Hyperacute Stroke Protocol - Thrombolysis and Mechanical Thrombectomy Clinical Guideline

V9.0

May 2020
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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.

1.3. **Data Protection Act 2018 (General Data Protection Regulation – GDPR) Legislation**

The Trust has a duty under the DPA18 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed and documented. We can’t rely on Opt out, it must be Opt in.

DPA18 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the DPA18 please see the ‘information use framework policy’, or contact the Information Governance Team rch-tr.infogov@nhs.net
Summary - Stroke Thrombolysis Pathway

Eligibility Criteria for consideration of IV Thrombolysis
Aged over 18 (there is no upper age limit)
Clinical symptoms of a stroke lasting for over 30 mins with clear time of symptom onset
Sufficient time available to start thrombolysis within 4.5 hours of symptom onset

ALL CRITERIA MET
Proceed with Thrombolysis Pathway

CRITERIA NOT MET
Treat per Acute Stroke Guidelines

Urgently transfer to ED
Pre-book CT brain scan in ED (and CT angiogram if within 8-3pm Monday-Friday)
Ring 4444 to alert radiographer/stroke nurse/ hyperacute stroke unit (HASU)
Transport patient straight to CT on arrival for urgent CT head scan

Initial Management
Focused history to clarify onset time and inclusion/exclusion criteria are met (see page 4).
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.
Send bloods for FBC, U&E, Clotting, Bone Profile, LFT, TFT, ESR, Glucose, Group and Save.
Record weight (if this will cause a significant delay then estimate weight). Point of care for INR.

Post CT Management
CT Head must be reviewed by Radiologist to exclude contra-indications to thrombolysis.
ED Consultant will make decision on whether to proceed with thrombolysis.
Patient consent should be obtained (see page 4).
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 (see page 4).
BP must be below 180/110 prior to thrombolysis and maintained after (see page 7).
Dose Alteplase according to weight (see page 5). Bolus can be given in Radiology Department.
Patients with a stroke secondary to an intracranial proximal large vessel occlusion may be considered for mechanical thrombectomy (see page 6).

Post-Thrombolysis Management
All patients should be transferred to HASU within 4 hours of arrival.
Record observations as per protocol for 24 hours post-thrombolysis. GCS should also be recorded 4 hourly or more often if indicated.
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 page 7 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
2. **The Guidance**

2.1. **Inclusion Criteria**

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
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</thead>
<tbody>
<tr>
<td>Age over 18 (no upper age limit)</td>
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<tr>
<td>Symptoms of acute stroke with clear onset time</td>
</tr>
<tr>
<td>Thrombolysis can be administered within 4.5 hours of symptom onset</td>
</tr>
<tr>
<td>Haemorrhage excluded on neuroimaging</td>
</tr>
</tbody>
</table>

2.2. **Exclusion Criteria**

**FROM THE HISTORY**

- Time of onset unknown
- Awoke with symptoms, unless last awake within lysis window
- Seizure at onset
- Known bleeding diathesis
- Arterial puncture at a non-compressible site, or lumbar puncture, within the last 7 days
- Major surgery within the last 14 days
- Gastrointestinal or urinary tract haemorrhage within 21 days
- Head injury, intracranial surgery or stroke within the last 3 months
- Any history of intracranial haemorrhage, brain tumour, intracranial AVM or aneurysm

**ON INITIAL ASSESSMENT**

- Coma (GCS <8; NIHSS question 1a = 3)
- Clinical presentation suggestive of subarachnoid haemorrhage (even if subsequent CT normal)
- BP greater than ≥180 systolic or ≥110 diastolic unresponsive to medical treatment (see page 8)
- Capillary glucose <2.7 (Treat as per Trust protocol)

