

Hyperacute Stroke Protocol - Thrombolysis and Mechanical Thrombectomy Clinical Guideline

V13.1

February 2026

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Summary - Stroke Thrombolysis and Thrombectomy Pathway

Eligibility Criteria for consideration of IV Thrombolysis and/or thrombectomy

Clinical symptoms of a stroke lasting for over 30 mins:

Thrombolysis: ischaemic stroke within 4.5 hours of symptom onset, can also be considered for thrombectomy.

Thrombectomy: ischaemic stroke within 24 hours, previously independent, significant symptoms and large vessel occlusion on CTA.



All Criteria Met

Proceed with Pathway

Criteria Not Met

Treat per Acute Stroke Guidelines



Urgently transfer to ED, ambulance team insert cannula- green anticubital fossa

- Pre-book CT brain scan and CT angiogram by ED team (Acute Stroke Protocol CT).
- ED team ring 4444 to alert radiographer/stroke nurse/ hyperacute stroke unit (HASU).
- Ambulance team transport patient straight to CT on arrival for urgent CT and CTA head scan.



Initial Management

- Focused history to clarify onset time and inclusion/ exclusion criteria are met.
- Perform NIHSS Score and focused physical examination.
- Record Capillary Blood Glucose – Treat if <4 or >20.
- Record BP – If ≥ 180 systolic and/or ≥ 110 diastolic (refer to page 6).
- Secure IV access with 20G (pink) cannula or larger if not completed by ambulance team.
- Send bloods for FBC, UandE, Clotting, LFT, TSH, CRP, Glucose, Group and Save.
- Record weight (if this will cause a significant delay then estimate weight).





Thrombolysis and Thrombectomy Management Post CT

- CT Head must be reviewed by Radiologist to exclude contra-indications to thrombolysis.
- ED Consultant/Tier4 Clinician (Tier 3 clinician may also proceed with senior support in department) checks inclusion and exclusion criteria and makes decision on whether to proceed with thrombolysis and/or referral for thrombectomy.
- Refer patients with a stroke due intracranial proximal large vessel occlusion for Thrombectomy.
- Do not wait for the effect of thrombolysis and refer for Thrombectomy asap (see page 8).
- Patient consent should be obtained for thrombolysis.
- Do not wait for blood results unless patient is on anti-coagulation or they have a co-morbidity that could adversely affect blood count or coagulation screen.
- BP must be below 180/110 prior to thrombolysis and maintained after.



Post-Thrombolysis Management

- All patients should be transferred to HASU within 4 hours of arrival unless transferred for thrombectomy.
- Record observations as per protocol for 24 hours post-thrombolysis.
- Maintain BP <180 systolic and <110 diastolic.
- Repeat NIHSS at 2 hours and 24 hours.
- Repeat CT brain scan at 24 hours.
- Avoid urinary catheters, NG tubes, IM injections and arterial puncture for 24 hours.
- Anti-platelets and anticoagulation should **not** be given in first 24 hours and should only be commenced when risk of intracranial haemorrhage is felt to be low.
- Do **not** anticoagulate for atrial fibrillation in first 24 hours after lysis.
- See below for management of the main post-thrombolysis complications.
- Refer to Acute Stroke Guidelines and Secondary Prevention Guidelines (on intranet) for further management and investigations after 24 hours.
- If you are concerned call the stroke team in hours, medical registrar or critical care team out of hours.

1. Aim/Purpose of this Guideline

- 1.1. To deliver safe and effective intravenous thrombolysis **and** thrombectomy for acute ischaemic stroke using robust evidence based clinical criteria. Intravenous thrombolysis has been offered at RCHT since 2008 and the evidence shows that it improves outcome in patients following ischaemic stroke [1]. However there is now evidence also for mechanical thrombectomy and the inclusion criteria are listed below with NICE guidelines included [2-3]. Early thrombectomy with second-generation stent retriever devices is safe and effective for reducing disability when used to treat patients with stroke caused by proximal large artery occlusions. The NNT for one additional person to achieve functional independence in these trials was 2.6.
- 1.2. This version supersedes any previous versions of this document.

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Royal Cornwall Hospital Trust rch-tr.infogov@nhs.net

2. The Guidance - Thrombolysis and Thrombectomy guidance

2.1. Thrombolysis

2.1.1. Inclusion Criteria

	Select
Age over 18.	
Clinical diagnosis of acute ischaemic stroke causing one or more of an NIHSS \geq 4, aphasia, binocular visual field deficit, a swallowing deficit, being unable to walk or self-care independently.	
Symptom-onset within 4.5 hours prior to initiation of thrombolysis treatment.	
Haemorrhage excluded on neuroimaging.	

2.1.2. Exclusion criteria

Absolute Contraindications	Select
Systolic BP > 185 mmHg or diastolic BP >110 mmHg despite medical treatment.	
Surgery or trauma within the last 14 days.	
Stroke within the last 14 days.	
Active internal bleeding.	
Severe haematological abnormalities / anticoagulation treatment. <ul style="list-style-type: none"> • INR > 1.7 or APTT >40. • On DOAC / Treatment dose LMWH and had dose within 24 hours, or on unfractionated heparin. • Known platelet count <50. 	
Arterial puncture at a non-compressible site or LP in last 7 days.	
Symptoms suggestive of subarachnoid haemorrhage, even if brain imaging normal.	
Infective endocarditis, pericarditis or presence of ventricular aneurysm related to recent MI.	
Acute pancreatitis.	
Severe liver disease, including hepatic failure, cirrhosis, portal hypertension, oesophageal varices and active hepatitis.	

Absolute Contraindications	Select
Current treatment with Donanemab (amyloid targeting monoclonal antibody)	

Relative Contraindications	Select
Thrombolysis can still be considered on a case by case basis – consider discussion with Stroke Consultant (contact via switchboard – 8am-9:30pm weekdays & 8am-8pm weekend/PHs)	
Pre-treatment scan showing: <ul style="list-style-type: none"> • Evidence of established infarction suggestive of symptom onset more than 4.5 hours ago. • Mass effect/ oedema. • Tumour, AVM or aneurysm. 	
Intracranial or intra-spinal surgery within the last 2 months.	
Stroke or head injury in last 6 weeks.	
History of GI or urinary tract bleed in last 6 weeks.	
Previous CNS bleeding e.g. subdural haemorrhage.	
Glucose <2.7 or >22 mmol/L.	
On a direct oral anticoagulant even with normal clotting screen.	
Seizure at stroke onset (only if the clinical diagnosis of stroke is in doubt).	
Pregnancy.	
Obstetric delivery within 10 days.	
Greater than 90-minute delay post scan.	
Symptoms that start during sleep.	
Severe pre-morbid dependency.	
Haemorrhagic retinopathy.	
Allergy or Hypersensitivity to Gentamicin. (which can be found in trace residue in Tenecteplase).	

The potential morbidity / mortality from an untreated ischaemic stroke is significant so this should be a consideration before treatment is ruled out. The mortality of an untreated total anterior circulation stroke for example exceeds 40% at 30 days.

