram (Arch to CoW) for all patients with NIHSS 6 or above
- CT Angiogram showing evidence of LVO (Large vessel occlusion) on the affected side

1.2 Standard Operating Procedure (SOP)

- Commence intravenous thrombolysis immediately as per protocol.
- Stroke team to contact thrombectomy coordinator QEH
- Transfer images of CT and CT angiogram scans
- If accepted, transfer patient asap to QEH

References for Thrombectomy

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Nursing protocol for all patients who have suffered an acute ischaemic stroke receiving thrombolysis with alteplase

(Reproduced with kind permission from Sheffield Teaching Hospitals NHS Trust and Lothian University Hospitals NHS Trust – Elaine Stratford December 2006)

ACTION	RATIONALE
Ensure the bed space is appropriately equipped with: Oxygen Drip stand Oxygen saturation monitor Has the CT been undertaken?	Patients receiving thrombolysis can deteriorate very quickly, therefore it is essential that they are monitored closely and emergency equipment needs to be accessible
Syringe pump and attachments are stored on the stroke thrombolysis trolley	The patient needs close monitoring for 24 hours. All staff have easy access to equipment allowing prompt delivery of treatment
Record a full set of baseline neurological observations and vital signs. Document and record any unusual findings and inform the doctor in charge of the patients care	Baseline observations are necessary to detect early signs of deterioration during or after treatment
Ensure alteplase is prescribed on drug chart	In accordance with Trust policy all drugs should be prescribed
Following administration of treatment, vital signs and GCS need to be monitored as follows: • Every 15 minutes for 2 hours using manual BP cuff • Every 30 minutes for the next 6 hours • 4 hourly for the next 36 hours If there is any cause for concern, review, report, document and increase observation frequency accordingly	Close observation of vital signs and GCS are essential to detect any signs of early deterioration in the patient's condition. Deterioration may be due to an intracranial or extracranial haemorrhage.
Immediately report any signs of bleeding or deterioration in the patients condition to the clinician responsible for the patient's care	Ensure that early detection and prevention of serious bleeding or other complications may be prevented.
Avoid giving IM injections for 48 hours from time of treatment administration	IM injections can cause bleeding at the injection site in patients who have received thrombolysis
Avoid giving heparin or warfarin. Refer to Stroke Consultant before giving any anticoagulant therapy. Do not give aspirin, clopidogrel or dipyridamole MR for 24 hours post thrombolysis, and then only after checking with the stroke consultant	Anticoagulants are contraindicated in patients who have received thrombolysis due to the increased risk of bleeding.

Avoid urinary catheterisation or passing nasogastric tubes for 24 hours. Check with medical staff if this is required	There is a risk of causing bleeding with these procedures
If haemorrhage is suspected send an urgent Full Blood Count, Clotting and Group and Save. Contact the stroke consultant immediately.	These results can enable early detection of abnormalities and prompt initiation of appropriate treatment
Blood pressure to be maintained below 180/110	To maintain adequate cerebral perfusion but reduce the risk of intracerebral bleeding due to hypertension
Signs of raised intracranial pressure/intracranial bleeding: • Unequal pupils • Sudden drop in GCS • Onset of drowsiness • Onset of nausea and vomiting, sometime photophobia • Rising BP and falling pulse	To detect whether there has been a further intracranial event and seek urgent assistance
In the event of a sudden drop in GCS or change in vital signs an urgent medical review is essential	Early detection and intervention can minimise complications. An urgent CT brain can be arranged to detect complications and initiate further treatment
If temperature is elevated above 37˚C, treat with PR oral or IV paracetamol 1g 4-6 hourly (max 4g/24hours). Report any sustained pyrexia	Increased temperature is detrimental to recovery of patents who have had a stroke
If BM>11.0 or patient is a known diabetic commence IV sliding scale insulin to keep BM between 4 and 11mmol/l	
Provide supplemental oxygen only if O_2Sats <94% on air	
Keep the patient well hydrated, commence IV sodium chloride (not glucose) at a rate that addresses any signs of dehydration and provides maintenance requirements until formal swallow assessment, NBM	
IF UNSURE SEEK HELP REMEMBER “TIME IS BRAIN”	Early intervention can limit complications

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Nursing protocol for all patients who have suffered an acute ischaemic stroke receiving thrombolysis with alteplase

