Hyper Acute Stroke

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Definition of Stroke / TIA
Hyper Acute Stroke
HASU
IV Thrombolysis
Basics of Thrombectomy

Stroke nurse’s role in HASU :
Mr Mar Nadal, Stroke assessment nurse
Definition of Stroke / TIA

**Stroke**: “rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with **symptoms lasting 24 hours or longer** or leading to death, with no apparent cause other than of vascular origin”

**Transient ischemic attack (TIA)**: rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with **symptoms last less than 24 hours**, and patients with stroke symptoms caused by subdural haemorrhage, tumours, poisoning, or trauma are excluded.

*The World Health Organization (WHO) definition of stroke*
What causes Stroke?

85% of Strokes are due to
   Thrombosis
   Embolism

Heamorrhage

Rare causes:
Cerebral Venous thrombosis (Heamorrhagic)
Thrombus (Clot)
Risk Factors for forming thrombus

- Hypercholesterolaemia
- Smoking
- Diabetes
- Hypertension
- Hypercoagulation states - Polycythaemia
- Medications – Vit K, OCP
Embolism
Risk factors for Embolic stroke

- Atrial Fibrillation / Flutter
- Left Ventricular Clot
- Valvular Heart Disease
- Infective Endocarditis
- Dislodging Carotid Artery Plague
Patients presenting **within 6 hours of rapidly developing clinical signs** of focal (or global) disturbance of cerebral function
Is stroke Important?

- 150,000 stroke patients a year in the UK
- One person every five minutes
- Stroke is the third most common cause of death in the UK
- Stroke affects any age, any sex, any race
  - 20,000 strokes under age 65yrs
“We should seek to optimise acute stroke services to ensure 24/7 access to specialist care (including thrombolysis) and prompt admission to acute stroke units, reconfiguring services where necessary to ensure high-quality, safe and effective care for all those experiencing stroke”
Summary of stroke service models pre- and post-centralisation
Hyper Acute Stroke Unit (HASU)

- bring experts and equipment under one roof to provide world-class treatment 24 hours a day
- reducing death rates and long-term disability
HASU

MDT / Transfer of Care

Early treatment

High Dependency Care
HASU Team

- Medical
- Nursing
- MDT
- Radiology
Rapid Assessment

How do we diagnose Stroke?

(a) (b) (c) (d)
FAST

- **F - Face Drooping** - Does one side of the face droop or is it numb? Ask the person to smile.
- **A - Arm Weakness** - Is one arm weak or numb? Ask the person to raise both arms. Does one arm drift downward?
- **S - Speech Difficulty** - Is speech slurred? Are they unable to speak, or are they hard to understand? Ask the person to repeat a simple sentence like: “The sky is blue.” Is the sentence repeated correctly?
- **T - Time to call 999** - If the person shows any of these symptoms, even if the symptoms go away, call 999 and get them to the hospital immediately.
• ROSIER

• Recognition of Stroke in the Emergency Room

• 5 positive questions: Favours Stroke/TIA
• 2 Negative Questions: Favours Stroke Mimics
Number (%) 

<table>
<thead>
<tr>
<th>ROSIER Score</th>
<th>Stroke or TIA(n)</th>
<th>Stroke mimic(n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>-1</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>0</td>
<td>47</td>
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</tr>
<tr>
<td>1</td>
<td>56</td>
<td>68</td>
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<td>103</td>
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<td>3</td>
<td>76</td>
<td>43</td>
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<td>4</td>
<td>67</td>
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<tr>
<td>5</td>
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</tbody>
</table>

Does use of the recognition of stroke in the emergency room stroke assessment tool enhance stroke recognition by ambulance clinicians?


**Abstract**

**BACKGROUND AND PURPOSE:**
U.K. ambulance services assess patients with suspected stroke using the Face Arm Speech Test (FAST). The Recognition Of Stroke In the Emergency Room (ROSIER) tool has been shown superior to the FAST in identifying strokes in emergency departments but has not previously been tested in the ambulance setting. We investigated whether ROSIER use by ambulance clinicians can improve stroke recognition.

**METHODS:**
Ambulance clinicians used the ROSIER in place of the FAST to assess patients with suspected stroke. As the ROSIER includes all FAST elements, we calculated a FAST score from the ROSIER to enable comparisons between the two tools. Ambulance clinicians' provisional stroke diagnoses using the ROSIER and calculated FAST were compared with stroke consultants' diagnosis. We used stepwise logistic regression to compare the contribution of individual ROSIER and FAST items and patient demographics to the prediction of consultants' diagnoses.

**RESULTS:**
Sixty-four percent of strokes and 78% of nonstrokes identified by ambulance clinicians using the ROSIER were subsequently confirmed by a stroke consultant. There was no difference in the proportion of strokes correctly detected by the ROSIER or FAST with both displaying excellent levels of sensitivity. The ROSIER detected marginally more nonstroke cases than the FAST, but both demonstrated poor specificity. Facial weakness, arm weakness, seizure activity, age, and sex predicted consultants' diagnosis of stroke.

**CONCLUSIONS:**
The ROSIER was not better than the FAST for prehospital recognition of stroke. A revised version of the FAST incorporating assessment of seizure activity may improve stroke identification and decision making by ambulance clinicians.
National Institutes of Health Stroke Scale

- Enables the healthcare provider to rapidly determine the severity and possible location of the stroke

- NIHSS scores are strongly associated with outcome

- can help to identify those patients who are likely to benefit from reperfusion therapies and those who are at higher risk of developing complications from the stroke itself and potential reperfusion strategies

- focuses on the following 6 major areas of the neurologic examination:
  - Level of consciousness
  - Visual function
  - Motor function
  - Sensation and neglect
  - Cerebellar function
  - Language
History

- A focused medical history
- Identify risk factors for atherosclerotic and cardiac disease
- History cannot differentiate ischaemic from haemorrhagic stroke

In younger patients, elicit a history of the following:

- Recent trauma
- Coagulopathies
- Illicit drug use (especially cocaine)
- Migraines
- Oral contraceptive use
The physical examination always includes a careful head and neck examination for signs of trauma, infection, and meningeal irritation.

Identify conditions that may influence treatment decisions (eg, recent surgery or trauma, active bleeding, active infection).
Neurological examination

Perform a brief but accurate neurologic examination on patients with suspected stroke syndromes

The goals of the neurologic examination:

- Confirming the presence of a stroke syndrome
- Distinguishing stroke from stroke mimics
- Establishing a neurologic baseline (including documenting an NIH Stroke Scale) should the patient's condition improve or deteriorate
- Establishing stroke severity to assist in prognosis and therapeutic selection (based on potential disability due to current neurologic deficits)
HASU

Rapid Assessment

MDT / Transfer of Care

High Dependency Care

EARLY TREATMENT
### Thrombolysis for acute ischaemic stroke

**Review**: Thrombolysis for acute ischaemic stroke  
**Comparison**: 1 Any thrombolytic agent versus control  
**Outcome**: 1 Deaths from all causes within seven to ten days

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Treatment n/N</th>
<th>Control n/N</th>
<th>Peto Odds Ratio Peto,Fixed,95% CI</th>
<th>Weight</th>
<th>Peto Odds Ratio Peto,Fixed,95% CI</th>
</tr>
</thead>
</table>
| **1 Intravenous Urokinase vs control**  
Chinese UK 2003  
23/317 | 8/148 | 7.6 % | 1.35 [0.62, 2.94] |
| **Subtotal (95% CI)** | **317** | **148** | **7.6 %** | **1.35 [0.62, 2.94]** |
| Total events: 23 (Treatment), 8 (Control)  
Heterogeneity: not applicable  
Test for overall effect: Z = 0.74 (P = 0.46) |
| **2 Intravenous Streptokinase vs control**  
ASK 1996  
31/174 | 18/166 | 12.8 % | 1.76 [0.96, 3.22] |
| MAST-I 1995  
30/157 | 20/156 | 12.8 % | 1.60 [0.87, 2.92] |
| MAST-E 1996  
53/156 | 28/154 | 18.2 % | 2.26 [1.36, 3.75] |
| **Subtotal (95% CI)** | **487** | **476** | **43.8 %** | **1.90 [1.37, 2.63]** |
| Total events: 114 (Treatment), 66 (Control)  
Heterogeneity: Chi² = 8.4, df = 2 (P = 0.06); I² = 0.0%  
Test for overall effect: Z = 3.84 (P = 0.0012) |
| **3 Intravenous tPA vs control**  
Mori 1992  
2/19 | 2/12 | 10.0 % | 0.59 [0.07, 4.91] |
| Haley 1993  
1/14 | 3/13 | 1.1 % | 0.30 [0.04, 2.39] |
| ECASS 1995  
37/313 | 26/307 | 17.2 % | 1.44 [0.86, 2.43] |
| ECASS II 1998  
25/409 | 20/391 | 12.9 % | 1.21 [0.66, 2.20] |
| **Subtotal (95% CI)** | **755** | **723** | **32.2 %** | **1.24 [0.85, 1.81]** |
| Total events: 65 (Treatment), 51 (Control)  
Heterogeneity: Chi² = 2.61, df = 3 (P = 0.45); I² = 0.0%  
Test for overall effect: Z = 1.10 (P = 0.27) |
| **4 Intravenous Streptokinase + oral aspirin vs oral aspirin**  
MAST-I 1995  
53/156 | 16/153 | 16.3 % | 3.86 [2.26, 6.59] |
| **Subtotal (95% CI)** | **156** | **153** | **16.3 %** | **3.86 [2.26, 6.59]** |
| Total events: 53 (Treatment), 16 (Control)  
Heterogeneity: not applicable  
Test for overall effect: Z = 4.95 (P < 0.00001) |
| **Total (95% CI)** | **1715** | **1500** | **100.0 %** | **1.81 [1.46, 2.24]** |
| Total events: 255 (Treatment), 141 (Control)  
Heterogeneity: Chi² = 15.64, df = 8 (P = 0.05); I² = 49%  
Test for overall effect: Z = 5.38 (P = 0.000001)  
Test for subgroup differences: Chi² = 12.12, df = 3 (P = 0.01), I² = 75% |

Cochrane Database of Systematic Reviews  
21 JUL 2003 DOI: 10.1002/14651858.CD000213  
Authors' conclusions

- Thrombolytic therapy appears to result in a
  - significant net reduction in the proportion of patients dead or dependent in activities of daily living.

- Trials using intravenous recombinant tissue plasminogen activator,
  - suggest that it may be associated with less hazard and more benefit
  - justify the use of thrombolytic therapy with intravenous recombinant tissue plasminogen activator in experienced centres in highly selected patients

- However, the data do not support the widespread use of thrombolytic therapy in routine clinical practice at this time, but suggest that further trials are needed to identify which patients are most likely to benefit from treatment and the environment in which it may best be given.
Association of outcome with early stroke treatment: pooled analysis of ATLANTIS, ECASS, and NINDS rt-PA stroke trials

The ATLANTIS, ECASS, and NINDS rt-PA Study Group Investigators

Summary

Background Quick administration of intravenous recombinant tissue plasminogen activator (rt-PA) after stroke improved outcomes in previous trials. We aimed to analyse combined data for individual patients to confirm the importance of rapid treatment.

Methods We pooled common data elements from six randomised placebo-controlled trials of intravenous rt-PA. Using multivariable logistic regression we assessed the relation of the interval from stroke onset to start of treatment (OTT) on favourable 3-month outcome and on the occurrence of clinically relevant parenchymal haemorrhage.

Findings Treatment was started within 360 min of onset of stroke in 2775 patients randomly allocated to rt-PA or placebo. Median age was 68 years, median baseline National Institute of Health Stroke Scale (NIHSS) 11, and median OTT 243 min. Odds of a favourable 3-month outcome increased as OTT decreased (p=0.005). Odds were 2.8 (95% CI 1.8–4.5) for 0–90 min, 1.6 (1.1–2.2) for 91–180 min, 1.4 (1.1–1.9) for 181–270 min, and 1.2 (0.9–1.5) for 271–360 min in favour of the rt-PA group. The hazard ratio for death adjusted for baseline NIHSS was not different from 1.0 for the 0–90, 91–180, and 181–270 min intervals; for 271–360 min it was 1.45 (1.02–2.07). Haemorrhage was seen in 82 (5.9%) rt-PA patients and 15 (1.1%) controls (p<0.0001). Haemorrhage was not associated with OTT but was with rt-PA treatment (p=0.0001) and age (p=0.0002).

Interpretation The sooner that rt-PA is given to stroke patients, the greater the benefit, especially if started within 90 min. Our results suggest a potential benefit beyond 3 h, but this potential might come with some risks.

Lancet 2004; 363: 168–74

Introduction

Thrombolysis with intravenous rt-PA is effective for strokes due to acute cerebral ischaemia when given within 3 h of symptom onset. In six large, multicentre, randomised, placebo-controlled trials researchers tested the benefits of rt-PA for acute stroke within 6 h of onset. The investigators used similar doses of rt-PA and had common outcome measures, but the maximum time allowed to start rt-PA infusion ranged from 3 to 6 h. The most appropriate interval for beginning thrombolytic treatment remains to be clarified. Better understanding of the therapeutic window for intravenous rt-PA is important because the short time currently allocated for treatment is the greatest barrier to wider application of thrombolytic therapy.

The chance of benefit from intravenous rt-PA diminishes as time elapses during the first 3 h after onset of the stroke. By combining individual patient’s data from six trials, we have extended this analysis to 6 h. The trials were: two National Institute of Neurological Disorders and Stroke (NINDS) trials (parts 1 and 2, 3-h window), two ECASS trials (6-h window), and two ATLANTIS trials (part A, 6-h window and part B, 5-h window). We sought to determine whether time-to-treatment with intravenous thrombolytic therapy is a critical predictor of therapeutic benefit.

Methods

Patients

The trials we analysed represent all major investigations of rt-PA for acute stroke and more than 99% of all patients treated with intravenous rt-PA in randomised controlled clinical trials of acute ischaemic stroke identified in an ongoing cumulative meta-analysis. From all investigations of rt-PA identified in that meta-analysis, the results of only one small (n=27) randomised pilot feasibility trial were not included because different endpoints were used. For our combined analysis, a neuroradiologist (RvK) assessed all CT scans of patients
<table>
<thead>
<tr>
<th>Time Period</th>
<th>Placebo (n)</th>
<th>rt-PA (n)</th>
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</thead>
<tbody>
<tr>
<td><strong>Modified Rankin Scale 0–90 min</strong></td>
<td>10</td>
<td>22</td>
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<td>40</td>
<td>19</td>
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<tr>
<td><strong>Modified Rankin Scale 91–180 min</strong></td>
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<td>16</td>
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<tr>
<td><strong>Modified Rankin Scale 181–270 min</strong></td>
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<td>20</td>
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<td>17</td>
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<tr>
<td><strong>Modified Rankin Scale 271–360 min</strong></td>
<td>15</td>
<td>18</td>
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<td></td>
<td>21</td>
<td>19</td>
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<td>8</td>
<td>9</td>
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<td></td>
<td>10</td>
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</tbody>
</table>

Figure 4: Modified Rankin Scale measurement at day 90
0–90 min, n=311; 91–180 min, n=618; 181–270 min, n=801; 270–360 min, n=1046. Values do not equal 100% because of rounding.
Thrombolysis with Alteplase 3 to 4.5 Hours after Acute Ischemic Stroke

Intravenous thrombolytic treatment with alteplase, initiated within 3 hours after the onset of symptoms, is the only medical therapy currently available for acute ischemic stroke. In 1995, the National Institute of Neurological Disorders and Stroke (NINDS) study group reported that patients with acute ischemic stroke who received alteplase (0.9 mg per kilogram of body weight) within 3 hours after the onset of symptoms were at least 30% more likely to have minimal or no disability at 3 months than those who received placebo.\(^1\) Two European trials, the European Cooperative Acute Stroke Study (ECASS) and ECASS II, investigated a time window of up to 6 hours but failed to show the efficacy of thrombolytic treatment, as defined by each trial.\(^2,3\)

A subsequent analysis of the NINDS study\(^4\) and the combined analysis\(^5\) of data from six randomized trials,\(^1-3,6,7\) which investigated thrombolysis treatment for ischemic stroke in a total of 2775 patients, showed a clear association between treatment efficacy and the interval between the onset of symptoms and administration of the thrombolytic agent. In the pooled analysis, a favorable outcome was observed even if treatment was given between 3 and 4.5 hours, with an odds ratio of 1.4 for a favorable outcome with alteplase treatment as compared with placebo. This analysis also suggested that the longer time window, as compared with the shorter window, was not associated with higher rates of symptomatic intracranial hemorrhage or death.\(^5\) International
Benefits and Risks

- The chief benefit: improved final functional outcome through reperfusion salvage of threatened tissue

- The chief risk is intracerebral haemorrhage
  - Intravenous thrombolysis, about 6% of patients have intracerebral haemorrhage associated with early worsening
  - Intra-arterial thrombolysis, about 10% of patients have major early haemorrhage – majority in already infarcted areas and do not clearly alter final outcome

- Other less frequent complications of thrombolytics include systemic haemorrhage, angioedema and allergic reactions
Thrombolysis

Main inclusion criteria

- Acute ischemic stroke
- Age: 18 to 80 years
- Onset of stroke symptoms 3 to 4.5 hours before initiation of study-drug administration
- Stroke symptoms present for at least 30 minutes with no significant improvement before treatment
Main exclusion criteria

- Intracranial **haemorrhage**: Evidence of intracranial haemorrhage (ICH) on the CT-scan
- Time of symptom onset unknown
- Symptoms rapidly improving or only minor before start of infusion
- **Severe stroke** as assessed clinically (e.g., NIHSS score >25) or stroke involving more than one third of the middle cerebral artery territory by appropriate imaging techniques
- **Seizure** at the onset of stroke
- Stroke or serious head trauma within the previous 3 months
- Combination of previous stroke and diabetes mellitus
- Administration of **heparin within the 48 hours** preceding the onset of stroke, with an activated partial-thromboplastin
- **New Oral anticoagulant within the 48 hours** preceding the onset of stroke
- **INR > 1.7**
- time at presentation exceeding the upper limit of the normal range
- Platelet count of less than 100,000 per cubic millimetre
- Systolic pressure greater than 185 mm Hg or diastolic pressure greater than 110 mm Hg, or aggressive treatment (intravenous medication) necessary to reduce blood pressure to these limits
- Blood glucose less than 50 mg per deciliter or greater than 400 mg per deciliter
- Symptoms suggestive of subarachnoid haemorrhage, even if CT scan was normal
- Major surgery or severe trauma within the previous 3 months
- Other major disorders associated with an increased risk of bleeding
Changes in final outcome as a result of treatment:

- **Green**: Normal or nearly normal
- **Light Green**: Better
- **White**: No major change
- **Red**: Worse
- **Maroon**: Severely disabled or dead

Early course:
- □ No early worsening with brain bleeding
- — Early worsening with brain bleeding
Table 1

Health system factors associated and not associated with higher thrombolysis rates

<table>
<thead>
<tr>
<th>Health system factors</th>
<th>Studies finding no association with higher thrombolysis rate</th>
<th>Studies finding a significant association with higher thrombolysis rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel time and location (environmental restructuring)³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shorter transport time or distance to hospital</td>
<td>[48–51]</td>
<td>[52, 53]</td>
</tr>
<tr>
<td>Urban (vs rural)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Centralised (hub model)</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Training, skills and expertise (training and education)³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treated by a neurologist</td>
<td></td>
<td>[49, 56], [58] (no statistical test)</td>
</tr>
<tr>
<td>Admitted to or treated in a neurology department or stroke unit</td>
<td>[59]</td>
<td></td>
</tr>
<tr>
<td>Academic teaching hospital</td>
<td>[59]</td>
<td></td>
</tr>
<tr>
<td>Continuing medical education formal stroke training</td>
<td>[53, 62]</td>
<td></td>
</tr>
<tr>
<td>Higher volume of stroke admissions/number of neuro beds</td>
<td>[56, 59]</td>
<td></td>
</tr>
<tr>
<td>Accreditation as medical centre</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Facilities and staffing (service provision)³</td>
<td></td>
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<tr>
<td>Emergency medical services or emergency department</td>
<td>[53]</td>
<td></td>
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<tr>
<td>Neurologists, stroke nurse, stroke unit or team</td>
<td>[53]</td>
<td>[25, 61, 62, 67]</td>
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<tr>
<td>Neurological neuroradiology services</td>
<td>[62]</td>
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<tr>
<td>Laboratory services</td>
<td>[25, 62]</td>
<td></td>
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<tr>
<td>Larger/higher volume hospital</td>
<td>[56, 61]</td>
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<tr>
<td>Arrival during “on” hours</td>
<td>[57, 70]</td>
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<tr>
<td>Arrival on weekend</td>
<td>[70]</td>
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<tr>
<td>24 h or rapid CT/MRI</td>
<td>[62]</td>
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<tr>
<td>Intensive care unit (cat 1)</td>
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<td>Stroke allocated beds</td>
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<tr>
<td>Organisational elements (guidelines and regulations)³</td>
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<tr>
<td>Commitment of medical organisation or stroke centre director</td>
<td>[25]</td>
<td>[62]</td>
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<tr>
<td>Quality improvement outcomes or activities</td>
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<td></td>
</tr>
<tr>
<td>Pre-hospital notifications or triage tool</td>
<td>[23, 74]</td>
<td></td>
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<tr>
<td>Stroke-related certification</td>
<td>[76]</td>
<td></td>
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<tr>
<td>Ambulance agreements/protocols or training</td>
<td>[33]</td>
<td>[33] (borderline positive association)</td>
</tr>
<tr>
<td>Who interprets CT</td>
<td>[25]</td>
<td></td>
</tr>
<tr>
<td>Stroke-specific protocols</td>
<td>[62] (acute stroke protocol)</td>
<td>[25, 33, 62]</td>
</tr>
<tr>
<td>Transfer by a mobile emergency team or ambulance</td>
<td>-</td>
<td>[48, 50, 78, 79]</td>
</tr>
</tbody>
</table>

³Terms in parentheses refer to BCW intervention functions and policy categories

bSignificant in univariate analysis only
Thrombectomy

- Evidence from clinical trials
  - suggests that faster times to reperfusion lead to better clinical outcomes, and
  - IV rt-PA remains the standard of care for patients with acute stroke presenting within 4.5 hours of stroke onset and experiencing significant neurologic deficits

- Results from recent randomized controlled trials (MR CLEAN, ESCAPE, EXTEND-IA, and SWIFT PRIME)
  - confirm that endovascular intervention using stent retrievers in patients with acute stroke and proximal intracranial artery occlusions improves recanalization and functional outcomes beyond what is possible with IV rt-PA alone
Endovascular mechanical thrombectomy devices
EndoVascular Treatment (Thrombectomy)

Agreed evidence based criteria: NHS England

1. Thrombectomy (arterial puncture) can be achieved within 6 hours of the onset of symptoms, unless advanced brain imaging (perfusion or multiphase computed tomography angiography (CTA) indicates substantial salvageable brain tissue is still present up to 12 hours after the onset of symptoms. AND either:

   a. Where there has been an inadequate response to intravenous thrombolysis by the time of groin puncture OR

   b. for patients who are unable to receive intravenous thrombolysis because they are on anticoagulants or have had recent surgery

   AND

2. Where a proximal occlusion (intracranial carotid; and/or, M1 or proximal M2 segments of middle cerebral artery) in the anterior cerebral circulation is demonstrated on vascular imaging
AND

3. Where there are no major ischaemic changes on plain Computed Tomography (CT) or MRI brain scan

AND

4. With significant new disability with a score of $>5$ on the National Institute of Health Stroke Score (NIHSS)

AND

5. Previously independent in activities of daily living (Modified Rankin score less than 3)
Haemorrhagic Stroke
Risk factors for Haemorrhagic Stroke

- HYPERTENSION
- Cerebral Aneurysms
- AV Malformations
- Anticoagulants
- Cortical amyloid angiopathy
A Nursing Perspective on Stroke Thrombolysis

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Stroke nurse’s role in HASU

- Rapid assessment of stroke patients
- Arrange early CT head scan
- Thrombolysis of suitable patients
- Facilitate stroke referrals
- Support to junior staff
- Management of stroke beds
- Transfer/repatriation to DSC within 72 hours
- Data collection
Before thrombolysis

- Obtain as much information from ambulance crew/next of kin

- Time of onset of symptoms, any eyewitness to confirm timescale?

- Identify if patient is on OACs has allergies, diabetic and other medical history

- Recording of vital & neurological observations, BP < than 180 mmhg systolic

- Venous access X 2, send routine bloods, blood sugar, poc INR <1.7

- Escort patient for CT brain scan, record ECG and commence cardiac monitoring
During Thrombolysis

- Ensure treatment is prescribed: dose 0.9 mg/kg body weight up to a maximum of 90 mg

- Initial bolus of 10% of the treatment is given over 2 minutes via peripheral iv site. This dose is given by the senior doctor and the remaining 90% given by the nurse via infusion pump over 1 hour. Note door to needle time

- Record vital and neuro observations every 15 minutes for the first 2 hours

- Include observation of any likely bleeding sources and initially check of oral cavity

- Careful documentation of drowsiness, language impairment and ataxia

- If at any time, the patient’s condition deteriorates during administration of the drug, the infusion should be stopped immediately
Post thrombolysis care

- Strict protocols for observations after the first 2 hours.
  - Every 30 minutes for the next 2 hours
  - Every hour for the next 4 hours
  - Every 2 hours until repeat CT scan
  - Every 4 hours thereafter
- High intensity nursing for 24 hours
- Bed rest for 24 hours
- Can eat and drink if swallow screen passed
- Strict protocols for BP control
- Any deterioration, patient requires a repeat scan
Summary

- Stroke is the leading cause of preventable permanent disability

- Timely recognition and treatment are imperative to reduce stroke-related morbidity and mortality

- Strong evidence supporting intravenous thrombolysis and mechanical thrombectomy for ischemic stroke. Time to treatment is the most important prognostic factor for clinical outcome

- Intravenous tissue plasminogen activator is recommended for all qualified patients with Ischaemic stroke

- Large vessel occlusion should be evaluated for mechanical thrombectomy

- Rapid Blood Pressure control is key in the management of Haemorrhagic stroke
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