2.2. Tenecteplase Administration

Tenecteplase is now licensed for thrombolysis of ischaemic strokes.

It is administered as a **single IV bolus** over **5-10 seconds**.

Estimate of patients weight (kg)	Tenecteplase (U)	Tenecteplase (mg)	Corresponding volume of reconstituted solution (ml)
< 60	3000	15.0	3.0
≥ 60 to < 70	3500	17.5	3.5
≥ 70 to < 80	4000	20.0	4.0
≥ 80 to < 90	4500	22.5	4.5
≥ 90	5000	25.0	5.0

Benefit-risk of tenecteplase treatment should be carefully evaluated (by the senior clinical decision-maker) in patients weighing 50 kg or less due to limited availability of data. For further information, please see below.

- Medusa homepage: [Injectable Medicines Guide - Medusa Myth Page - IVGuideDisplayMain.asp](#) and search for Tenecteplase.
- Dosing and preparation: [pc-gb-110099 cardiovascular metalyse 25mg how-to-use pdf for promotional use.pdf](#).
- For information on preparation: [73033431 Metalyse-Video](#).

2.3. Mechanical Thrombectomy

An Interventional Neuro-radiology service is available Monday-Friday 8am-5pm, at Derriford Hospital, which provides the mechanical thrombectomy service. Please note patients have to arrive at receiving hospital by 5pm (discuss with Derriford team on referral).

Patients with a proximal intracranial large vessel occlusion (in the anterior circulation) causing a disabling stroke (NIHSS >5) should be considered for combination IV thrombolysis and mechanical thrombectomy. Evidence suggests that it is effective for patients with ischaemic stroke within the last 24 hours – if there is evidence of salvageable brain in neuroimaging.

If there is a contra-indication to thrombolysis but not mechanical thrombectomy, then a referral should be considered (e.g. high INR).

2.3.1. How to proceed

The ED consultant or senior doctor in charge of the patient's care requests urgent plain CT and CT angiogram (Acute Stroke Protocol). Stroke nurse supports pathway.

The ED or Stroke consultant makes the referral to Mechanical Thrombectomy service at **Derriford hospital see next page for details**. Provide time of onset, NIHSS and systolic blood pressure when making referral. See referral details below.

ED / Stroke team arranges urgent ambulance transport (see Appendix 8) to Derriford Hospital once patient accepted.

The ED consultant/ Tier 4 and 3 Clinicians can discuss any patients with Stroke / Eldercare Consultant on call – via the Stroke / Frailty phone.

Administer **Aspirin 300mg** (oral or PR) prior to transfer if patient has:

- Been accepted for Mechanical Thrombectomy, but,
- Not been treated with intravenous thrombolysis.

2.3.2. Contact Details for Hospitals for Thrombectomy referral and working days

Derriford Hospital – Monday- Sunday including public holidays (service is available 24 hours)	
When making a referral please provide: Time of onset; NIHSS; Systolic blood pressure.	
Inclusion Criteria:	<p>1. Previously independent in activities of daily living – this depends on the time window / time from symptom onset or last known well time</p> <p style="text-align: center;">Less than 6 hours: mRS 0-2</p> <p style="text-align: center;">6 and 24 hours: mRS 0 -1*</p> <p><i>*patients with mRS 2 may still be considered for MT if the referring senior clinician feels they are likely to benefit.</i></p> <p><i>See Appendix 6 for help in determining patient's mRS.</i></p> <p>2. Significantly disabling acute stroke symptoms, as determined by an NIHSS score of >5</p> <p>Note exceptions to this (consider discussion with Derriford Stroke Team)</p> <ul style="list-style-type: none"> - posterior circulation stroke (no NIHSS specified) - disabling stroke symptoms (e.g. aphasia, hemianopia) <p>3. Large vessel occlusion confirmed on CTA (MCA, basilar and internal carotid artery).</p> <p>Fit for transfer (if 'high-risk' refer to Retrieve Team for transfer; otherwise refer to SWAST – see Appendix 8).</p>
Onset time	<p>Symptom onset / Last known well within last 24 hours.</p> <p>Note: CTP is required for Late window MT selection (See below).</p>

Derriford Hospital – Monday- Sunday including public holidays (service is available 24 hours)	
Contact Details	<ol style="list-style-type: none"> 1. Complete electronic referral via referapatient; select Derriford Hospital and Mechanical thrombectomy (compact) referral form. 2. Contact Derriford Stroke Registrar – dial 07623 941 515 and enter your full contact number followed by # key. Derriford Stroke / Thrombectomy team will ring you ASAP. 3. Update Derriford Stroke team by ‘Quick Message’ about any significant results e.g. relevant blood test results which become available after initial referral/ after patient leaves ED.
Late window MT selection	<p>CT perfusion imaging is required for MT selection in late window:</p> <ul style="list-style-type: none"> - 12-24 hours from onset, ‘wake up’ stroke or if ‘unknown onset’ <p>The decision to request CTP must be made by the Senior Clinician responsible for patient care/decision-maker about reperfusion treatment.</p> <p><i>See Appendix 7 for further information and process for requesting CTP</i></p>
Exclusion criteria:	Intracranial haemorrhage.

2.4. Hypertension Management

Blood pressure must be **less** than 180/110 diastolic prior to administering Tenecteplase, **and** must be maintained at this level for 24 hours after thrombolysis.

For rapid BP control:

1. If BP remains high administer 10mg IV Labetalol over 1-2 mins. This can be repeated after 10 minutes if required.
2. If BP is unresponsive to Labetalol boluses or if Labetolol is contra-indicated (e.g. bradycardia, Asthma, CCF, heart block) then commence Isoket (Isosorbide dinitrate) infusion at a rate 2-12ml/hr (25mg mg in 50 ml of N Saline).
3. If BP remains raised despite above measures then discuss with consultant about proceeding / continuing with thrombolysis administration.

Note: A rapid rise in blood pressure after thrombolysis may be due to an intracranial haemorrhage and should be considered as a potential cause.

2.5. Special Circumstances

2.5.1. Cervical artery dissection

Spontaneous Cervical artery dissection (CAD), involving internal carotid or vertebral arteries, can present with symptoms of acute ischaemic stroke, with no or minimal history of trauma.

In Stroke caused by CAD initial management principles are generally those of acute stroke, including thrombolysis and thrombectomy. Commence appropriate hyperacute stroke treatment (see below) and refer to Stroke team.

Thrombolysis should be considered where all other criteria are met (e.g. disabling stroke symptoms, but is **contraindicated** where:

- The dissection starts OR EXTENDS beyond the Dura (i.e. intradural cervical artery dissection). The risk of sub-arachnoid haemorrhage is much higher in this population.
- There is frank rupture of the cervical vessel.
- There is intercurrent Intra-cranial haemorrhage (e.g. Sub-Arachnoid Haemorrhage).