Recognising Complications

Anaphylaxis • Urticaria • Facial swelling • Rash • Difficulty breathing • Low blood pressure and thready pulse	Treatment • Call doctor • Stop Alteplase infusion • Airway, Breathing, Circulation 1. Adrenaline 5ml 1:1000 nebulised in 6 litres oxygen 2. Chlorphenamine 10mg Intravenously 3. Hydrocortisone 200mg Intravenously • Fluids
Intracranial bleeding • Falling Glasgow coma score • New onset of headache • Rising blood pressure • Abnormal ventilation pattern	Treatment • Call doctor • Stop Alteplase infusion • Urgent CT scan head • Intravenous fluids • DO NOT CORRECT COAGULATION ABNORMALITY • Contact person who administered thrombolysis • Liaise with haematology Consultant
Extracranial bleeding □ Low blood pressure rapid thready pulse	Treatment • Call doctor • Stop Alteplase infusion • Apply direct pressure • Check coagulation and group or cross match • Intravenous fluids Evaluate blood results and consult haematologist to discuss giving platelets / cryoprecipitate / factor concentrates. ◘ Tranexamic acid 1gram intravenously three times a day in 100mls sodium chloride solution 0.9% over 15 minutes. ◘ Do not recommence alteplase infusion.

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Nursing protocol for all patients who have suffered an acute ischaemic stroke receiving thrombolysis with alteplase

Observations

- Respiration rate
- Blood pressure
- Pulse
- Glasgow coma score
- Neurological observations
- Oxygen saturations

❑ Prior to giving Alteplase

❑ Every 15 minutes for 2 hours

❑ Every 30 minutes for the next 6 hours

❑ Every hour for the next 6 hours

❑ Every 4 hours for the next 36 hours

If there is any cause for concern, review, report , document and increase observation frequency accordingly

- BM Stix

❑ On arrival to ward

❑ 4 times a day for 48 hours

❑ Twice a day after 48 hours

Other things to consider:

- ❑ Set pump rate at millilitres required for the dose prescribed over 1 hour
- ❑ Do not remove cannulas unless absolutely necessary for 24 hours
- ❑ Give gentle eye and mouth care with soft swabs for 24 hours
- ❑ Avoid arterial puncture and central venous access for 24 hours
- ❑ No wet shaving for 24 hours
- ❑ Avoid intramuscular injections for 48 hours
- ❑ Avoid anticoagulation therapy with warfarin/heparin
- ❑ Do not give any antiplatelet therapy (i.e aspirin, clopidogrel, dipyridamole) for 24 hours post thrombolysis
- ❑ Consider paracetamol if pyrexial

IF THERE ARE ANY SIGNS OF BLEEDING OR THE PATIENT DETERIORATES IN ANY WAY CALL THE DOCTOR WHO ADMINISTERED THE THROMBOLYSIS OR THE RESPONSIBLE MEDICAL TEAM

Nursing pathway summary

Prepare for arrival of patient to ward: **Minimum equipment required:**
• O_2 and O_2 saturation monitor
• Suction
• Drip stand
• Syringe pump and attachments
•

On arrival of patient record:	
• GCS	• Temperature
• BP	• BM
• Pulse	• Resp rate
• O_2 saturation	•

Next:
Initial bolus of treatment given by doctor over 1-2 minutes
Remainder of treatment to be given by syringe driver over 1 hour

Record Glasgow Coma Scale and vital signs:
Every 15 minutes for 2 hours
Every 30 minutes for the next 6 hours
Hourly for a further 6 hours
4 hourly for the next 36 hours

IF THERE ARE ANY SIGNS OF BLEEDING OR THE PATIENT DETERIORATES IN ANY WAY, CALL THE SENIOR NURSE IN CHARGE AND THE CLINICIAN

In the 24 hours following treatment avoid	**NOTE:**
Urinary catheterisation	Avoid IM injections for 48 hours
NG tube insertion	Avoid anticoagulant therapy with warfarin and heparin
Central venous access	Do not give aspirin, clopidogrel or dipyridamole for 24 hours post thrombolysis

Arterial puncture	
If essential discuss with medical team first	

Appendices

Appendix 1: Thrombolysis Protocol for use in acute ischaemic stroke

Appendix 1 Thrombolysis pathw

Appendix 2: Addendum to the existing SOP for use of thrombolytic agent (tenecteplase) in acute ischaemic stoke

Purpose: This protocol provides guidance on the appropriate use of Tenecteplase (TNK-tPA) for the treatment of acute ischemic stroke (AIS), ensuring it is administered safely and effectively.

Scope: Applicable to emergency department (ED) staff, stroke team, and healthcare professionals involved in the care of patients with acute ischemic stroke.