**ON LAB RESULTS**

- Platelets <100 (only wait for FBC if known haematological disorder or on chemotherapy)
- Current **warfarin** treatment with INR > 1.7
  - Do not start treatment until INR available
- Current **apixaban/edoxaban/rivaroxaban** within 24 hrs
  - Dabigatran- check thrombin time and APPTR (a normal thrombin time and APPTR would suggest that the therapeutic effects of Dabigatran is minimal and these patients can be considered for thrombolysis)
- Current **unfractionated heparin** treatment and APTT > 1.2
  - Do not start treatment until APTT available
- Current therapeutic Low Molecular Weight Heparin (**Dalteparin, Enoxaparin**) within 24 hrs
- Plasma glucose <2.7 (Treat as per Trust protocol)

**ON CT SCAN** – reported by radiologist

- Radiological signs of intracranial haemorrhage
- Diffuse swelling of a cerebral hemisphere
2.3. Consent

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

2.3.1. 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

2.4. Alteplase Administration

Alteplase is the only agent licensed for thrombolysis of ischaemic strokes.

Administer 0.9 mg/kg body weight up to a maximum of 90mg.

10% of this dose should be administered as a IV bolus dose over 2-3 minutes. This should be prepared as a solution at 1mg/ml.

The remainder should be administered as an infusion over 60 mins.

<table>
<thead>
<tr>
<th>Estimate of patients weight (kg)</th>
<th>Equivalent Imperial weight</th>
<th>Bolus dose (mls) given over 1-2 minutes</th>
<th>Infusion dose (mls) = infusion rate in mls/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>45</td>
<td>7 st 1 lb</td>
<td>4</td>
<td>36</td>
</tr>
<tr>
<td>50</td>
<td>7 st 12 lb</td>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td>55</td>
<td>8 st 9 lb</td>
<td>5</td>
<td>44</td>
</tr>
</tbody>
</table>
### 2.5. Mechanical Thrombectomy

An Interventional Neuro-radiology service is available Monday-Friday between 8am-3pm, at Derriford Hospital, which provides the mechanical thrombectomy service.

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. Although the commissioning criteria suggests that it is only for those who have had symptom onset in the last 6 hours, evidence suggests that it can be considered (in selected group of patients) in those who developed symptoms 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 if the procedure can begin within 6 hours of symptom onset.

Mechanical thrombectomy can be performed up to 24 hours after the onset of symptoms in a Posterior Circulation Stroke (POCS). Please discuss with Stroke Consultant if in doubt.

#### 2.5.1. How to proceed

The ED consultant in charge of the patient’s care requests urgent CT angiogram (if not already done). The ED consultant discusses patient with stroke consultant on Phoenix (ext 2120/via switch).

ED or Stroke consultant contacts on call interventional neuroradiology consultant at Derriford hospital (see contact details below). Provide time of onset, NIHSS and systolic blood pressure when making referral.

ED consultant contacts Derriford neuroradiology team once CTA images uploaded and arranges urgent transfer to Derriford hospital. ED team arrange urgent ambulance transport to Derriford hospital once patient accepted.
## Derriford Hospital Mechanical Thrombectomy Referral

When making a referral - please provide: time of onset; NIHSS; systolic blood pressure

<table>
<thead>
<tr>
<th><strong>Contact Details</strong></th>
<th>Thrombectomy Pager Direct dial 07623 941 515 Derriford Switch 81515</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inclusion Criteria</strong></td>
<td>Thrombectomy can be achieved within 6 hours of onset (this can be extended to 24 hours in basilar artery thrombus)</td>
</tr>
<tr>
<td><strong>Times</strong></td>
<td>08:00 - 15:00</td>
</tr>
<tr>
<td><strong>Days</strong></td>
<td>Monday – Friday</td>
</tr>
<tr>
<td><strong>CT angio evidence</strong></td>
<td>Thrombus in intracranial carotid, and/or M1 or proximal M2 segments of middle cerebral artery, basilar artery</td>
</tr>
<tr>
<td><strong>Onset time</strong></td>
<td>Definitely known</td>
</tr>
<tr>
<td><strong>NIHSS</strong></td>
<td>With significant new disability with a score of &gt;5 on the NIHSS</td>
</tr>
<tr>
<td><strong>Plain CT</strong></td>
<td>No major ischaemic changes on plain CT or MRI</td>
</tr>
<tr>
<td><strong>Referral times</strong></td>
<td>Time to groin puncture achievable within 4.5 hrs</td>
</tr>
<tr>
<td><strong>Modified Rankin Score</strong></td>
<td>Previously independent in activities of daily living (mRS &lt;3)</td>
</tr>
<tr>
<td><strong>Exclusion criteria</strong></td>
<td>Intracranial haemorrhage</td>
</tr>
</tbody>
</table>