Thrombectomy should be considered where extracranial Cervical artery dissection has led to occlusion of the Internal Carotid artery or Vertebral artery with or without a tandem occlusion involving the proximal large intracranial arteries (middle cerebral artery, basilar artery) and where there are disabling stroke symptom (NIHSS >5).

Such patients should be considered for discussion with the Derriford Thrombectomy service. This may prevent clot propagation and endovascular repair may be amenable even if thrombolysis is contra-indicated.

2.5.2. Pregnancy

Pregnancy or women who are post-partum – Tenecteplase is unlicensed for use in pregnancy. It should not be withheld in pregnant patients with ischaemic stroke, but because experience is limited, risks and benefits must be carefully weighed and should be discussed with on-call obstetrician.

2.5.3. Chemotherapy

Some chemotherapy agents may be relative contra-indications to thrombolysis or patients may be thrombocytopenic. If patient on chemotherapy drugs please ensure bloods normal first and check with oncology or haematology before giving lysis.

2.5.4. Children

Tenecteplase is not licensed for <18 years. Studies are ongoing in children. Cases should be discussed immediately on arrival with the paediatric neurologists at Bristol.

2.6. Treatment of Complications after Thrombolysis

2.6.1. Bleeding

Intracranial bleeding should be suspected in any patient who experiences: Neurological deterioration (Drop in GCS of 2 or more, Increase in NIHSS of ≥ 4).

- New headache.
- Acute rise in blood pressure.
- Nausea and vomiting.

Extracranial bleeding is not always obvious but should be suspected if:

- Signs of shock.
- Drop in BP.
- Evidence of blood loss.

If bleeding is suspected, then the following steps should be followed:

1. If applicable stop administering any remaining Tenecteplase injection.
2. Arrange appropriate urgent imaging. If intra-cranial haemorrhage is suspected, then CT Head is required. If bleeding suspected from other non-compressible site then imaging might include CT chest or abdomen or endoscopic procedures.
3. Review admission bloods and send repeat FBC, Coagulation screen and Fibrinogen as urgent samples.
4. Inform Stroke Consultant (in hours) or ED/medical registrar out of hours.

If bleeding is confirmed and has occurred within 24 hours of administering Tenecteplase then rapid reversal may be required:

1. Administer 1g Tranexamic Acid in 100mls 0.9% Saline over 10 mins.
2. Urgently check FBC, Coagulation screen, Fibrinogen and Group and Save.
3. If Fibrinogen is <1.5 requests and administer 2 pools of cryoprecipitate.
4. Recheck fibrinogen after Cryoprecipitate and discuss with Haematology if still <1.5 .

5. Consider Tranexamic Acid Infusion (1g in 250ml 0.9% Saline over 8 hours).
6. Discuss with ED/Stroke Consultant about whether a referral to Neurosurgery or other appropriate specialty is required.

2.6.2. Anaphylaxis

Anaphylaxis is uncommon but can occur after receiving IV Tenecteplase. This should be suspected if any of the following features are present:

- Urticarial rash.
- Bronchospasm.
- Angioedema.
- Shock.

If an Anaphylaxis is suspected:

1. If applicable stop administering any remaining Tenecteplase injection.
2. Patient requires urgent medical review as per Advanced Life Support Guidelines.
3. Administer 1:1000 Adrenaline 0.5-1ml SC depending on severity of reaction.
4. IV fluid challenge with 500-1000ml saline of hypotensive/ shocked.
5. Inform Critical Care Team.

If concerns about refractory anaphylaxis, refer to [Refractory anaphylaxis algorithm 2021.pdf](#)

2.6.3. Cerebral Oedema

Raised Intracranial Pressure may be indicated by:

1. Unequal pupils.
2. Drop in GCS.
3. Nausea and vomiting.
4. High BP and low pulse rate.

An urgent CT Head should be arranged if cerebral oedema is suspected and if confirmed:

1. Discuss with Stroke Consultant or medical registrar on call.

2. Avoid excessive fluid administration.
3. Consider administration of 400ml of 10% Mannitol over 30 hour. If this is administered, then catheterisation, fluid balance and electrolyte monitoring is required.

2.6.4. Malignant Middle cerebral artery (MCA) syndrome

Neurosurgical referral for consideration of a Decompressive Hemicraniectomy is required if a patient has suffered a large MCA territory stroke and meets the following criteria:

- No significant pre-stroke disability (modified Rankin Score <2).
- Neurological deficit consistent with an MCA stroke.
- NIHSS > 15.
- Signs on CT of an infarct involving over 50% of the MCA territory or an infarct volume of greater than 145 cm³ on diffusion-weighted MRI images.
- Within 48 hours of stroke onset.

Do not wait for a drop in GCS before making neurosurgical referral.

Exclusion criteria for Decompressive Hemicraniectomy include:

- Both pupils fixed and dilated.
- Haemorrhagic transformation of the infarct.
- Life expectancy < Three years.
- Significant co-morbidities.

Patients should not be excluded from surgery based on age alone.

2.7. Thrombolysis training and education

Acute Stroke Thrombolysis Treatment is provided by the Emergency Department (ED) at RCHT. Consultants and senior medical staff in ED providing this treatment are expected to have completed the e-learning module, shadowed experienced peers and completed the National Institute for Health Stroke Scale (NIHSS training). The ED consultant takes responsible for the patient.

Training for stroke thrombolysis is available as an e-learning package from the RCHT electronic learning management website ESR. The course title is 156 Thrombolysis in Acute Stroke Patients Online and Employee Support is available on 01872 255148 Extension **5148**.

For NIHSS training please visit the [NIH Stroke Scale International \(NIHSS\) - English Program website](#) and enter your NHS email for account registration.

NIHSS training needs to be renewed every Three years and it is the responsibility of the individual clinician to ensure training is in date.

The stroke team provide face to face training sessions if required. Please contact the Governance Lead for stroke (Dr Lisa Manning, Eldercare Consultant lisa.manning12@nhs.net).

Governance for stroke thrombolysis is provided by the Governance Lead for stroke, who attends the Emergency Department governance meetings on a monthly basis.

3. Monitoring compliance and effectiveness

Information Category	Detail of process and methodology for monitoring compliance
Element to be monitored	Outcome of thrombolysis for individual patients.
Lead	Dr Lisa Manning, Eldercare Consultant.
Tool	Sentinel Stroke National Audit Programme (SSNAP) from the Royal College of Physicians.
Frequency	Each thrombolysed patients details and outcomes are entered on to SSNAP.
Reporting arrangements	Dr Manning reports outcome locally to the stroke and eldercare governance and Emergency Department governance meeting monthly. SSNAP data is collected as part of the Trust Clinical Audit and Outcomes Program on an ongoing basis and reviewed quarterly. SSNAP data is reported and published nationally and monitored by the Clinical Commissioning Group.
Acting on recommendations and Lead(s)	Dr Manning, Stroke Consultant. Dr Stephen Godfrey, Emergency Department Consultant. Tamsyn Anderson, Acute Stroke Unit Manager.
Change in practice and lessons to be shared	Required changes to practice will be identified and actioned within six months. Dr Manning as lead members of the team will take each change forward where appropriate.