Indications: Tenecteplase is indicated for patients with acute ischemic stroke who meet the following criteria:

- Clinical diagnosis of ischemic stroke with onset of symptoms within 4.5 hours.
- Age ≥ 18 years.
- Non-contrast CT showing no evidence of intracerebral haemorrhage or extensive early ischemic changes
- NIHSS score indicative of a disabling stroke (varies depending on responsible clinician's discretion, typically NIHSS ≥ 4).
- Confirmed large-vessel occlusion (LVO) that may require mechanical thrombectomy.

Absolute Contraindications:

- Intracranial haemorrhage on CT head scan.
- Current use of oral anti-coagulant or on Low molecular weight heparin.

- Known bleeding diathesis (warfarin >1.7)
- Uncontrolled hypertension (SBP > 185 mmHg or DBP > 110 mmHg).

Relative Contraindications (discuss with stroke consultant):

- Recent major surgery, head trauma, or intracranial surgery within the last 3 months.
- Previous intracranial bleed (exception of treated aneurysm in the past).
- Active bleeding or conditions with high bleeding risk (e.g., gastrointestinal bleeding)-discuss with stroke consultant
- Hypoglycaemia (Capillary glucose <2.8, treat for hypoglycaemia and re-assess)
- Known or suspected aortic dissection.
- Lumbar puncture in the last 48 hrs of presentation.
- Known structural cerebral vascular lesion.
- Pregnancy (discuss with stroke consultant)
- Check if patient has gentamicin allergy due to trace amounts present in tenecteplase manufacturing process.

Dosing:

- **Weight-based Tenecteplase dosing**: Administer 0.25 mg/kg IV bolus (maximum dose of 25 mg).
- Tenecteplase is administered as a single IV bolus over 5–10 seconds.

Pre-administration Preparation:

- Verify the time of stroke onset (Last Known Well time).
- Perform a non-contrast head CT scan to exclude haemorrhage.
- Assess and document the NIH Stroke Scale (NIHSS).
- Review inclusion and exclusion criteria for thrombolysis.

Administration:

- Prepare Tenecteplase according to the manufacturer's instructions.
- Administer the IV bolus of Tenecteplase over 5–10 seconds.
- Document the time of administration.
- Follow standard post-lysis observations as per protocol

Post-administration Monitoring:

- **Blood Pressure Control**: Monitor blood pressure closely. Target SBP < 180 mmHg and DBP < 105 mmHg. Administer antihypertensive medications if needed.
- **Neurological Monitoring**: Follow standard post-lysis neurological monitoring as per protocol
- **Bleeding Risk**: Monitor for signs of bleeding, particularly intracerebral haemorrhage (e.g., worsening neurological status, headache, vomiting).
- Avoid invasive procedures (e.g., arterial puncture, lumbar puncture) for at least 24 hours post-administration wherever possible.

Post-treatment Imaging:

- Obtain a follow-up CT or MRI of the brain approximately 24 hours after Tenecteplase administration to assess for haemorrhage or further ischemic changes.
- If there is neurological deterioration, an urgent CT scan should be performed immediately to exclude haemorrhage.

Adverse Events:

- **Haemorrhagic Transformation**: Discontinue Tenecteplase immediately if suspected of haemorrhagic transformation and obtain an urgent CT head scan. If haemorrhage confirmed on CT head scan then initiate emergency management of intracerebral haemorrhage (blood pressure management and use of reversal agent if necessary-speak to stroke consultant)
- **Angioedema**: Monitor for oro-lingual angioedema, particularly in patients on ACE inhibitors. Manage angioedema with antihistamines and adrenaline. Alert anaesthetic team for their review.

Documentation:

- Document all assessments, inclusion/exclusion criteria, informed consent, time of administration, dose, and patient response on the stroke pro-forma.
- Record post-administration monitoring results, including blood pressure and neurological assessments.

Education and Training:

- All healthcare providers involved in administering Tenecteplase should receive regular training on this protocol and management of acute ischemic stroke.

TENECTEPLASE DOSING CHART

Body weight (kg)	Volume (ml)	Tenecteplase (units)	Tenecteplase (mg)
<60	3	3000	15
60 to 70	3.5	3500	17.5
70 to 80	4.0	4000	20
80j to 90	4.5	4500	22.5
>90	5.0	5000	25

REFERENCES:

NICE recommendation: TA990 Tenecteplase for treating acute ischaemic stroke

Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and included as an appendix to key document when submitted to the appropriate committee for consideration and approval.