### 2.6. Hypertension Management

Blood pressure must be **less** than 180/110 diastolic prior to administering Alteplase, 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 a GTN infusion at a rate 0.6-12ml/hr.
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.

### 2.7. Special Circumstances

#### 2.7.1. PREGNANCY

Pregnancy or women who are post-partum – r-tPa 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.

#### 2.7.2. CHEMOTHERAPY

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

2.7.3. CHILDREN

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

2.8. Treatment of Complications after Thrombolysis

2.8.1. 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. Stop Alteplase infusion
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 Alteplase 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.

### 2.8.2. Anaphylaxis

Anaphylaxis is uncommon but can occur after receiving IV Alteplase. This should be suspected if any of the following features are present:
- Urticarial rash
- Bronchospasm
- Angioedema
- Shock

If an Anaphylaxis is suspected:

1. Stop Alteplase infusion immediately
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 Hydrocortisone 200mg
5. IV Chlorphenamine 10mg
6. IV fluid challenge with 500-1000ml saline of hypotensive/shocked
7. Inform Critical Care Team

### 2.8.3. 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.

### 2.8.4. 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 < 3 years
• Significant co-morbidities

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

2.9. 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 ext 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 3 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.

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

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Outcome of thrombolysis for individual patients</th>
</tr>
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<tbody>
<tr>
<td>Lead</td>
<td>Dr Katja Adie, Consultant</td>
</tr>
<tr>
<td>Tool</td>
<td>Sentinel Stroke National Audit Programme (SSNAP) from the Royal College of Physicians</td>
</tr>
<tr>
<td>Frequency</td>
<td>Each thrombolysed patients details and outcomes are entered on to SSNAP</td>
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<tr>
<td>Reporting arrangements</td>
<td>Dr Adie 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 &amp; Outcomes Program on an ongoing basis. SSNAP data is reported and published nationally and monitored by the Clinical Commissioning Group</td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>Dr Adie, Dr Harrington</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Required changes to practice will be identified and actioned within six months. Dr Adie and Dr Harrington as lead members of the team will take each change forward where appropriate.</td>
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</table>

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 & 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

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Hyperacute Stroke Protocol - Thrombolysis and Mechanical Thrombectomy Clinical Guideline V9.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>6&lt;sup&gt;th&lt;/sup&gt; April 2020</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>May 2020</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>May 2023</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Katja Adie, Consultant, ElderCare Department</td>
</tr>
<tr>
<td>Contact details:</td>
<td>07717 714009</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>Guideline for administration of intravenous thrombolysis and mechanical thrombectomy for acute ischaemic stroke</td>
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<tr>
<td>Suggested Keywords:</td>
<td>Stroke, Thrombectomy, Thrombolysis, Alteplase</td>
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<tr>
<td>Target Audience</td>
<td>RCHT</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>6&lt;sup&gt;th&lt;/sup&gt; April 2020</td>
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<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Stroke Thrombolysis Guideline V8.0</td>
</tr>
<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>ElderCare governance group 7/2/2020 ED governance group 26/2/2020</td>
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<tr>
<td>Care Group Manager confirming approval processes</td>
<td>Johanna Floyd</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not Required</td>
</tr>
<tr>
<td>Name and Signature of Care Group / Directorate Governance Lead confirming approval by specialty and divisional management meetings</td>
<td>{Original Copy Signed} Paul Evangelista</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet</td>
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<tr>
<td>Document Library Folder/Sub Folder</td>
<td>Clinical / Stroke</td>
</tr>
<tr>
<td>Links to key external standards</td>
<td>NICE Guidance NG128 – 2019</td>
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<tr>
<td>Related Documents:</td>
<td>Acute Stroke Management Stroke and TIA Multidisciplinary Care Pathway Secondary Prevention after Stroke or TIA</td>
</tr>
</tbody>
</table>
References:

1. NICE Guidance TA 122 - Alteplase for the treatment of acute ischaemic stroke


   https://www.nice.org.uk/guidance/ng128/chapter/Recommendations#thrombectomy-for-
   people-with-acute-ischaemic-stroke

   https://www.thelancet.com/action/showPdf?pii=S0140-6736%2814%2960584-5


Training Need Identified? Yes. Learning and Development department have been informed.

Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<tr>
<td>July 2008</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td>Dr F Harrington</td>
</tr>
<tr>
<td>Dec 2010</td>
<td>V2.0</td>
<td>Amendment to 24/7 service</td>
<td>Dr F Harrington</td>
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<td>3/9/12</td>
<td>V3.0</td>
<td>Extended age and treatment window</td>
<td>Dr F Harrington</td>
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<tr>
<td>21/1/14</td>
<td>V4.0</td>
<td>Change of service provision from Eldercare to Emergency Department team</td>
<td>Dr F Harrington</td>
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<tr>
<td>Date</td>
<td>Version</td>
<td>Update Description</td>
<td>Authors</td>
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<td>2/10/2015</td>
<td>V5.0</td>
<td>Availability of intra-arterial treatment</td>
<td>Dr F Harrington Dr K Adie A James</td>
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<tr>
<td>11/11/2016</td>
<td>V6.0</td>
<td>Updated Evidence and change in pathway</td>
<td>Dr K Adie Dr F Harrington</td>
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<tr>
<td>07/07/2017</td>
<td>V7.0</td>
<td>Updated Evidence</td>
<td>Dr K Adie Dr F Harrington</td>
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<tr>
<td>11/07/2018</td>
<td>V8.0</td>
<td>Update with changes in pathway</td>
<td>Dr K Adie</td>
</tr>
<tr>
<td>6/4/2020</td>
<td>V9.0</td>
<td>Update with evidence NICE 2019</td>
<td>Dr K Adie</td>
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This document is to be retained for 10 years from the date of expiry.

This document is only valid on the day of printing

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Appendix 2. Initial Equality Impact Assessment Form

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed</th>
<th>Directorate and service area:</th>
<th>Is this a new or existing document:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperacute Stroke Protocol - Thrombolysis and Mechanical Thrombectomy Clinical Guideline V9.0</td>
<td>Urgent, Emergency &amp; Trauma Medicine/Stroke</td>
<td>Existing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of individual completing assessment:</th>
<th>Telephone:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Katja Adie</td>
<td>07717 714009</td>
</tr>
</tbody>
</table>

1. **Policy Aim***
   - **Who is the strategy / policy / proposal / service function aimed at?**
     - 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 the 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)**

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**
   - **Workforce** | **Patients** | **Local groups** | **External organisations** | **Other**
   - X

   **Please record specific names of groups**
   - Eldercare governance meeting
   - Stroke operational group meeting

   **What was the outcome of the consultation?**
   - Ratified

### 7. The Impact

Please complete the following table. **If you are unsure/don't know if there is a negative impact you need to repeat the consultation step.**

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td>✔</td>
<td></td>
<td></td>
<td><strong>Removal of upper age limit for stroke thrombolysis based on recent randomised controlled trials</strong></td>
</tr>
</tbody>
</table>

Hyperacute Stroke Protocol - Thrombolysis and Mechanical Thrombectomy Clinical Guideline V9.0
<table>
<thead>
<tr>
<th>Protected Characteristics</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex (male, female, trans-gender / gender reassignment)</td>
<td></td>
</tr>
<tr>
<td>Race / Ethnic communities /groups</td>
<td></td>
</tr>
<tr>
<td>Disability - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.</td>
<td></td>
</tr>
<tr>
<td>Religion / other beliefs</td>
<td></td>
</tr>
<tr>
<td>Marriage and Civil partnership</td>
<td></td>
</tr>
<tr>
<td>Pregnancy and maternity</td>
<td></td>
</tr>
<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td></td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:
- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation - this excludes any *policies* which have been identified as not requiring consultation. or
- Major this relates to service redesign or development

8. Please indicate if a full equality analysis is recommended.  
   - Yes  
   - No ✔

9. If you are *not* recommending a Full Impact assessment please explain why.

There are no adverse effects on any of the protected characteristics.

<table>
<thead>
<tr>
<th>Date of completion and submission</th>
<th>6th April 2020</th>
<th>Members approving screening assessment</th>
<th>Policy Review Group (PRG)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>APPROVED</td>
</tr>
</tbody>
</table>
Appendix 3. NIHSS

### 3. Visual:
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.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No visual loss.</td>
</tr>
<tr>
<td>1</td>
<td>Partial hemianopia.</td>
</tr>
<tr>
<td>2</td>
<td>Complete hemianopia.</td>
</tr>
<tr>
<td>3</td>
<td>Bilateral hemianopia (blind including cortical blindness).</td>
</tr>
</tbody>
</table>

### 4. Facial Palsy:
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.

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Normal symmetrical movement.</td>
</tr>
<tr>
<td>1</td>
<td>Minor paralysis (flattened nasolabial fold, asymmetry on smiling).</td>
</tr>
<tr>
<td>2</td>
<td>Partial paralysis (total or near total paralysis of lower face).</td>
</tr>
<tr>
<td>3</td>
<td>Complete paralysis (absence of facial movement in the upper and lower face).</td>
</tr>
</tbody>
</table>

### 5-8. Motor Arm and Leg:
The limb is placed in the appropriate position: extend the arms 90 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”.

<table>
<thead>
<tr>
<th>Arm</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No drift, arm holds 90 (or 45) degrees for full 10 seconds.</td>
</tr>
<tr>
<td>1</td>
<td>Drift, arm holds 90 (45) degrees, but drifts down before full 10 seconds; does not hit bed or other support.</td>
</tr>
<tr>
<td>2</td>
<td>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.</td>
</tr>
<tr>
<td>3</td>
<td>No effort against gravity, arm falls.</td>
</tr>
<tr>
<td>4</td>
<td>No movement.</td>
</tr>
<tr>
<td>9</td>
<td>Amputation, joint fusion -explain:</td>
</tr>
</tbody>
</table>

#### 5. Right Arm

#### 6. Left Arm

#### Leg

<table>
<thead>
<tr>
<th>Leg</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No drift, leg holds 30 degrees position for full 5 seconds.</td>
</tr>
<tr>
<td>1</td>
<td>Drift, leg falls by the end of the 5 second period but does not hit bed.</td>
</tr>
<tr>
<td>2</td>
<td>Some effort against gravity, leg falls to bed by 5 seconds, but has some effort against gravity.</td>
</tr>
<tr>
<td>3</td>
<td>No effort against gravity, leg falls to bed immediately.</td>
</tr>
<tr>
<td>4</td>
<td>No movement.</td>
</tr>
<tr>
<td>9</td>
<td>Amputation, joint fusion -explain:</td>
</tr>
</tbody>
</table>

#### 7. Right Leg
8. = Left Leg

9. **Limb Ataxia:**
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.

- **0 = Absent.**
- **1 = Present in one limb.**
- **2 = Present in two limbs.**

10. **Sensory:**
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.

- **0 = Normal; no sensory loss.**
- **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.**
- **2 = Severe to total sensory loss; patient is not aware of being touched.**

11. **Best Language:**
A great deal of information about comprehension will be obtained during the preceding sections of the 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 does not respond.

- **0 = No aphasia, normal.**
- **1 = Mild to moderate aphasia; some obvious loss of fluency 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.**
- **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**
| 12. Dysarthria: | 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. | 0 = Normal.  
1 = Mild to moderate; patient slurs at least some words and, at worst, can be understood with some difficulty.  
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.  
9 = Intubated or other physical barrier - explain: --- | 
| 13. Extinction and Inattention (formerly Neglect) | 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. | 0 = No abnormality.  
1 = Visual, tactile, auditory, spatial, or personal inattention or extinction to bilateral simultaneous stimulation in one of the sensory modalities.  
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. | --- | --- |
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.
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°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
1.4 Pharmacological treatments and thrombectomy for people with acute stroke (3)

Thrombolysis with alteplase for people with acute ischaemic stroke

1.4.1 Alteplase is recommended within its marketing authorisation for treating acute ischaemic stroke in adults if:
- treatment is started as soon as possible within 4.5 hours of onset of stroke symptoms and
- intracranial haemorrhage has been excluded by appropriate imaging techniques.[2008]

[This recommendation is from NICE’s technology appraisal guidance on alteplase for treating acute ischaemic stroke.]

1.4.2 Administer alteplase only within a well organised stroke service with:
- staff trained in delivering thrombolysis and in monitoring for any complications associated with thrombolysis
- nursing staff trained in acute stroke and thrombolysis to provide level 1 and level 2 care
- immediate access to imaging and re-imaging, and staff trained to interpret the images. [2008, amended 2019]

1.4.3. Staff in emergency departments, if appropriately trained and supported, can administer alteplase for the treatment of ischaemic stroke provided that patients can be managed within an acute stroke service with appropriate neuroradiological and stroke physician support. [2008]

1.4.4 Ensure that protocols are in place for delivering and managing intravenous thrombolysis, including post-thrombolysis complications. [2008]

Thrombectomy for people with acute ischaemic stroke

1.4.5 Offer thrombectomy as soon as possible and within 6 hours of symptom onset, together with intravenous thrombolysis (if not contraindicated and within the licensed time window), to people who have:
- acute ischaemic stroke and
- confirmed occlusion of the proximal anterior circulation demonstrated by computed tomographic angiography (CTA) or magnetic resonance angiography (MRA)

taking into account the factors in recommendation 1.4.8. [2019]

1.4.6 Offer thrombectomy as soon as possible to people who were last known to be well between 6 hours and 24 hours previously (including wake-up strokes):
- who have acute ischaemic stroke and confirmed occlusion of the proximal anterior circulation demonstrated by CTA or MRA and
- if there is the potential to salvage brain tissue, as shown by imaging such as CT perfusion or diffusion-weighted MRI sequences showing limited infarct core volume

taking into account the factors in recommendation 1.4.8. [2019]
1.4.7 Consider thrombectomy together with intravenous thrombolysis (where not contraindicated and within the licensed time window) as soon as possible for people last known to be well up to 24 hours previously (including wake-up strokes):

- who have acute ischaemic stroke and confirmed occlusion of the proximal posterior circulation (that is, basilar or posterior cerebral artery) demonstrated by CTA or MRA and
- if there is the potential to salvage brain tissue, as shown by imaging such as CT perfusion or diffusion-weighted MRI sequences showing limited infarct core volume

taking into account the factors in recommendation 1.4.8.[2019]

1.4.8 Take into account the person's overall clinical status and the extent of established infarction on initial brain imaging to inform decisions about thrombectomy. Select people who have (in addition to the factors in recommendations 1.4.5 to 1.4.7):

- a pre-stroke functional status of less than 3 on the modified Rankin scale and
- a score of more than 5 on the National Institutes of Health Stroke Scale (NIHSS).[2019]