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the ['Equality, Inclusion and Human Rights Policy'](#) or the [Equality and Diversity website](#).

4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.

Appendix 1. Governance Information

Information Category	Detailed Information
Document Title:	Hyperacute Stroke Protocol - Thrombolysis and Mechanical Thrombectomy Clinical Guideline V13.1
This document replaces (exact title of previous version):	Hyperacute Stroke Protocol - Thrombolysis and Mechanical Thrombectomy Clinical Guideline V13.0
Date Issued/Approved:	February 2026
Date Valid From:	February 2026
Date Valid To:	May 2028
Directorate / Department responsible (author/owner):	Mo Maddula, Stroke Consultant.
Contact details:	07717 714009.
Brief summary of contents:	Guideline for administration of intravenous thrombolysis and mechanical thrombectomy for acute ischaemic stroke.
Suggested Keywords:	Stroke, Thrombectomy, Thrombolysis, Alteplase.
Target Audience:	RCHT: Yes CFT: No CIOS ICB: No
Executive Director responsible for Policy:	Chief Medical Officer.
Approval route for consultation and ratification:	Eldercare governance meeting. ED governance meeting. Referral pathway at Derriford.
General Manager confirming approval processes:	Rebecca Cave, Interim Deputy GM.
Name of Governance Lead confirming approval by specialty and care group management meetings:	Paul Evangelista.
Links to key external standards:	NICE Technology appraisal guidance TA990.

Information Category	Detailed Information
<p>Related Documents:</p>	<p>Acute Stroke Management. Stroke and TIA Multidisciplinary Care Pathway. Secondary Prevention after Stroke or TIA.</p> <p>References:</p> <ol style="list-style-type: none"> 1. NICE Technology appraisal guidance TA990 2024. 2. National Clinical Guidelines for Stroke 2023 Update National Clinical Guideline for Stroke (strokeguideline.org). 3. NICE NG 128. Stroke and TIA in over 16s: diagnosis and initial management. 2019. Recommendations#thrombectomy-for-people-with-acute-ischaemic-stroke. 4. Emberson J, Lees KR, Lyden P, et al. Effect of treatment delay, age, and stroke severity on the effects of intravenous thrombolysis with alteplase for acute ischaemic stroke: a meta-analysis of individual patient data from randomised trials. Lancet 2014; 384(9958): 1929-35. https://www.thelancet.com/action/showPdf?pii=S0140-6736%2814%2960584-5 5. Wardlaw JM, Murray V, Berge E et al. Thrombolysis for acute stroke. Cochrane Data base Review 7. 2014. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4153726/pdf/nihms618736.pdf. 6. European Stroke Organisation (ESO) expedited recommendation on tenecteplase for acute ischaemic stroke Eur Stroke J 2023 Mar;8(1):854. https://doi.org/10.1177/23969873221150022. 7. BIASP consensus document supporting the use of Tenecteplase in the treatment of acute ischaemic stroke in the UK and RoI 2024 BIASP-CONSENSUS-DOCUMENT-SUPPORTING-THE-USE-OF-TENECTEPLASE-v4-FINAL-301024-003.pdf. 8. CT Perfusion for late window Mechanical Thrombectomy patient selection (SOP) v1.2 PASP Stroke Project & PenRad

Information Category	Detailed Information
Training Need Identified?	Yes. Learning and Development department have been informed.
Publication Location (refer to Policy on Policies – Approvals and Ratification):	Internet and Intranet.
Document Library Folder/Sub Folder:	Clinical / Stroke.

Version Control Table

Date	Version Number	Summary of Changes	Changes Made by
July 2008	V1.0	Initial Issue.	Dr F Harrington.
December 2010	V2.0	Amendment to 24/7 service.	Dr F Harrington.
September 2012	V3.0	Extended age and treatment window.	Dr F Harrington.
January 2014	V4.0	Change of service provision from Eldercare to Emergency Department team.	Dr F Harrington.
October 2015	V5.0	Availability of intra-arterial treatment.	Dr F Harrington. Dr K Adie. A James.
November 2016	V6.0	Updated Evidence and change in pathway.	Dr K Adie. Dr F Harrington.
July 2017	V7.0	Updated Evidence.	Dr K Adie. Dr F Harrington.
July 2017	V8.0	Update with changes in pathway.	Dr K Adie, Consultant in Eldercare Department.
April 2020	V9.0	Update with evidence NICE 2019.	Dr K Adie, Consultant in Eldercare Department
January 2021	V10.0	Update with new referral pathway.	Dr K Adie, Consultant in Eldercare Department.

Date	Version Number	Summary of Changes	Changes Made by
September 2021	V11.0	Update with Extended hours at Derriford for thrombectomy.	Dr K Adie, Consultant in Eldercare Department.
December 2022	V11.1	Update to section 2.3.2 - extended service times for thrombectomy at Derriford.	Dr K Adie, Consultant in Eldercare Department.
March 2025	V12.0	Updated Thrombolysis criteria, out of hours and interhospital referral details.	Dr Mo Madula, Stroke Consultant.
April 2025	V13.0	Switch from alteplase to Tenecteplase.	Dr Mo Madula, Stroke Consultant.
February 2026	V13.1	Thrombectomy service at Derriford hospital 24 / 7 access. Section 2.3.2. CTP for late window MT selection – section 2.3.2. Administration of aspirin prior to transfer for thrombectomy. Section 2.3.2. Inclusion of Donanemab as absolute contraindication for thrombolysis. Section 2.1.2. Addition of a section on Cervical artery dissection in relation to thrombolysis and thrombectomy. Section 2.5.1. Deleted used to IV Hyd+rocortisone & IV Chlorphenamine in management of anaphylaxis after thrombolysis (as per Resus Council 2021 guidelines). Section 2.6.1.	Dr Mo Madula, Stroke Consultant.

All or part of this document can be released under the Freedom of Information Act 2000.

All Policies, Strategies and Operating Procedures, including Business Plans, are to be kept for the lifetime of the organisation plus six years.

This document is only valid on the day of printing.

Controlled Document.

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Appendix 2. Equality Impact Assessment

Section 1: Equality Impact Assessment (EIA) Form

The EIA process allows the Trust to identify where a policy or service may have a negative impact on an individual or particular group of people.

For guidance please refer to the Equality Impact Assessment Policy (available from the document library) or contact the Equality, Diversity, and Inclusion Team
rcht.inclusion@nhs.net

Information Category	Detailed Information
Name of the strategy/policy/proposal/service function to be assessed:	Hyperacute Stroke Protocol - Thrombolysis and Mechanical Thrombectomy Clinical Guideline V13.1
Directorate and service area:	Urgent, Emergency and Trauma Medicine / Stroke.
Is this a new or existing Policy?	Existing.
Name of individual completing EIA (Should be completed by an individual with a good understanding of the Service/Policy):	Katja Adie, Consultant in Eldercare Department.
Contact details:	07717 714009.

Information Category	Detailed Information
1. Policy Aim - Who is the Policy aimed at? (The Policy is the Strategy, Policy, Proposal or Service Change to be assessed)	To safely administer thrombolytic agent to acute ischaemic stroke patients using updated, clearly defined criteria.
2. Policy Objectives	Safe administration of emergency drug therapy. Clear advice and guidance for staff involved in the administration of emergency treatment and aftercare of patients who have undergone thrombolysis for stroke.
3. Policy Intended Outcomes	As above.
4. How will you measure each outcome?	Patient response to treatment. Audit – ongoing local and RCP National Sentinel Stroke Audit. Inclusion in international SITS-MOST register (Safe implementation of thrombolysis in stroke).

Information Category	Detailed Information
5. Who is intended to benefit from the policy?	Patients: through the promotion of safe, effective, evidence based practice.
6a. Who did you consult with? (Please select Yes or No for each category)	<ul style="list-style-type: none"> • Workforce: Yes • Patients/visitors: No • Local groups/system partners: No • External organisations: No • Other: No
6b. Please list the individuals/groups who have been consulted about this policy.	Please record specific names of individuals/groups: Eldercare governance meeting. Stroke operational group meeting.
6c. What was the outcome of the consultation?	Ratified.
6d. Have you used any of the following to assist your assessment?	National or local statistics, audits, activity reports, process maps, complaints, staff, or patient surveys: No.

7. The Impact

Following consultation with key groups, has a negative impact been identified for any protected characteristic? Please note that a rationale is required for each one.

Where a negative impact is identified without rationale, the key groups will need to be consulted again.

Protected Characteristic	(Yes or No)	Rationale
Age	Yes	Removal of upper age limit for stroke thrombolysis based on recent randomised controlled trials.
Sex (male or female)	No	
Gender reassignment (Transgender, non-binary, gender fluid etc.)	No	
Race	No	
Disability (e.g. physical or cognitive impairment, mental health, long term conditions etc.)	No	

Protected Characteristic	(Yes or No)	Rationale
Religion or belief	No	
Marriage and civil partnership	No	
Pregnancy and maternity	No	
Sexual orientation (e.g. gay, straight, bisexual, lesbian etc.)	No	

A robust rationale must be in place for all protected characteristics. If a negative impact has been identified, please complete section 2. If no negative impact has been identified and if this is not a major service change, you can end the assessment here.

I am confident that section 2 of this EIA does not need completing as there are no highlighted risks of negative impact occurring because of this policy.

Name of person confirming result of initial impact assessment: Katja Adie, Consultant in Eldercare Department.

If a negative impact has been identified above OR this is a major service change, you will need to complete section 2 of the EIA form available here:

[Section 2. Full Equality Analysis](#)

Appendix 3. Consent for Thrombolysis

Verbal consent should be obtained from the patient prior to administration of IV thrombolysis.

If the patient lacks capacity to give their consent then a treatment decision should be made in their best interests. Where possible this should be discussed with their next of kin.

Patients should be informed there is a 1 in 3 chance of improvement, 1 in 20 chance of bleeding and a 1 in a 100 chance of death with thrombolysis treatment.^{4,5}

The NNT for ischemic stroke treatment to achieve one additional patient with excellent functional outcome (mRS 0-1) is time-dependent and is displayed below by onset to treatment time:

- 0-3h: NNT of 10.
- 3-4.5h: NNT of 19.
- 4.5-6h: NNT of 50.

Harms in NNT.

Fatal intracranial haemorrhage within 7 days of treatment:

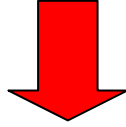
- 0-3h: NNH of 40.
- 3-4.5h. NNH of 50.
- 4.5-6h: NNH of 40.
- 90-day all-cause mortality: NNH of 71.

Appendix 4. Stroke Nursing Protocol and Stroke Thrombolysis Observation Chart

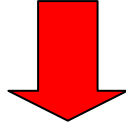
1. Patient to be nursed in identified bed space that allows for continuous observation and from ED transferred to HASU.
2. Oxygen, Suction, Cardiac Monitor, Sphygmomanometer, O2 Saturation machine should be available at the bed side. Capillary blood glucose machine, Anaphylaxis box should be easily accessible.
3. Initiate post administration thrombolysis care plan on arrival.
4. Perform patient observations as indicated and record a baseline ECG.
5. If blood pressure is rising please contact doctors immediately to consider intravenous therapy.
6. If there are any concerns, medical review is essential. Report, review, document and increase frequency of observations accordingly.
7. Pyrexia $> 37^{\circ}\text{C}$ should be treated with PR or PO Paracetamol (1g 4-6 hourly. No more than 4g in 24 hours).
8. If haemorrhage is suspected, report immediately and arrange for urgent medical review. Send urgent FBC, clotting and group and save.
9. If anaphylaxis is suspected (Tachypnoea, dyspnoea, tachycardia, swelling, rash) Stop infusion and employ anaphylaxis protocol. Arrange for urgent medical review or perform a crash call (2222) if required.
10. Avoid catheterisation for 24 hours following thrombolysis infusion to minimise the risk of trauma and bleeding. If essential, consult with medical team.
11. Do not insert naso gastric tubes for 24 hours post thrombolysis infusion to minimise the risk of trauma and bleeding.
12. IM injections should be avoided for 48 hours post thrombolysis infusion to minimise the risk of excessive bruising.
13. Avoid giving heparin / warfarin. Refer to medical staff before commencing any anti coagulant or antiplatelet therapy (only given if CT at 24h shows no bleeding).

Manual BP, Pulse, Temperature, Respirations, GCS and Oxygen Saturations – *log on Eobs*

Every 15 minutes for 2 hours



Every 30 minutes for 6 hours



Hourly for 18 hours

Maintain BP < Systolic 180 / Diastolic 110

Temperature not to exceed 37°C.

Observe for signs of raised intracranial pressure or intracranial bleeding

- Unequal pupils.
- Sudden drop in GCS.
- Onset of drowsiness.
- Onset of nausea, vomiting (photophobia).
- Rising BP and falling pulse.

Appendix 5. NIHSS

Number and Type	Details	Score	Score
1a. Level of Consciousness	<p>0 = Alert; keenly responsive.</p> <p>1 = Not alert; but arousable by minor stimulation to obey, answer, or respond.</p> <p>2 = Not alert; requires repeated stimulation to attend or is obtunded and requires strong or painful stimulation to make movements (not stereotyped).</p> <p>3 = Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, and areflexic.</p>		
1b. LOC Questions: The patient is asked the month and his/her age. The answer must be correct	<p>0 = Answers both questions correctly.</p> <p>1 = Answers one question correctly.</p> <p>2 = Answers neither question correctly.</p>		
1c. LOC Commands: The patient is asked to open and close the eyes and then to grip and release the non-paretic hand.	<p>0 = Performs both tasks correctly.</p> <p>1 = Performs one task correctly.</p> <p>2 = Performs neither task correctly.</p>		
<p>2. Best Gaze: Only horizontal eye movements will be tested.</p> <p>Voluntary or reflexive (oculocephalic) eye movements will be scored, but caloric testing is not done. If the patient has a conjugate deviation of the eyes that can be overcome by voluntary or reflexive activity, the score will be 1. If a patient has an isolated peripheral nerve paresis (CN III, IV or VI), score a 1. Gaze is testable in all aphasic patients. Patients with ocular trauma, bandages, pre-existing blindness, or other disorder</p>	<p>0 = Normal.</p> <p>1 = Partial gaze palsy; gaze is abnormal in one or both eyes but forced deviation or total gaze paresis is not present.</p> <p>2 = Forced deviation, or total gaze paresis not overcome by the oculocephalic manoeuvre.</p>		

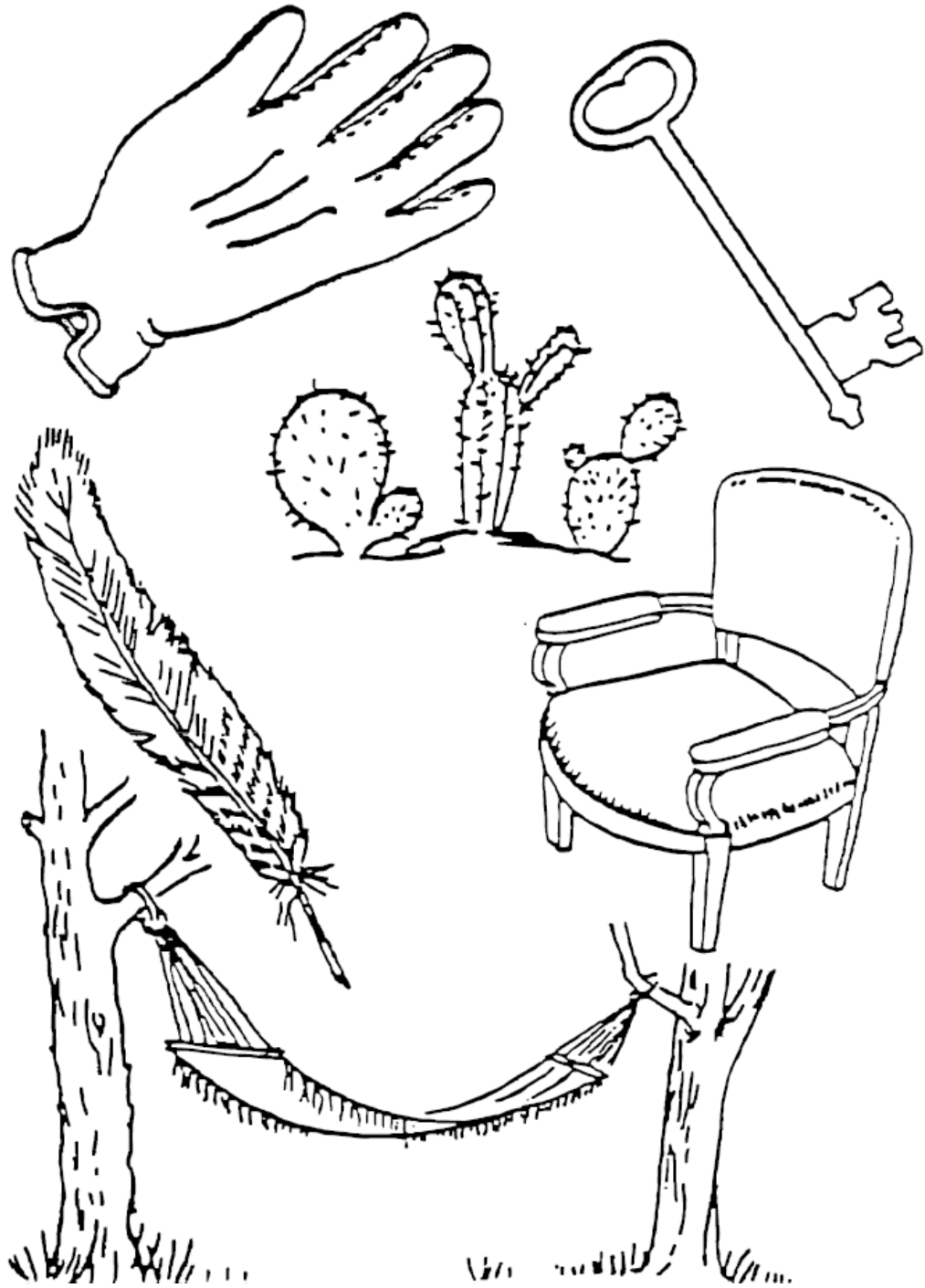
Number and Type	Details	Score	Score
<p>of visual acuity or fields should be tested with reflexive movements, and a choice made by the investigator. Establishing eye contact and then moving about the patient from side to side will occasionally clarify the presence of a partial gaze palsy.</p>			
<p>3. Visual:</p> <p>Visual fields (upper and lower quadrants) are tested by confrontation, using finger counting or visual threat as appropriate. Patient must be encouraged, but if they look at the side of the moving fingers appropriately, this can be scored as normal. If there is unilateral blindness or enucleation, visual fields in the remaining eye are scored. Score 1 only if a clear-cut asymmetry, including quadrantanopia is found. If patient is blind from any cause score 3. Double simultaneous stimulation is performed at this point. If there is extinction patient receives a 1 and the results are used to answer question 11.</p>	<p>0 = No visual loss.</p> <p>1 = Partial hemianopia.</p> <p>2 = Complete hemianopia.</p> <p>3 = Bilateral hemianopia (blind including cortical blindness).</p>		
<p>4. Facial Palsy:</p> <p>Ask, or use pantomime to encourage the patient to show teeth or raise eyebrows or close eyes. Score symmetry of grimace in response to noxious stimuli in the poorly responsive or non-comprehending patient. If facial trauma/bandages, orotracheal tube, tape, or other physical barrier obscures the face, these should be removed to the extent possible.</p>	<p>0 = Normal symmetrical movement.</p> <p>1 = Minor paralysis (flattened nasolabial fold, asymmetry on smiling).</p> <p>2 = Partial paralysis (total or near total paralysis of lower face).</p> <p>3 = Complete paralysis (absence of facial movement in the upper and lower face).</p>		
<p>5-8. Motor Arm and Leg:</p> <p>The limb is placed in the appropriate position: extend the arms 90</p>	<p>Arm.</p>		

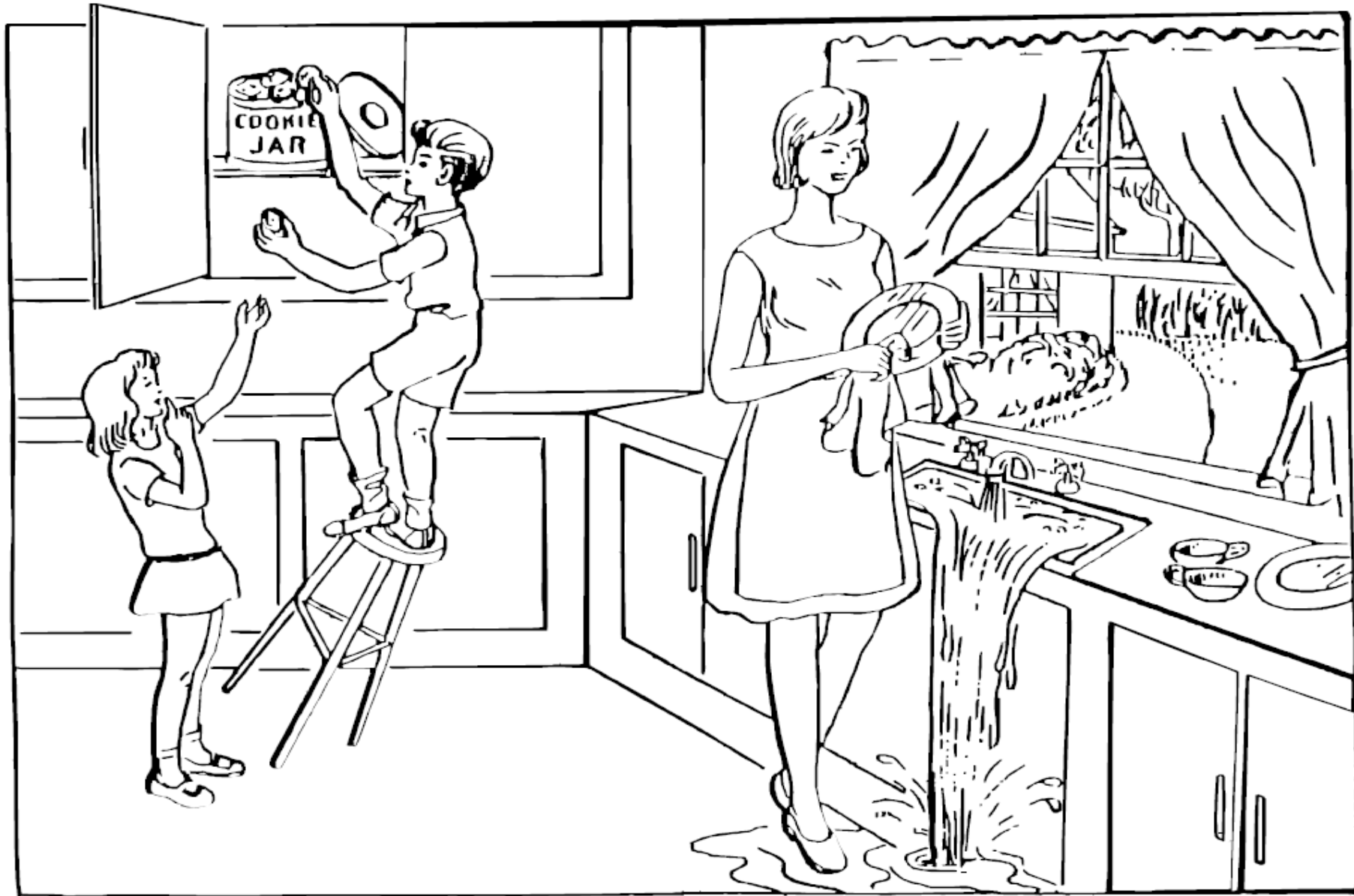
Number and Type	Details	Score	Score
<p>degrees (if sitting) or 45 degrees (if supine) and the leg 30 degrees (always tested supine). Drift is scored if the arm falls before 10 seconds or the leg before 5 seconds. The aphasic patient is encouraged using urgency in the voice and pantomime but not noxious stimulation. Each limb is tested in turn, beginning with the nonparetic arm. Only in the case of amputation or joint fusion at the shoulder or hip may the score be “9” and the examiner must clearly write the explanation for scoring as a “9”.</p>	<p>0 = No drift, arm holds 90 (or 45) degrees for full 10 seconds.</p> <p>1 = Drift, arm holds 90 (45) degrees, but drifts down before full 10 seconds; does not hit bed or other support.</p> <p>2 = Some effort against gravity, limb cannot get to or maintain (if cued) 90 (or 45) degrees, drifts down to bed, but has some effort against gravity.</p> <p>3 = No effort against gravity, arm falls.</p> <p>4 = No movement.</p> <p>9 = Amputation, joint fusion - explain:</p> <p>5. Right Arm.</p> <p>6. Left Arm.</p> <p>Leg</p> <p>0 = No drift, leg holds 30 degrees position for full 5 seconds.</p> <p>1 = Drift, leg falls by the end of the five second period but does not hit bed.</p> <p>2 = Some effort against gravity, leg falls to bed by 5 seconds but has some effort against gravity.</p> <p>3 = No effort against gravity, leg falls to bed immediately.</p> <p>4 = No movement.</p> <p>9 = Amputation, joint fusion - explain:</p> <p>7. = Right Leg.</p> <p>8. = Left Leg.</p>		

Number and Type	Details	Score	Score
<p>9. Limb Ataxia:</p> <p>This item is aimed at finding evidence of a unilateral cerebellar lesion. Test with eyes open. In case of visual defect, ensure testing is done in intact visual field. The finger-nose-finger and heel-shin tests are performed on both sides, and ataxia is scored only if present out of proportion to weakness. Ataxia is absent in the patient who cannot understand or is hemiplegic. Only in the case of amputation or joint fusion may the item be scored "9", and the examiner must clearly write the explanation for not scoring. In case of blindness, test by touching nose from extended arm position.</p>	<p>0 = Absent.</p> <p>1 = Present in one limb.</p> <p>2 = Present in two limbs.</p>		
<p>10. Sensory:</p> <p>Sensation or grimace to pinprick when tested, or withdrawal from noxious stimulus in the obtunded or aphasic patient. Only sensory loss attributed to stroke is scored as abnormal and the examiner should test as many body areas [arms (not hands), legs, trunk, face] as needed to accurately check for hemisensory loss. A score of 2, "severe or total", should only be given when a severe or total loss of sensation can be clearly demonstrated. Stuporous and aphasic patients will therefore probably score 1 or 0. The patient with brainstem stroke who has bilateral loss of sensation is scored 2. If the patient does not respond and is quadriplegic, score 2. Patients in coma (item 1a=3) are arbitrarily given a 2 on this item.</p>	<p>0 = Normal; no sensory loss.</p> <p>1 = Mild to moderate sensory loss; patient feels pinprick is less sharp or is dull on the affected side; or there is a loss of superficial pain with pinprick but patient is aware he/she is being touched.</p> <p>2 = Severe to total sensory loss; patient is not aware of being touched.</p>		
<p>11. Best Language:</p> <p>A great deal of information about comprehension will be obtained during the preceding sections of the</p>	<p>0 = No aphasia, normal.</p> <p>1 = Mild to moderate aphasia; some obvious loss of fluency.</p>		

Number and Type	Details	Score	Score
<p>examination. The patient is asked to describe what is happening in the attached picture, to name the items on the attached list of sentences. Comprehension is judged from responses here as well as to all of the commands in the preceding general neurological exam. If visual loss interferes with the tests, ask the patient to identify objects placed in the hand, repeat, and produce speech. The intubated patient should be asked to write. The patient in coma (question 1a = 3) will arbitrarily score 3 on this item. The examiner must choose a score in the patient with stupor or limited cooperation but a score of 3 should be used only if the patient is mute and follows no one step commands.</p>	<p>or facility of comprehension, without significant limitation on ideas expressed or form of expression. Reduction of speech and/or comprehension, however, makes conversation about provided material difficult or impossible. For example, in conversation about provided materials examiner can identify picture or naming card from patient's response.</p> <p>2 = Severe aphasia; all communication is through fragmentary expression; great need for inference, questioning, and guessing by the listener. Range of information that can be exchanged is limited; listener carries burden of communication. Examiner cannot identify materials provided from patient response.</p> <p>3 = Mute, global aphasia; no usable speech or auditory comprehension.</p>		
<p>12. Dysarthria:</p> <p>If the patient is thought to be normal, an adequate sample of speech must be obtained by asking patient to read or repeat words from the attached list. If the patient has severe aphasia, the clarity of articulation of spontaneous speech can be rated. Only if the patient is intubated or has other physical barrier to producing speech may the item be scored "9", and the examiner must clearly write an explanation for not scoring. Do not tell the patient why he/she is being tested.</p>	<p>0 = Normal.</p> <p>1 = Mild to moderate; patient slurs at least some words and, at worst, can be understood with some difficulty.</p> <p>2 = Severe; patient's speech is so slurred as to be unintelligible in the absence of or out of proportion to any dysphasia or is mute/anarthric.</p> <p>9 = Intubated or other physical barrier - explain:</p>		

Number and Type	Details	Score	Score
<p>13. Extinction and Inattention (formerly Neglect)</p> <p>Sufficient information to identify neglect may be obtained during the prior testing. If the patient has severe visual loss preventing visual double simultaneous stimulation, and the cutaneous stimuli are normal, the score is normal. If the patient has aphasia but does appear to attend to both sides, the score is normal. The presence of visual spatial neglect or anosagnosia may also be taken as evidence of neglect. Since neglect is scored only if present, the item is never untestable.</p>	<p>0 = No abnormality.</p> <p>1 = Visual, tactile, auditory, spatial, or personal inattention or extinction to bilateral simultaneous stimulation in one of the sensory modalities.</p> <p>2 = Profound hemi-inattention or hemi-inattention to more than one modality. Does not recognize own hand or orients to only one side of space.</p>		
		<p>Total Max score 42.</p>	<p>Total Max score 42.</p>





MAMA
TIP-TOP
FIFTY-FIFTY
THANKS
HUCKLEBERRY
BASEBALL PLAYER

You know how.

Down to earth.

I got home from work.

**Near the table in the
dining room.**

**They heard him speak on
the radio last night.**

Appendix 6. Modified Rankin Score

0	No symptoms.	No symptoms or limitations to participating in 'normal' activities including sport and work. No muscle weakness, no walking aid.
1	No significant disability. Able to carry out usual activities, despite some symptoms.	Participate in 'normal' activities despite some symptoms such as fatigue, low mood, swallowing difficulties, cognitive difficulties or visual disturbance. Walks independently- no walking aid. Independent with all PADL and DADL (e.g. shopping, housework, finances, driving, cooking, sport, usual hobbies).
2	Slight disability. Able to look after own affairs without assistance, but unable to carry out all previous activities.	Walk independently but may use a walking aid. Able to look after own affairs such as banking, but may have some weakness, cognitive, visual or communication difficulties that prevent them from driving, returning to work or doing all usual activities outside of the home.
3	Moderate disability. Requires some help, but able to walk unassisted.	Able to walk with or without an aid but needs help from family or carers for some ADLs inside the home.
4	Moderately severe disability. Unable to attend to own bodily needs without assistance, and unable to walk unassisted.	Requires assistance to walk and help with ADLs.
5	Severe disability. Requires constant nursing care and attention, bedridden, incontinent.	Hoist transfer, unable to sit unsupported (i.e. without the support of a chair).
6	Dead.	

Useful Questions	If 'yes' mRS =
Did they stay in bed most of the day, need constant care or use a hoist to transfer?	5
Did they need assistance from another person to walk/transfer?	4+
Did they need help with toileting, eating, bathing?	3+
Did they need any help with making a meal, household chores, managing finances?	3+
Did they use a walking aid?	2+
Did they need help with shopping or travelling close to home?	2+
Were they able to carry out all duties, hobbies and activities?	0-1

Appendix 7. CTP for Late-window MT selection

Below is extracted from the agreed Peninsula-wide SOP for 'CT Perfusion for late-window Mechanical Thrombectomy patient selection' (v1.3)

IMAGING PATHWAY – AGREED PROCESS

- A. Patient with acute anterior circulation ischaemic stroke, AND
- Proximal intracranial large artery occlusion (ICA and/or M1 segment MCA) identified by CT angiogram, causing
 - Disabling neurological deficit (NIHSS ≥ 6), with
 - Symptom onset 12-24 hours ago, 'wake up' stroke, or 'stroke with unknown onset' but last known well within last 24 hours, and with
 - No previous disability (mRS 0 or 1)

If ALL above criteria met, CTP is indicated to enable selection for MT

- B. The ED or stroke team at the referring centre determines the need for CTP to facilitate selection for MT for wake-up strokes or in the 12-24 hour window* using the above criteria (in discussion with the stroke team at Derriford if required). **The decision to request CTP must be made by the senior clinician responsible for patient care/decision-maker about reperfusion treatment.**
- C. Clinician at admitting/referring ASC refers to Derriford Hospital MT service
- D. Clinician at admitting/referring ASC requests CTP through local Radiology service
- E. CTP is performed (this is likely to require another trip to the CT scanner)
- F. The stroke team at Derriford contact INR
- G. CTP images are reviewed by INR +/- use of AI and decision made about MT.

Interpretation of CTP falls under the responsibility of the INR.**

Documentation of CTP review and decision-making is to be recorded on the referapatient portal

- H. CTP reporting:

Default report should state: "Scan acquired for stroke thrombectomy assessment".

However, the INR involved in patient care may add an addendum if felt to be necessary.

Appendix 8. Interhospital thrombectomy transfer process



Transfer for Stroke Thrombectomy

Purpose: Management of transfers between Acute Stroke Centre (ASC) to Comprehensive Stroke Unit (CSC)

Scope: This document provides a breakdown of actions to follow once the decision has been made to clinically treat and manage a patient at the CSC.

Role and responsibilities: It is the responsibility of the referring clinician to determine whether the patient is low risk or high risk and who should undertake the transfer.

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