Please complete assessment form:

Herefordshire & Worcestershire STP - Equality Impact Assessment (EIA) Form
Please read EIA guidelines when completing this form

Section 1 - Name of Organisation (please tick)

Herefordshire & Worcestershire STP		Herefordshire Council		Herefordshire CCG	
Worcestershire Acute Hospitals NHS Trust	X	Worcestershire County Council		Worcestershire CCGs	
Worcestershire Health and Care NHS Trust		Wye Valley NHS Trust		Other (please state)	

Name of Lead for Activity	**Dr G Muddegowda**

Details of individuals completing this assessment	**Name**	**Job title**	**e-mail contact**
	Mohima Akhtar	**Lead Pharmacist – Stroke & Thrombosis**	**Mohima.akhtar1@nhs.net**
Date assessment completed	**18/11/2024**		

Section 2

Activity being assessed (e.g. policy/procedure, document, service redesign, policy, strategy etc.)	**Title: Addition of appendix 2: addendum to the existing SOP for use of thrombolytic agent (tenecteplase) in acute ischaemic stroke**

What is the aim, purpose and/or intended outcomes of this Activity?				
Who will be affected by the development & implementation of this activity?	X ❑ ❑ ❑	Service User Patient Carers Visitors	X ❑ ❑ ❑	Staff Communities Other _____
Is this:	❑ Review of an existing activity X New activity ❑ Planning to withdraw or reduce a service, activity or presence?			
What information and evidence have you reviewed to help inform this assessment? (Please name sources, eg demographic information for patients / services / staff groups affected, complaints etc.	National guidelines			
Summary of engagement or consultation undertaken (e.g. who and how have you engaged with, or why do you believe this is not required)	Approved at Stroke Governance and directorate meeting			
Summary of relevant findings				

Section 3

Please consider the potential impact of this activity (during development & implementation) on each of the equality groups outlined below. **Please tick one or more impact box below for each Equality Group and explain your rationale**. Please note it is possible for the potential impact to be both positive and negative within the same equality group and this should be recorded. Remember to consider the impact on e.g. staff, public, patients, carers etc. in these equality groups.

Equality Group	**Potential positive impact**	**Potential neutral impact**	**Potential negative impact**	**Please explain your reasons for any potential positive, neutral or negative impact identified**
Age		X		
Disability		X		
Gender Reassignment		X		
Marriage & Civil Partnerships		X		

Pregnancy & Maternity		X		
Race including Traveling Communities		X		
Religion & Belief		X		
Sex		X		
Equality Group	**Potential positive impact**	**Potential neutral impact**	**Potential negative impact**	**Please explain your reasons for any potential positive, neutral or negative impact identified**
Sexual Orientation		X		
Other Vulnerable and Disadvantaged Groups (e.g. carers; care leavers; homeless; Social/Economic deprivation, travelling communities etc.)		X		
Health Inequalities (any preventable, unfair & unjust differences in health status between groups, populations or individuals that arise from the unequal distribution of social, environmental & economic conditions within societies)		X		

Section 4

What actions will you take to mitigate any potential negative impacts?	**Risk identified**	**Actions required to reduce / eliminate negative impact**	**Who will lead on the action?**	**Timeframe**
		.		

How will you monitor these actions?	
When will you review this EIA? (e.g in a service redesign, this EIA should be revisited regularly throughout the design & implementation)	

Section 5 - Please read and agree to the following Equality Statement

1. Equality Statement

1.1. All public bodies have a statutory duty under the Equality Act 2010 to set out arrangements to assess and consult on how their policies and functions impact on the 9 protected characteristics: Age; Disability; Gender Reassignment; Marriage & Civil Partnership; Pregnancy & Maternity; Race; Religion & Belief; Sex; Sexual Orientation

1.2. Our Organisations will challenge discrimination, promote equality, respect human rights, and aims to design and implement services, policies and measures that meet the diverse needs of our service, and population, ensuring that none are placed at a disadvantage over others.

1.3. All staff are expected to deliver services and provide services and care in a manner which respects the individuality of service users, patients, carer's etc, and as such treat them and members of the workforce respectfully, paying due regard to the 9 protected characteristics.

Signature of person completing EIA	Mohima Akhtar
Date signed	18/11/2024
Comments:	
Signature of person the Leader Person for this activity	
Date signed	
Comments:	

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	No
2.	Does the implementation of this document require additional revenue	No
3.	Does the implementation of this document require additional manpower	No
4.	Does the implementation of this document release any manpower costs through a change in practice	No
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	No
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval