Trust Guideline for the Management of Acute Stroke and Transient Ischaemic Attack in Adults

Document Control:

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Document Author:	Dr Patrick Sutton, Silvia Marroquí		
Document Owner:	Stroke Consultant, Advanced Specialist Pharmacist - Stroke		
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			checklist, positioning advice, link to NRT prescribing decision aid, updated references
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Previous Titles for this Document:

Previous Title/Amalgamated Titles	Date Revised
None	Not applicable

Distribution Control

Printed copies of this document should be considered out of date. The most up to date version is available from the Trust Intranet.

Consultation

This guideline was produced on behalf of the Stroke Multidisciplinary Team. The following were consulted during the development of this document:

Neurosciences Clinical Governance Group

Monitoring and Review of Procedural Document

The document owner is responsible for monitoring and reviewing the effectiveness of this Procedural Document. This review is continuous however as a minimum will be achieved at the point this procedural document requires a review e.g. changes in legislation, findings from incidents or document expiry.

Relationship of this document to other procedural documents

This document is a clinical guideline applicable to NNUHFT; please refer to local Trust's procedural documents for further guidance, as noted in Section 4.

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TIA Pathway

Quick reference guideline: Acute Management of stroke and TIA (cont.)

Quick reference guideline: Secondary prophylaxis

1. Introduction

1.1. Rationale

This guideline has been developed as a summary of all relevant clinical guidelines available in the management of acute stroke and TIA, to standardise care of this group of patients.

The guideline has been produced in compliance with NICE Guideline 128: Stroke and transient ischaemic in over 16s: diagnosis and initial management (2019) and National Clinical Guideline for Stroke for the UK and Ireland (2023).

1.2. Objective

The objective of the guideline is to:

- Provide evidence-based guidance on the diagnosis, acute management and early secondary prevention of stroke.
- Provide advice to prevent and treat complications during admission for acute stroke.

1.3. Scope

This guideline covers the management of acute stroke and transient ischaemic attack in patients over 16 years old. For specific management of Early-Onset stroke in Young Patients aged 18-50, see separate clinical guideline 16061. Neither guideline covers management of stroke in Paediatrics.

This guideline does not cover subarachnoid haemorrhage (see Trust Guideline 8886).

1.4. Glossary

The following terms and abbreviations have been used within this document:

Term	Definition
AF	Atrial Fibrillation
CEA	Carotid Endarterectomy
CRP	C-Reactive Protein
CT	Computed Tomography
CTA	Computed Tomography Angiography
DBP	Diastolic Blood Pressure
DAPT	Dual Antiplatelet Therapy
DOAC	Direct Oral Anticoagulant
ECG	Electrocardiogram
ESR	Erythrocyte Sedimentation Rate
FAST	Face Arm Speech Time test for diagnosis of stroke
FBC	Full Blood Count
GTN	Glyceryl Trinitrate
(H)ASU	(Hyper) Acute Stroke Unit
ICH	Intracerebral Haemorrhage
IHD	Ischaemic Heart Disease
INR	International Normalised Ratio
IPC	Intermittent Pneumatic Compression sleeves
LDL-C	Low-Density-Lipoprotein Cholesterol

LFT	Liver Function Test
LMWH	Low Molecular Weight Heparin
MCA	Middle Cerebral Artery
MRA	Magnetic Resonance Angiography
MRI	Magnetic Resonance Imaging
mRS	Modified Rankin Scale (to measure degree of disability after stroke)
MT	Mechanical Thrombectomy
MUST	Malnutrition Universal Screening Tool
NGT	Nasogastric feeding Tube
NASCET	North American Symptomatic Carotid Endarterectomy Trial
NIHSS	National Institutes of Health Stroke Scale (to measure severity of stroke)
PCC	Prothrombin Complex Concentrate
PEG	Percutaneous Endoscopic Gastrostomy feeding tube
PVD	Peripheral Vascular Disease
ROSIER	Recognition of Stroke in the Emergency Room
SAN	Stroke Alert Nurse
SBP	Systolic Blood Pressure
TC	Total Cholesterol
TIA	Transient Ischaemic Attack
U&E	Urea & Electrolytes
VRIII	Variable Rate Intravenous Insulin Infusion
VTE	Venous Thromboembolism

2. Responsibilities

Guideline authors – responsibility to review contents and ensure advice follows latest national guidance available and to share it with the rest of the services via Neurosciences Clinical Governance processes.

Stroke Services Director – overall responsibility for this guideline and that there is a process in place to ensure medical staff are aware of the recommendations and to facilitate any required training.

Neurosciences Matron/Ward Managers/Stroke and TIA Lead Nurse – responsibility to ensure they have a process in place for Ward/Clinic nursing staff to be aware of the recommendations in this guideline and to facilitate any required training.

Other Stroke Services Professional Leads - responsibility to ensure staff working in Stroke Services are aware of the recommendations in this guideline and to facilitate any required training.

All Staff have a responsibility to ensure they are aware of the advice in this guideline and apply it appropriately. It is the responsibility of each employee to be aware of the procedural documents which relate to their department/area of practice.

3. Recommendations

3.1. Diagnosis

- In people with sudden onset of neurological symptoms a validated tool, such as FAST (Face Arms Speech Time), should be used outside hospital to screen for a diagnosis of stroke or TIA.
- For people who are admitted to the emergency department with a suspected stroke, establish the diagnosis quickly using the ROSIER scale (Appendix 1).
- People with a suspected TIA should be referred to the TIA Clinic using the Referral for Rapid Access TIA Clinic form (Appendix 7).
- All patients needing to be admitted should be clerked using the **Rapid Stroke Assessment Proforma** (unless already clerked on an equivalent document). Patients should be transferred directly to the Hyperacute Stroke Unit (HASU) as soon as possible and should remain in the specialist stroke unit (HASU or ASU) for the duration of their inpatient stay.

3.2. Investigations

- **Brain Imaging for stroke** (see Appendix 2)

  Brain imaging (CT) should be performed immediately (ideally the next imaging slot and definitely within an hour of arrival to NNUH) for the following:

  - candidate for thrombolysis or mechanical thrombectomy (MT)
  - on anticoagulant treatment
  - a known bleeding tendency
  - a depressed level of consciousness (Glasgow Coma Score below 13)
  - unexplained progressive or fluctuating symptoms
  - papilloedema, neck stiffness or fever
  - severe headache at onset of stroke symptoms
  - if MT might be indicated, perform imaging with CTA following initial non-enhanced CT. Add CT perfusion imaging (or MR equivalent) if MT might be indicated beyond 6h of symptom onset

  For the rest of patients, brain imaging for those with persistent neurology should be performed as soon as possible.

  Mode of imaging:

  - CT brain

    This should be sufficient in most cases and should be considered as the first line unless there are specific indications for other imaging modalities (MRI, CT perfusion).

  - MRI brain

Not used as a routine investigation. However, it will be useful in the following situations:

- Location of the stroke in the brain not clear with CT scan
- Suspected posterior circulation stroke but CT scan is negative or equivocal, if positive imaging will influence treatment
- Diagnosis other than stroke is suspected from CT scan
- Consider first line in posterior (non thrombolysable) strokes, and suspected stroke during pregnancy (if not thrombolysable and not leading to significant delay).

- CT perfusion (only during hyperacute stage)
  - Wake up stroke (time of onset possibly within 4.5 hours)
  - Fluctuating symptoms
  - Diagnostic doubts (eg seizure vs stroke)
  - High NIHSS score (more than 20) and timing within 3 to 4.5 hours

- **Brain imaging for TIA**

Brain imaging modality will be at the choice of the treating consultant. Some patients will need no imaging, some will need urgent CT head, others urgent or non-urgent MRI.

- CT brain

CT heads should only be requested where there is a reasonable expectation of there being an abnormality. It should not be a blanket request for all TIAs. If patient seen by ED and clearly a TIA then a CT does not need to be done prior to referral to TIA clinic unless anticoagulated..

CT heads should be requested when:

1) Symptoms have persisted for 24 hours or more.
2) Fluctuating symptoms where a tumour or haemorrhage (recent) is suspected.
3) A patient is anticoagulated.
4) There is a suspicion of an illness that might be visible on CT head.
5) Head injury associated with onset of symptoms.

CT heads should not be requested for:

1) Amarosis fugax.
2) Migraine symptoms.
3) Suspected ICH over 7 days from onset – should have MRI, better pick up for blood products.

- MRI brain

Ideally should be done on day of TIA clinic.

Should be requested after Consultant review. Should not be a blanket request for all patients.

Should be requested when:

1) Clarity over involved arterial territory needed (e.g. for CEA when unclear whether anterior or posterior symptoms).
2) For diagnostic uncertainty.
3) Young patients under 55 with suspected TIA/stroke where an ischaemic lesion might alter further investigations or treatment (e.g. PFO closure)
4) If ICH is suspected after 7 days from onset.
5) Suspicion of demyelinating lesions or other abnormalities that are better seen on MRI.
   If trying to catch an acute ischaemic lesion should ideally be done within 10 days of symptom onset.

- **Urgent blood tests**

  All stroke patients should have the following blood tests on admission:

  - FBC
  - LFT
  - U&E and bone profile
  - ESR and CRP
  - Random blood glucose (HbA1c if known diabetic)
  - HDL Cholesterol profile
  - Coagulation screen (URGENT if on oral anticoagulants*) * warfarin, acenocoumarol, phenindione, dabigatran, apixaban, edoxaban, rivaroxaban
  - Pregnancy test (if woman of child bearing age)

- **Other Blood tests**

  Depending on the circumstances, the following tests may be indicated:

  - Fasting Blood Sugar (FBS) or HbA1c if random blood glucose raised (this needs to be carried out within 24 to 48 hours of arrival; if patient is already known to have diabetes, FBS is not needed)
  - Antiphospholipid screen and vasculitic screen (**NOT for all strokes**): Consider in young patients (under 60 years) where an obvious pathology is not found. Consider testing for Fabry's disease (see Clinical Guideline for Early-Onset Stroke in Young Patients aged 18-50).

- **ECG**

  Urgent ECG (12 lead) should be performed on each patient, preferably in A&E.

- **Chest X-ray**

Although not a stroke-specific investigation, a chest X-ray is a valuable test in the management of stroke to investigate e.g. concurrent aspiration pneumonia, cardiac disease or malignancy. Therefore, this needs to be carried out within 24 hours (urgently if any of the above suspected).

- **Cardiac investigations (NOT for all strokes, discuss with senior clinician)**
  - Apoplex cardiac monitoring whilst on HASU or in TIA Clinic. If has 24 hours of this, the patient may not require OPD 24 hour tape depending on likelihood of AF as cause of stroke.
  - 24 hour Holter monitor (to detect paroxysmal AF).
  - Echocardiogram (Transthoracic (TTE) or Transoesophageal (TOE))
  - Bubble echocardiogram (young strokes with no cause found for stroke)

- **Carotid vessels imaging**
  - Carotid ultrasound - all patients who have had a carotid territory ischaemic stroke should undergo duplex carotid ultrasound scan if:
    - they are considered to be a suitable candidate for endarterectomy (CEA)
    - they have made a reasonable recovery from the stroke (at least able to transfer with assistance of one and cognitively stable)
  - If the ultrasound result is equivocal, proceeding to a CTA or MRA carotid is recommended.
  - CTAs can be requested over the weekend for those with TIAs either on the ward or as part of the TIA clinic. These need to be requested first thing in the morning and discussed with the Radiology registrar on call.

3.3. Acute therapy

Avoid or discontinue antithrombotic therapy until brain imaging has been performed. It is not possible to discriminate between infarction and haemorrhage on clinical grounds.

3.3.1. Ischaemic Stroke

1. Selected patients may be suitable for **intravenous thrombolysis** with alteplase (rt-PA), after discussion between clerking doctor and a Consultant Stroke Physician. This must be with strict adherence to the Trust Protocol for the use of Alteplase for Acute Ischaemic Stroke (Thrombolysis). See full protocol for management of anaphylaxis or any other potential complications with Alteplase.
2. Selected patients may be suitable for **mechanical thrombectomy (MT)** for acute ischaemic stroke due to large vessel occlusion. These are patients who are less than 5 hours from onset, have a NIHSS > 5 and a premorbid mRS 0-2. These patients should have a CTA (arch to vertex) at the same time as the CT head and be discussed with the oncall stroke consultant urgently for emergency transfer to a neuroscience centre as per SOP for the Emergency Transfer of Stroke patients for

Mechanical Thrombectomy. Patients should receive prior IV thrombolysis (unless contraindicated) but this should not delay transfer to a thrombectomy centre.

If not for thrombolysis/MT, once brain imaging has excluded haemorrhage:

3. In **minor stroke with a low risk of bleeding**, give dual antiplatelet therapy (DAPT) with Aspirin (STAT 300 mg followed by 75 mg daily for 21 days) and Clopidogrel (STAT 300 mg followed by 75 mg daily long term). Lansoprazole should be considered to reduce the risk of gastrointestinal haemorrhage. If in AF, review earlier, within first 2 weeks , and decide on anticoagulation.
4. In **moderate to severe stroke**, give aspirin 300 mg once daily for up to 2 weeks after symptom onset and then initiate long-term antithrombotic treatment.
5. Aspirin 300 mg can be given orally or rectally, This should be given as soon as possible after the brain imaging has been reviewed (liaise with nursing staff for prompt administration). Consider lansoprazole if previous dyspepsia with aspirin (available as orodispersible tablet if patient dysphagic).
6. If the patient is allergic to or genuinely intolerant of aspirin, give a STAT dose of clopidogrel 300 mg instead and continue clopidogrel 75 mg once daily on regular prescription.
7. If a patient has been thrombolysed/MT avoid any antiplatelets for the first 24 hours post-thrombolysis and until a repeat CT scan of the brain has excluded haemorrhage.
8. Anticoagulation should not be used routinely for the treatment of acute ischaemic stroke. In people with **prosthetic valves** who have disabling cerebral infarction and who are at significant risk of haemorrhagic transformation, anticoagulation treatment should be stopped for one week and aspirin 300 mg substituted. Discussion with Stroke Consultant required.
9. Patients with **cerebral venous sinus thrombosis** (including those with secondary cerebral haemorrhage) should receive full-dose anticoagulation (initially full-dose heparin and then warfarin with a target INR of 2-3) for at least 3 months unless there are comorbidities that preclude use.
10. Patients with **cervical artery dissection** should be treated with either an anticoagulant (DOAC or vitamin K antagonist) or an antiplatelet for at least 3 months. DAPT may be considered for the first 21 days to be followed by antiplatelet monotherapy until at least 3 months after onset.

3.3.2. Haemorrhagic Stroke

- In patients admitted on a **coumarin oral anticoagulant e.g. Warfarin, Phenindione or Acenocoumarol**, anticoagulation should be reversed immediately with **Vitamin K** (see Adult patients requiring anticoagulation with warfarin) and **Prothrombin Complex Concentrate (PCC)** as soon as possible. Discuss with Haematology.
- In patients admitted on **Dabigatran**, if the last dose was given < 24h ago, discuss with on call Haematologist in order to give Idarucizumab (Praxbind) (see Haemorrhage protocol for patients taking DOACs)
- In patients admitted on **Apixaban, Edoxaban or Rivaroxaban**, consider oral charcoal if the last dose was given <2h ago (<6h ago for apixaban) and patient's

swallow is not impaired. Consider IV Tranexamic Acid. Discuss with on call Haematologist and consider PCC (see Haemorrhage protocol for patients taking DOACs)

- If there is a possibility that the bleed is from an aneurysm, then the patient should have urgent CT angiography, either locally or in a regional neuroscience centre. The aneurysm is at high risk of rebleeding and may require urgent coiling or clipping. If in doubt, discuss with a regional neurosurgeon or local stroke physician/ neurologist.
- A third of intracerebral haematomas will enlarge over the first few hours. Monitor neurological function carefully and control blood pressure aiming for a SBP of 140mmHg, ideally on the Hyperacute Stroke Unit. If there is clinical deterioration, repeat imaging and discuss with neurosurgery regarding evacuation of the haematoma.
- In any case where there is doubt as to the benefit of neurosurgical intervention, and in all cases of posterior fossa haemorrhage (where decompressive surgery is commonly indicated), refer to Addenbrooke's neurosurgical team via online ORION system available via the intranet. Record the associated CODE and PIN in the notes and then speak to the Neurosurgical SpR on call at Addenbrooke's. Note that in most stable patients with supratentorial haemorrhage, particularly for deep haemorrhages without mass effect, neurosurgical intervention will not be indicated.

3.3.3. Transient Ischaemic Attack (TIA) (see Appendix 7)

11. Patients with suspected TIA should be given Aspirin 300 mg immediately unless contraindicated and assessed urgently within 24h by a stroke specialist clinician

12. As soon as diagnosis of TIA is confirmed, offer secondary prevention:

- Support to modify lifestyle factors (smoking, alcohol, diet, exercise)
- Antiplatelet or anticoagulant therapy: Consider DAPT with Aspirin (STAT 300 mg followed by 75 mg daily for 21 days) and Clopidogrel (STAT 300 mg followed by 75 mg daily long term) with a proton pump inhibitor to reduce the risk of gastrointestinal haemorrhage in those at high risk. Patients with TIA in atrial fibrillation should be anticoagulated with a DOAC in the TIA Clinic once intracranial bleeding has been excluded and if there are no other contraindications.
- High intensity statin (e.g. Atorvastatin 20-80 mg daily)
- Antihypertensive treatment (e.g. thiazide-like diuretic, long-acting calcium channel blocker or ACE inhibitor)

3.4. Physiological support

All patients should be assessed for airway, breathing, and circulation, and resuscitated appropriately.

3.4.1. Oxygen

Give supplementary oxygen if the oxygen saturation is below 95% on air. Aim for normal oxygen sats 96-99% unless COPD (88-92%). Oxygen should be prescribed on EPMA.

3.4.2. Blood glucose

Aim to maintain a blood glucose concentration between 5-15 mmol/L. Start a VRIII if the blood glucose is >15mmol/L on the initial reading, or at any point over the first 24-48 hours. This should be started as soon as possible, and continued until 48 hours after the onset of the stroke, unless risk of fluid overload.

3.4.3. Hyperthermia

Treat hyperthermia (temperature >37.5˚C) immediately with paracetamol and cooling (fans, sponging). Identify and treat any infection following the guidelines given on the Antibiotic Policy.

1.1.1. Fluid and electrolytes

Correct hypovolaemia, and then give maintenance fluids. Consider using sodium chloride 0.9% for fluid replacement. Avoid dextrose for first 24h if possible (unless hyperosmolar, hypoglycaemic, or on a VRIII). Dextrose will lower the serum osmolality, tends to increase cerebral oedema, and will promote lactic acidosis in the ischaemic penumbra, potentially increasing the infarct size. Monitor urea & electrolytes daily over the first few days.

1.1.2. Hypertension

Patients with pre-existing hypertension should restart their oral antihypertensives when medically stable and able to swallow safely.

High blood pressure should generally not be treated unless it is excessive. Acceptable levels of BP vary between ischaemic and haemorrhagic stroke (see below). Loss of cerebral autoregulation will mean that a drop in blood pressure will lead to a loss of cerebral blood flow, which may threaten the ischaemic penumbra. Calming the patient, treating painful stimuli such as urinary retention, and nursing in a side room if possible will often be all that is required. Treatment will need to be given if there is a co-existing hypertensive emergency, e.g. hypertensive encephalopathy, acute renal failure, acute pulmonary oedema, acute myocardial infarction or aortic dissection.

Treat hypertension as below if conservative attempts at blood pressure reduction have failed. Aim for a small reduction in blood pressure only. Avoid sublingual nifedipine due to the risk of abrupt BP reduction.

- **Haemorrhagic Stroke** Patients with acute spontaneous ICH with a SBP 150 -220 mm Hg should be considered for urgent treatment within 6h of symptom onset (target SBP 130-139 mm Hg within 1h and for at least 7 days), unless GCS≤5, very large haematoma, macrovascular or structural cause identified or immediate surgery planned:
  - First line – Labetalol IV (unless contraindicated, see **Appendix 4**). Give 10 mg slow IV bolus over 1-2 minutes. A second slow IV bolus of 10-20 mg may be given after 10-20 minutes. If inadequate response, start Labetalol IV infusion (**Appendix 4**).
  - Second line – Nicardipine IV infusion (see **Appendix 5**)

- Consider keeping IV infusion at lowest dose for up to 12 hours after target reached to maintain BP to target, especially if other administration routes are unavailable

○ **Post-thrombolysis** If SBP repeatedly >180 mmHg and DBP >105 mmHg then treat as per haemorrhagic stroke above.

○ **Ischaemic stroke** Patients with acute ischaemic stroke should only receive BP lowering treatment if there is indication for emergency treatment, such as SBP>185 mm Hg/DBP>110 mm Hg in candidate for thrombolysis; hypertensive encephalopathy; hypertensive nephropathy; hypertensive cardiac failure or MI; aortic dissection; pre-eclampsia or eclampsia:

- Lisinopril 5 mg *or* Amlodipine 5 mg PO (dose may be repeated once if BP still high after 1 hour)

If patient is NBM, consider one of the following options:

- Lisinopril 5 mg tablet given sublingually (unlicensed use)
- Glyceryl trinitrate (GTN) 5 mg/24h patch (unlicensed use)
- Labetalol IV as above
- Nicardipine IV infusion as above
- GTN IV infusion (see **Appendix 6**)

1.1.3. Hypotension

Hypotension may lead to infarction of the ischaemic penumbra through cerebral hypoperfusion, particularly if there is carotid stenosis. If the blood pressure is below 120mmHg systolic then omit normal antihypertensives, and correct hypovolaemia with sodium chloride 0.9%. Consider a cause for the hypotension e.g. cardiac ischaemia, arrhythmia, sepsis, aortic dissection or pulmonary embolus.

1.1.4. Cardiac arrhythmias

Patients with a history of cardiac disease, those who are haemodynamically unstable or those who have ischaemic stroke/TIA should have continuous cardiac monitoring for the first 48 hours.

3.5. Prevention and Management of complications

3.5.1. Prevention of Complications

1.1.1.1. Aspiration pneumonia caused by dysphagia

A Stroke Dysphagia Screening Test will be performed by a Dysphagia Trained Nurse (DTN) within 4 hours of admission to NNUHFT, or as soon as Stroke diagnosis has been confirmed for current inpatients, and before oral nutrition, fluid or medication is given, on patients deemed to be 'appropriate'.

Dysphagia Trained Nurses must have completed the relevant training prior to administering the screening test. Please see Trust Protocol for Nurse Screening of Dysphagia in Adults for full criteria and guidance.

Referral to SLT for further assessment will be indicated following the completion of the above DTN screen.

Consider referring to a Physiotherapist if the patient has suspected aspiration pneumonia with sputum retention.

1.1.1.2. Venous thromboembolism (VTE) prevention

Many venous thrombi occur in the first 48 hours, and preventative measures should be initiated in A&E. VTE should be prevented with timely use of antiplatelets, adequate hydration and early mobilisation.

VTE prophylaxis should be considered for all immobile stroke patients. VTE prophylaxis should be considered at the first HASU ward round if not previously documented.

Consider Intermittent Pneumatic Compression stockings (IPC) in the initial phase (as soon as possible after admission or within 72 hours) for immobile stroke patients (unable to walk to the bathroom and back with or without assistance. See below for guidelines.

TED stockings are not recommended.

Prophylactic LMWH is not recommended in Acute strokes (first 2 weeks). The decision should be documented in the VTE Assessment section of EPMA and reviewed at 24 h.

Consider prophylactic LMWH at 2 weeks in immobile patients with ischaemic stroke, as the risk of haemorrhagic transformation substantially reduced. Consider prophylactic LMWH at 2 weeks in immobile patients with haemorrhagic stroke.

Review if the patient becomes mobile and update VTE Assessment on EPMA.

- **IPC Stockings – Guidelines**

IPC stockings should be offered in those with low mobility compared to their usual. Poor mobility is defined as an inability to walk to and from the bathroom. A decision should be made within 3 days on whether to start these.

The CLOTS3 trial showed that they reduce mortality but predominately in the mRS 5 end of the spectrum. Patients and/or families should have this explained prior to a decision to start IPC stockings as they may find this an unacceptable benefit.

Information to tell patient/family:

1) These stockings will reduce the risk of DVT.
2) This should reduce the risk of pulmonary embolus and death.
3) In patients with massive disabling strokes the net result of this is increased survival rates whilst still being fully dependent.

4) In addition to this, stockings can be quite uncomfortable and are not always well tolerated. If this is the case then even when a decision has been made to use them their use may be stopped early.
5) Because they are compression stockings they can sometimes cause ulceration and skin break down.

Once a decision that IPC stockings are appropriate has been made by a consultant then consent can be taken by any member of the multidisciplinary team. This should be documented on the medical notes. IPC stockings need to be prescribed on EPMA.

IPC Stocking use:

Contraindications:

- Age <16 years of age
- Patient not on stroke ward unless nurses trained and competent.
- Severe leg oedema.
- Leg ulceration
- PVD
- Leg Cellulitis.
- Diabetics with foot lesions.
- Confused agitated patients who are at risk of falling. – relative risk.
- SAH, subdural or extradural haemorrhage.
- Patient wishes.
- Palliative patient.

IPC stockings should be worn for 30 days or until patient mobile or discharged, whichever is sooner.
If thigh-length IPC sleeves are not tolerated, consider single sleeve to the affected side or calf-length IPC sleeves. If they are still not tolerated then don't persist.

If stockings are not worn for more than 48 hours they should not be replaced.
For patients who are normally immobile if their mobility has not changed and they are not acutely ill (e.g. physiological changes, deranged U+Es etc.) there is no need to use IPC stockings.

Whatever method of prophylaxis is used, it does not need to be carried on beyond 30 days unless the patient is acutely unwell. Should they then decompensate (unless new stroke) then standard dose prophylactic LMWH should be used.

1.1.1.3. Urinary catheters and Continence

Catheters should be avoided where possible. Appropriate indications for urinary catheterisation in stroke patients are:

- urinary retention (measure residual)
- need for accurate fluid balance
- sacral pressure area skin breach
- dignity in end-of-life care

If a patient has been catheterised, every effort must be made to have a trial without the catheter at the earliest opportunity. The majority of hospital-acquired urinary tract infections are associated with indwelling urinary catheters.

Patients with urinary incontinence should have a continence plan within 3 weeks of admission.

In those who are incontinent, measures such as regular toileting, urinary sheaths and pads should be tried. A referral to the continence nurses can also be made.

1.1.1.4. Bowel care

Faecal incontinence

- Patient should be fully assessed for potential treatable causes.
- Should have documented action plan.

Constipation

- Should have their medications reviewed for constipating drugs.
- Oral laxatives should be offered as first line.
  Consider rectal laxatives as second line if constipation persists.

1.1.1.5. Feeding and Nutrition

- **Screening**

A weight and MUST (Malnutrition Universal Screening Tool) score should be completed within 24 hours of admission and weekly thereafter. If patients are on a modified consistency diet (e.g. puree diet), or risk of malnutrition is identified via MUST, the MUST care guidance should be implemented. Dietitian referral to be made if indicated.

- **Refeeding Syndrome**

Patients with little or no nutritional intake for more than 5 days and/or significant weight loss and/or a BMI less than 18.5 kg/m^2 are at risk of refeeding syndrome.

Refer to the Trust Policy on Enteral Tube Feeding in Adults, section 4.3, for identification and management of Refeeding Syndrome.
Liaise with Dietitian to ensure safe feeding.

- **Enteral Feeding**

Feed all patients as soon as possible after stroke to reduce the risk of malnutrition and refeeding syndrome. If the patient is nil by mouth, commence nasogastric feeding within 24 hours.

Contraindications: patients with a poor prognosis

- Consider withholding feeding *if* end of life care is agreed following discussion with family and all active treatment is to be withdrawn.
- If prognosis unclear, consider a time-specific trial of NG feeding after discussion with family and commence feeding as soon as possible.

In cases of coughing, chestiness and suspected aspiration (with or without pneumonia), follow the guidelines below **and continue to feed patient**:

- Re-check nasogastric tube position
- Ensure patient correctly positioned for feeding (see below)
- Feeding rates may be reduced; however there is no evidence to support this need. Liaise with Dietitian in this instance

With repeated aspirations:

- Increase attention to mouth care
- Increase monitoring of patient during feeding and optimise best times to feed
- Consider prokinetics to improve gut motility
- Consider hyoscine patches to reduce oral secretions
- **If feed withheld, liaise with dietitian and review regularly in order to prevent unnecessary starvation.**

When feeding is stopped e.g. bowel obstruction, pre-/post-procedure, GI bleed:

- If **less than 5 days** since last feed and patient on established feed, re-commence previous regime
- If **more than 5 days** since last feed or patient not on established feed, start temporary regimen Day 1. Inform Dietitian as patient may be at risk of Refeeding Syndrome
- Contact Dietitian in all cases of uncertainty

Refer patient to Nutrition Support Team:

- If nasogastric feeding unsuccessful

  e.g. NG tube with bridle repeatedly pulled out
- If NG feeding is contraindicated e.g. non-functioning GI tract or requiring complete bowel rest

- **Long term feeding**

  Patients who are NBM or unable to maintain their nutrition and hydration needs orally should be considered for PEG/RIG four weeks post-stroke and referred to the Nutrition Support Team following discussion with the Speech & Language Therapist and Dietitian (see Pre-operative Percutaneous Endoscopic Gastrostomy (PEG)/ Radiologically Inserted Gastrostomy (RIG) Insertion checklist and Antithrombotic plan for PEG/RIG insertion).

- **Discharging patients with NG tubes**
  - Discharging patients on NG tubes should be avoided
  - It is the responsibility of the consultant to ensure the NG tube is changed every 3 – 4 months or replaced in the event of displacement or blockage
  - This is to be done on the discharging ward by a nurse

  For further information see Trust Policy on Enteral Tube Feeding in Adults.

- **Positioning**
  Dependent patients should be placed supine at 35-45 degrees if being PEG or NG fed and for 30 minutes after feeding; or lying on alternative sides, if tolerated, when feed not running.

  Pressure areas should be prevented by pressure area risk assessment (e.g. Waterlow), pressure-relieving mattresses where appropriate, regular inspection, and attention to nutrition (see Trust Guideline B12).

  Patients with severe stroke symptoms can often have impaired head and trunk control. Each individual's optimum head and trunk positioning will be advised by a physiotherapist, taking into account feeding, respiratory function, cognition and environment. Impaired weakness, sensation, cognition, positional awareness and spasticity can often affect patients positioning, specifically their impaired upper limb. Most patients should have their upper limb supported on a pillow to assist with optimum positioning, however patients with more complex presentations will have an individual plan which will be documented on the handover and in some cases photos placed in bedside notes. Liaise with PT/OT if any concerns.

  Patients should be transferred into the appropriate chair via the appropriate manual handling device (identified in the medical notes and on nursing handover following their physiotherapy assessment) as soon as they are stable enough to do so.

3.5.2. Management of Medical and Neurological Complications

Listed below are common conditions leading to a worsening neurological status of a post stroke patient:

- Sepsis
- Hypoglycaemia
- Hypoxia

- Hypotension
- Evolving infarction
- Haemorrhagic conversion of infarction
- VTE
- Cerebral oedema
- Malignant MCA syndrome
- Hydrocephalus (ICH with intraventricular blood, posterior fossa bleed/infarct)
- Seizures (especially after haemorrhage)

- Carotid stenosis with recurrent mbolization
  - Carotid stenosis with low-flow (possibly with hypotension)
  - Recurrent cardioembolism

1.1.1.6. Venous thromboembolism (VTE)

Ischaemic stroke patients with symptomatic proximal DVT or PE should be treated with anticoagulation instead of antiplatelets except where there are contraindications to anticoagulation.

Haemorrhagic stroke patients with symptomatic proximal DVT or PE should be treated either with anticoagulation or insertion of inferior vena cava filter (IVC).

1.1.1.7. Cerebral oedema

This tends to peak at 3-5 days after cerebral infarction.

Manage by nursing at 30 degrees head-up tilt and avoiding hypotonic intravenous infusions (i.e. glucose 5%). Avoid pain and other noxious stimuli.

Patients with space-occupying cerebellar infarction and reduced conscious level should be discussed early with neurosurgery for consideration of decompressive surgery.

1.1.1.8. Malignant middle cerebral artery syndrome – Referral to Addenbrooke's **Stroke** Team for hemicraniectomy by contacting on-call **stroke** registrar**.**

Decompressive hemicraniectomy may be considered within 48h of symptom onset if:

- Clinical deficits suggest infarct in MCA with a NIHSS score >15
- Decreased level of consciousness, with a score ≥1 on item 1a of NIHSS
- Signs on CT of an infarct ≥ 50% in the MCA territory:
  - With or without additional infarction in anterior or posterior cerebral artery on the same side
  - With infarct volume >145 cm3, as shown on diffusion-weighted MRI

See decompressive-hemicraniectomy-surgery-in-people-under-60-patient-decision-aid-pdf-6775901389 (nice.org.uk)

1.1.1.9. Acute Hydrocephalus

Consider hydrocephalus if there is neurological deterioration, especially if there has been intraventricular haemorrhage, or if there has been posterior fossa stroke (e.g. cerebellar bleed or infarction). Urgent ventriculostomy may be required. If the patient is felt to be at high risk of this, then discuss with Addenbrooke's Neurosurgery prior to deterioration.

1.1.1.10. Seizures

Seizures are common, especially after cerebral haemorrhage. Consider in any deterioration, and treat conventionally (see Trust Guideline for the Management of Generalised Convulsive Status Epilepticus)

1.1.1.11. Agitation and delirium

Consider urinary retention or other sources of pain and manage appropriately.

Every effort should be made to rule out worsening of stroke as a cause of agitation (i.e. neurological evaluation and brain imaging).

Delirium is a common problem in the acute stroke setting and can be present in up to half of patients especially in the first week after ischaemic stroke.

Screen for infection and other causes of delirium. Review medications. Follow Trust Guideline for the acute management of delirium in older patients.

Once all the above potential causes have been ruled out and if it appears that agitation may pose a risk to the patient's health, consider medication as per Trust guideline above.

1.1.1.12. Mood disturbance (depression)

Depression is common post stroke, occurring in about 30% of patients.

- All patients should receive a mood and cognition screen by discharge
- If depressed should be offered antidepressant
- Mirtazapine is suitable particularly in patients with poor or reduced appetite

1.1.1.13. Post-stroke pain

Pain is a common complication following stroke which can be distressing for patients and has been shown to be common in the first 30 days post-stroke. The common

types of pain include headache, hemiplegic shoulder pain (HSP) and neuropathic pain including central post stroke pain (CPSP). However, stroke patients may experience pain due to other pre-existing conditions. Early recognition of the type of post stroke pain is vital for appropriate pain management.

- Headache:
  - Headache is common with acute ischaemic stroke, occurring prior to (sentinel headache), concurrently (onset headache) or following (late-onset headache) focal neurological signs. Headache could be secondary to medications (e.g. dipyridamole, GTN, nifedipine)
  - Consider simple analgesia such as paracetamol
  - Avoid opioids as they may obscure the clinical picture as well as have possible adverse effects such as respiratory depression and hypotension
- Hemiplegic Shoulder pain /subluxation:
  - Consider imaging in some patients to rule out a fracture or dislocation
  - Avoid poor handling and positioning of the affected shoulder as well as the use of overhead hand sling
  - Consider simple analgesics such as paracetamol, codeine and Ibuprofen gel
  - Non-steroidal anti-inflammatory drugs could be used for a short period
  - Intra-articular steroid injections should only be used if they also have inflammatory arthritis
  - Functional electrical stimulation of the supraspinatus and deltoid muscles has been recommended for shoulder subluxation
- Neuropathic pain including central post stroke pain (CPSP):
  - Careful history and examination of pain to ensure no other cause.
  - Pharmacotherapy
    - Amitriptyline (10 mg daily with gradual increase to an effective dose; max. 75 mg daily). First line, may take up to 8 weeks to be effective
    - Gabapentin (300 mg twice daily with gradual increase to max. 3.6 g daily in divided doses). It needs to be at maximum tolerated dose for at least 4 weeks before deciding ineffective
    - Pregabalin (75 mg twice daily with gradual increase to max. 300 mg BD)

    Gabapentin and Pregabalin should be used first line in patients with problems with high tone. Duloxetine is third line for neuropathic pain if other treatments ineffective (not licensed).

    If medications ineffective, they should be titrated down and stopped, rather than being left long term.

    Try and avoid opiates unless there is a musculoskeletal component to the pain. If opiates are tried and are ineffective, than again wean down and stop.

    If difficulties controlling pain, then refer to the Pain Management Service for advice.

1.1.1.14. Palliative Care

Stroke patients deteriorating with poor prognosis or imminent death should be referred with their families/carers to the specialist palliative care team to receive care and support that is consistent with the principles and philosophies of palliative care. This referral is made on ICE.

3.5.2.10. Osteoporosis

Stroke patients often spend long periods of time immobile in hospital. They are at risk of osteoporosis because of this and often come from groups who are already at risk. Vitamin D levels should be checked in patients from care settings and in those who have spent long periods in hospital. A FRAX score should be considered in those felt to be at risk of osteoporosis and patients should be treated and investigated depending on their FRAX score.

3.6. Early secondary prevention

Patients should have brain imaging as soon as possible, and all investigations completed within 7 days of the stroke. The main causes of early recurrence are carotid stenosis and atrial fibrillation. Posterior circulation infarction also has a high rate of early recurrence.

3.6.1. Antiplatelet therapy

Patients should receive long-term antithrombotic treatment following an ischaemic stroke, in order to reduce the risk of further cardiovascular events.

- In **minor ischaemic stroke not associated with atrial fibrillation**, Clopidogrel 75 mg once daily long-term is recommended following up to 21 days of DAPT with aspirin 75 mg daily and Clopidogrel 75 mg daily. If clopidogrel is contra-indicated or not tolerated, patients should receive aspirin 75 mg daily.
- In **moderate to severe ischaemic stroke not associated with AF**, Clopidogrel 75 mg daily is recommended after aspirin 300 mg daily. Consider Aspirin 75 mg daily for those who are unable to tolerate clopidogrel or with recurrent cardiovascular event on clopidogrel (consider clopidogrel resistance). If the patient is expected to have a PEG insertion, then consider Aspirin 75 mg daily instead, until the procedure is performed (see Antithrombotic plan for PEG/RIG insertion).
- In **severe symptomatic intracranial artery stenosis** offer DAPT with Aspirin and Clopidogrel for the first 3 months in addition to optimal secondary prevention including BP treatment, lipid-lowering therapy and lifestyle modification.

3.6.2. Anticoagulant therapy

Heparin, warfarin and DOACs are contraindicated in all kinds of primary cerebral haemorrhages.

There are very few indications for therapeutic heparin in acute ischaemic stroke. The danger of therapeutic heparin is haemorrhagic conversion of infarction. The risk is greater with large infarcts (e.g. >50% of the MCA territory) and with elevated blood pressure (e.g. SBP >180mmHg).

The selected indications for heparin after stroke are (discuss with consultant. See Appendix 8 for dosing):

- Initial stages of cerebral venous sinus thrombosis leading to infarcts (even with mild to moderate secondary haemorrhage into it) until warfarin is initiated
- Carotid and vertebral/ basilar artery dissection leading to recurrent TIA and ischaemic strokes (despite being on aspirin)
- Evidence of DVT and/or PE until warfarin is safe
- Mechanical heart valve

In most cases of cardioembolic ischaemic stroke (e.g. atrial fibrillation) the benefit of anticoagulation with heparin is offset by the risk of haemorrhagic transformation of the infarct. These patients should be managed with antiplatelet therapy for about two weeks (longer in patients with very large infarction or severe hypertension) and then restarted on anticoagulation.

Anticoagulation for AF should be started at the latest at 2 weeks post ischaemic stroke. In **minor stroke** this should be considered within 5 days of onset. For **moderate stroke** this should be considered within 5-14 days. DOACs are the first line anticoagulation for AF (See Advice sheet on starting DOACs). Warfarin should only be used if DOACs contraindicated (e.g. valvular/rheumatic AF or mechanical heart valve replacement) or patient's choice.

For people with prosthetic valves who have disabling cerebral infarction and who are at significant risk of haemorrhagic transformation, stop anticoagulation treatment for 1 week and substitute aspirin 300 mg.

3.6.3. Carotid Endarterectomy (CEA)

Contact Consultant Vascular Surgeon/on call Vascular Registrar via Alertive if symptomatic carotid stenosis ASAP.

Symptomatic carotid disease:

Locally, we offer CEA to those with

- 50-69% ICA stenosis (NASCET criteria) within 2 weeks of symptoms
- >=70% ICA stenosis (NASCET criteria) within 6 months of symptoms

We do not offer CEA to those with

- Occluded ICA
- Near-occluded ICA with string sign

We only consider Carotid Artery Stenting for those unsuitable for CEA.

Asymptomatic carotid disease:
Best medical management with BP control, antiplatelets, lipid modification and lifestyle advice. Refer those with >70% stenosis and >5 years predicted life expectancy to the Vascular Team for consideration of elective CEA.

3.6.4. Blood pressure management

Elevated blood pressure is very common after acute stroke, and often settles over the course of the first week. In general, blood pressure should not be lowered for the first week or two. Stop pre-existing anti-hypertensives initially. These should be restarted once the patient is medically stable.

After this period, BP may be treated according to current hypertension guidelines to achieve a clinic SBP < 130 mm Hg (equivalent to a home SBP < 125 mm Hg). The exception is for people with severe bilateral carotid artery stenosis, for whom a SBP target of 140-150 mm Hg is appropriate. BP control should be started prior to discharge from hospital if BP is raised.

Consider co-morbidities when starting treatment. The preferred antihypertensive agents in stroke care are ACE inhibitors (or Angiotensin II receptor antagonists if these are contraindicated), calcium-channel blockers and thiazide and related diuretics. Beta blockers should not be initiated for secondary prevention after stroke, unless there are specific indications (e.g. ischaemic heart disease, tachyarrhythmia). See NICE Hypertension guideline.

3.6.5. Lipid-lowering therapy

Statins are not recommended acutely in patients with **haemorrhagic** strokes (including haemorrhagic infarcts) due to the risk of further bleeds. Once the acute phase is over, the need for statins should be re-evaluated and those with good indications have them restarted. This should be decided prior to discharge from hospital.

All patients who have had an **ischaemic stroke** who are not on a lipid-lowering medication should have their HDL cholesterol screen checked on admission and be treated with Atorvastatin 80 mg daily unless contraindicated. A lower dose or alternative statin at maximum tolerated dose can be used if concerns about interactions with other drugs or side effects. Aim to reduce non-HDL cholesterol to below 2.5 mmol/L. This should be checked at 6 weeks and if not achieved then:

- Discuss adherence
- Discuss diet
- Increase statin dose
- Consider adding Ezetimibe 10 mg daily
- Consider referral to Lipid Clinic for injectables

3.6.6. Lifestyle modification

Appropriate lifestyle advice should be given on:

- Smoking cessation (see Nicotine Replacement Therapy (NRT) Prescribing Decision Aid and make an ICE referral to SmokeFree Norfolk)
- Weight loss to achieve BMI 20-25 Kg/m^2
- Reduction in saturated fat intake
- Increase in fresh fruit and vegetables intake – at least 5-a-day
- Increase in consumption of fish and other sources of omega 3 fatty acids
- Reduction in salt intake – target of 6g/day or less
- Reduction in alcohol intake (2 units/day or less)
- Regular exercise (150 minutes/week)

Driving after stroke:
The DVLA guidelines advise not to drive for at least one month following a stroke or 3 months following multiple TIAs, depending on a satisfactory recovery.

Sexual activity:
This is an issue that is often ignored among stroke survivors with partners. Issues relating to sexuality should be discussed with stroke survivors and their partners were appropriate.

Stroke patients with interest in sexual activity or with sexual dysfunction who want further help:

- Should be reassured that sexual activity is unlikely to trigger another attack of stroke and as such not a contraindication after stroke.
- Should be assessed for possible treatable causes.
- Could be referred to a psychosexual expert.

3.7. Early rehabilitation

Early sitting out and mobilisation help to reduce the incidence of stasis pneumonia, venous thromboembolism, and pressure ulceration, and should occur as soon as possible after admission providing the patient is stable. Some patients suffer neurological deterioration when placed in an upright position early after stroke, and appropriate monitoring is necessary.

Once stable, appropriate assessment of the most suitable discharge destination from the NNUH can be determined. When all assessments are completed by the multidisciplinary team, the transfer of a patient suitable for rehabilitation should be timely. Patient outcomes are improved if patients receive as much rehabilitation as tolerated.

Return to work; Stroke survivors who wish to take up or return to work should have their cognition and practical skills assessed. Where appropriate they should be offered some assistance or referred to a supported employment service

4. Related Documents

Clinical Guideline for Early-Onset Stroke in Young Patients aged 18-50
Trust Protocol for the use of Alteplase for Acute Ischaemic Stroke (Thrombolysis)
SOP for Emergency Transfer of Stroke Patients for Mechanical Thrombectomy

5. References

1. Stroke and transient ischaemic attack in over 16s: diagnosis and initial management. NICE guideline NG128, May 2019
2. National clinical guideline for stroke for the United Kingdom and Ireland, 2023
3. Clopidogrel and modified-release dipyridamole for the prevention of occlusive vascular events. NICE technology appraisal guidance 210, 2010
4. Effectiveness of intermittent pneumatic compression in reduction of risk of deep vein thrombosis in patients who have had a stroke (CLOTS 3): a multicentre randomised controlled trial. The Lancet Vol 382, No 6891, p 516-524, 2013
5. Hypertension in adults: diagnosis and management NICE guideline [NG136] 28 August 2019 Last updated: 18 March 2022
6. Neuropathic pain in adults: pharmacological management in non-specialist settings NICE Clinical guideline [CG173]: 20 November 2013 Last updated: 22 September 2020

6. Monitoring Compliance

Compliance with the process will be monitored through the following:

Key elements	Process for Monitoring	By Whom (Individual / group /committee)	Responsible Governance Committee /dept	Frequency of monitoring
	SSNAP			
	Datix			
	PDR			

The audit results are to be discussed at relevant governance meetings to review the results and recommendations for further action. Then sent to Medicine Divisional Governance who will ensure that the actions and recommendations are suitable and sufficient.

7. Appendices

Appendix 1. ROSIER Scale

ROSIER Scale
Stroke Assessment

The aim of this assessment tool is to enable medical and nursing staff to differentiate patients with stroke and stroke mimics.

Assessment Date ☐☐☐☐☐☐ Time ☐☐☐☐

Symptom onset Date ☐☐☐☐☐☐ Time ☐☐☐☐

GGS E=☐ M=☐ V=☐ **BP** ☐☐ ***BM** ☐☐

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

Has there been loss of consciousness or syncope?

Y (-1) ☐ N (0) ☐

Has there been seizure activity?

Y (-1) ☐ N (0) ☐

Is there a NEW ACUTE onset (or on awakening from sleep)?

I.	Asymmetric facial weakness	Y (+1) ☐	N (0) ☐
II.	Asymmetric arm weakness	Y (+1) ☐	N (0) ☐
III.	Asymmetric leg weakness	Y (+1) ☐	N (0) ☐
IV.	Speech disturbance	Y (+1) ☐	N (0) ☐
V.	Visual field defect	Y (+1) ☐	N (0) ☐

*Total Score _____ (-2 to +5)

Provisional diagnosis: ☐ Stroke ☐ Non-stroke (specify) _____

* Stroke is likely if total scores are > 0. Scores of </= 0 have a low possibility of stroke but not completely excluded.

Appendix 2. CT head protocol in acute stroke

				Appendix 3. NIHSS Stroke Scale	
1a. Level of Consciousness (LOC)	0 1 2 3	0 1 2 3	0 1 2 3	Alert; keenly responsive Not alert; but arousable by minor stimulation to obey, answer or respond Not alert; requires repeated stimulation to attend, or is obtunded and requires strong or painful stimulation to make movements (not stereotyped) Responds only with reflex motor or autonomic effects or totally unresponsive, flaccid, & areflexic.	
1b. LOC Questions	0 1 2	0 1 2	0 1 2	Answers both questions correctly Answers one question correctly Answers neither question correctly	Patient is asked to state the month and his/her name
1c. LOC Commands	0 1 2	0 1 2	0 1 2	Performs both tasks correctly. Performs one task correctly Performs neither task correctly	Patient is asked to open & close eyes, grip & release normal hand
2. Best Gaze	0 1 2	0 1 2	0 1 2	Normal Partial gaze palsy; abnormal gaze in one/both eyes, but forced deviation or total gaze paresis is not present. Forced deviation, or total gaze paresis not overcome by the oculocephalic manoeuvre.	
3. Visual fields	0 1 2 3	0 1 2 3	0 1 2 3	No visual loss Partial hemianopia Complete hemianopia Bilateral hemianopia (blind including cortical blindness)	
4. Facial Palsy	0 1 2 3	0 1 2 3	0 1 2 3	Normal symmetrical movements Minor paralysis (flattened nasolabial fold, asymmetry on smiling) Partial paralysis (total or near-total paralysis of the lower face) Complete paralysis of one or both sides (absence of facial movement in the upper and lower face)	
5a. Motor – Left Arm	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	No drift; limb holds 90 (or 45) degrees for full 10 seconds Drift; limb holds 90 (or 45) degrees, but drifts down before full 10 seconds, does not hit bed / other support. 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. No effort against gravity; limb falls. No movement.	
5b. Motor- Right Arm	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	No drift; limb holds 90 (or 45) degrees for full 10 seconds Drift; limb holds 90 (or 45) degrees, but drifts down before full 10 seconds, does not hit bed / other support. 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. No effort against gravity; limb falls. No movement.	
6a. Motor- Left Leg	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	No drift; leg holds 30-degree position for full 5 seconds. Drift; leg falls by the end of the 5-second period but does not hit the bed. Some effort against gravity; leg falls to bed by 5 seconds, but has some effort against gravity. No effort against gravity; leg falls to bed immediately No movement	
6b. Motor- Right Leg	0 1 2 3 4	0 1 2 3 4	0 1 2 3 4	No drift; leg holds 30-degree position for full 5 seconds. Drift; leg falls by the end of the 5-second period but does not hit the bed. Some effort against gravity; leg falls to bed by 5 seconds, but has some effort against gravity. No effort against gravity; leg falls to bed immediately No movement	
7. Limb Ataxia	0 1 2	0 1 2	0 1 2	Absent (if limb too weak to assess then) Present in one limb Present in two limbs	
8. Sensory	0 1 2	0 1 2	0 1 2	Normal; no sensory loss 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 of being touched. Severe to total sensory loss; patient is not aware of being touched in the face, arm, and leg.	
9. Best Language	0 1 2	0 1 2	0 1 2	No aphasia; normal. Mild-to-moderate aphasia; some obvious loss of fluency or facility of comprehension, without significant limitation on ideas expressed in the form of expression. Reduction of speech and/or comprehension, however, makes conversation about provided materials difficult or impossible. For example, in conversation about provided materials, examiner can identify picture or naming card content from patient's response. 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	

	3	3	3	communication. Examiner cannot identify materials provided from patient response. Mute, global aphasia; no usable speech or auditory comprehension.
10. Dysarthria	0 1 2	0 1 2	0 1 2	Normal Mild-to-moderate dysarthria; patient slurs at least some words and can be understood with some difficultly. Severe dysarthria; patient's speech is so slurred as to be unintelligible in the absence of or out of proportion to any aphasia, or is mute/anarthric.
11. Extinction and inattention (formally neglect)	0 1 2	0 1 2	0 1 2	No abnormality Visual, tactile, auditory, spatial, or personal inattention or extinction to bilateral simultaneous stimulation in one or the sensory modalities Profound hemi-inattention or extinction to more than one modality; does not recognise own hand or orients to only one side of space.
Total				

Appendix 4. Suggested protocol for Labetalol IV infusion

Form: 100 mg in 20 mL ampoules (5 mg/mL)

Route: Slow intravenous infusion

Dilution: Withdraw 90 mL from a 250 mL bag of 5% glucose *or* 0.9% sodium chloride and discard, leaving 160mL. To this, add two ampoules (200 mg in 40 mL in total) to the infusion bag to give a 1 mg/mL solution.

Dose and rate: Usual rate 120 mg/hour (2 mg/min) (i.e. 120 mL/hour of 1 mg/mL solution) until satisfactory response, then discontinue. The effective dose is usually 50 to 200 mg, but the infusion should be continued until a satisfactory response is obtained and larger doses may be needed.

Monitoring: Monitor BP and pulse at 5-10 minute intervals during infusion. Onset/duration: 5-10 min/2-6 hr. Peak effect in 30 minutes.

.

Contraindications: History of wheezing or asthma, uncontrolled heart failure, Prinzmetal's angina, marked bradycardia, hypotension, sick sinus syndrome, second or third degree heart block, cardiogenic shock, metabolic acidosis, severe peripheral arterial disease, untreated phaeochromocytoma,

Adverse Events: Bradycardia (severe bradycardia is unusual but may be controlled by injecting atropine), bronchospasm, postural hypotension (patient should lie for at least 3 hours after administration), tiredness, weakness, headache, rashes, scalp tingling, difficulty in micturition, epigastric pain, nausea, vomiting.

References: Trandate© SmPC (https://www.medicines.org.uk/emc/product/10831/smpc)
Medusa Injectable Medicines Guide (monograph 03/12/2019)

Appendix 5. Suggested protocol for Nicardipine IV infusion

Form: 10 mg in 10 mL ampoules (1 mg/mL)

Route: Slow intravenous infusion

Dilution: Withdraw 50 mL from a 500 mL bag of **5% glucose** and discard, leaving 450 mL. To this, add five ampoules (50 mg in 50 mL in total) to the infusion bag to give a 0.1 mg/mL solution.
NOTE: incompatible with solutions with a PH above 6 (e.g. bicarbonate), it should not be mixed with sodium chloride solutions, due to adsorption risk

Dose and rate: Usual starting rate 2.5 mg/hour (25 mL/h), but 1 mg/hour (10 mL/h) for patients>65 years. Increase by 1 mg/hour (10 mL/h). Rate changes should be made at least every 15 minutes. The absolute maximum rate is 15 mg/hour (150 mL/h).

Monitoring: ECG. Monitor BP and pulse (risk of tachycardia) at 5-minute intervals during infusion and for at least 12h post-infusion.

.

Contraindications: Known hypersensitivity, severe aortic stenosis, compensatory hypertension, unstable angina, within 8 days of MI, fructose intolerance.

Cautions: Cardiac failure, suspected coronary ischaemia, pregnancy, hepatic dysfunction, portal hypertension, pre-existing elevated intracranial pressure, acute ischaemic stroke

Adverse Events: Headache, dizziness, lower limb oedema, palpitations, flushing, hypotension, tachycardia, nausea and vomiting

References: Nicardipine SmPC (https://www.medicines.org.uk/emc/product/3322/smpc)
Medusa Injectable Medicines Guide (monograph 05/07/2017)

Appendix 6. Suggested protocol for glyceryl trinitrate (GTN) IV infusion

Form: 50 mg in 50 mL vials (1mg/mL), ready to infuse

Route: Slow intravenous infusion

Dose: 10-200 micrograms/min, depending on indication

Administration: Administer undiluted using a syringe pump incorporating a rigid plastic syringe (e.g. BD Plastipak syringes) and titrate according to response. ***Incompatible*** with PVC infusion containers (e.g. Viaflex, Steriflex)

Rate: For acute hypertension start at a rate of 25 micrograms/min (1.5 mL/h) and increase in steps of 25 micrograms/min (1.5 mL/h) at 5-10 minute intervals until desired drop in blood pressure is seen.

GTN 1 mg/mL via syringe pump	
Dosage (micrograms/min)	**Infusion rate (mL/h via syringe pump)**
10	0.6
15	0.9
20	1.2
25	1.5
30	1.8
40	2.4
50	3.0
75	4.5
100	6.0
150	9.0
200	12.0

Monitoring: Blood pressure: Monitor every 15 minutes. Ensure BP is maintained above 90/60mmHg. If SBP falls below 90mmHg, reduce or temporarily discontinue the infusion, and inform the doctor.
Pulse rate: If heart rate increases 10% above its initial value, discontinue infusion.

Contraindications: Known hypersensitivity, shock, severe hypotension or hypovolaemia, severe anaemia, myocardial insufficiency due to obstruction, aortic or mitral stenosis, hypertrophic obstructive cardiomyopathy or constrictive pericarditis

Caution: Avoid in haemorrhagic stroke

Adverse Events: Headaches, dizziness, tachycardia, hypotension, nausea, vomiting

References: Nitrocine© SmPC (https://www.medicines.org.uk/emc/product/9218)
Medusa Injectable Medicines Guide (monograph 20/12/2016)

Appendix 7. Rapid Access TIA / Stroke Prevention Clinic Referral Process

High Risk	**All High-Risk referrals must be phoned through to Stroke Team immediately with patient present.** After advice from stroke nurse fill out referral and email to: Tiastrokepreventionreferrals@nnuh.nhs.uk Mon - Fri, 08:30 – 17:00 Tel: 01603 647478 **OR** 01603 288173 Out of hours and weekends Tel: 01603 646588

Low Risk	**Email referral immediately to** Tiastrokepreventionreferrals@nnuh.nhs.uk (hospital will contact patient direct within 7 days to arrange appointment)

Next Steps

1. If symptoms have completely resolved: Give aspirin 300mg unless contraindicated or on an Anticoagulant until seen in clinic
2. Ask patient to bring their medication list with them to the appointment/clinic
3. Inform patient: They should not drive AND If they develop any further focal neurology call 999 immediately

If you are unsure, please call the Stroke team on 01603 288185 or 01603 646588 for advice

Patient Details	
First Name:	Last Name:
Date of Birth:	Gender:
NHS Number:	Hospital No:
Address:	
Post Code:	Home Phone:
Mobile Number:	Other Contact:
Patient Consent:	
☐	In line with GDPR, please confirm that you have spoken to the patient, and or parent / carer, and they have consented to the referral and the sharing of their data with this service

Accessible Information Standards		
Please specify below if the **patient** and or **parent** / **carer**, have additional needs related to:		
	Patient:	**Parent / Carer:**
Vision		
Hearing		
Speech		
Other communication difficulties		
The patient, and or parent / carer, requires an: ☐ Interpreter (*specify* ☐ Lip ☐ BSL interpreter		

language)	speaker

Referrer Details			
Referrer Name:			
Position:		Contact Number:	
Referred from:	☐ GP / ☐ A&E / ☐ Ophth / ☐ AMU / ☐ EEAST / ☐ Other		
GP Name (if not referrer):		Practice Name:	
Referrer's Email:			

Assessment			
Clinical Impression / Short History			
Date/time of onset of symptoms:		Date/time of first contact:	
Patient's Blood Pressure:			
Clinical Features:			
Duration:		Diabetes:	
Patient has known AF	☐ Yes / No ☐	Or currently in AF	☐ Yes / No ☐
Does your patient have any of these?	☐ More than 1 event in 7 days	☐ On Anticoagulants DOAC or NOAC (This is not Aspirin)	

The patient **must** have experienced sudden onset of at least one of the following symptoms:	**What happened?** Provide details:
☐ Dysphasia ☐ Amaurosis fugax ☐ Hemianopia ☐ Loss of power OR sensation OR both, in face OR arm OR leg. ☐ **MORE THAN ONE** of Dysarthria, Vertigo, Double Vision, Ataxia, Dysphagia	

NB: One or more of: Blackout, Light headedness, Faintness, Dizziness, Total Body weakness, Fatigue, Drop Attacks or Amnesia are NOT LIKELY to be TIA. Consider referral to general / syncope / falls clinic.

ABCD² Score (Essential)			Score
A	Age	Score 1 if over 60	
B	BP	Score 1 if systolic BP >140 or diastolic >90	

C	Clinical Features	Score 2 for unilateral weakness OR score 1 for speech disturbance without weakness (max score is 2)	
D	Duration	Score 1 for 10-59 minutes, score 2 for >60 minutes	
D	Diabetes	Score 1 if known Diabetes	
		Total Score	/ 7
Definition of Score:		**High - ABCD2 score of 4+, or on Anticoagulant, or more than 1 event in a week** **Low - ABCD2 score of 3 or less**	

Medical History (or attach separately) Eye clinic referrals: send copy of eye notes
Medication (or attach separately)

Have you told patient not to drive? ☐ **Yes / No** ☐

Appendix 8. Prescription Chart for Intravenous Unfractionated Heparin Infusions

Patient Name **Hospital Number** **Date of Birth**	**Ward** _____ **Consultant** _____ **Indication**

(1) Loading Dose Intravenous Unfractionated Heparin (only needed when starting therapy)

Date	Dose	Dr's Signature & Bleep	Time given	Given by/Checked by
	Unfractionated Heparin 5,000 units/5 mL IV stat			

(2) Continuation Intravenous Heparin Infusion (to begin immediately after stat Heparin)

Doctors

- **Sign and date in bold box below, add a placeholder "HEPARIN VARIABLE RATE INFUSION-see paper chart" to EPMA and prescribe on EPMA supplementary chart as** 20,000 units Unfractionated Heparin IV made up to 40 mL NaCl 0.9% at rate stated on Heparin Infusion Chart
- **Review** use of IV unfractionated heparin (UFH) daily; consider conversion to treatment dose Low Molecular Weight Heparin (LMWH). Leave interval of 1 to 2 hrs after stopping UFH before commencing LMWH. If Heparin (UFH or LMWH) is to continue **check FBC every 3rd day** or more frequently if clinical problems.
- **If platelet count falls >30% seek haematological advice.**
  BASELINE PLATELET COUNT: **x 10^9/L** (150 – 400)

Date	Dose	Infusion rate	Check aPTTr	Dr's Sign & Bleep	Time given	Given by/ Checked by
	Unfractionated Heparin 20,000U made up to 40 mLs with NaCl 0.9%	**2.0 mL/hr**	**3 hr**			

Titrate dose against APTTr as per schedule below.
aPTTr must be checked 4 hours after any change in infusion rate AND every 24 hours if in target range
TARGET aPTT RATIO 1.5 – 2.5

Date	Time of aPTTr	aPTTr result	NEW Infusion rate (mL/hr)	Next aPTTr check	Dr's Sign & Bleep *	Time started	Given by/ Checked by

* In specialist areas (critical care complex/vascular surgery) senior nursing staff/charge nurses/independent nurse practitioners with appropriate training and experience may adjust Heparin infusion rates without prior authorisation by a doctor (in this case nurse should sign in box above)

Nurses

aPTTr	Infusion Rate Change	
>5.0	Stop for 1 hour, reduce by 1 mL/hr	-500 units/hr
4.1-5.0	Reduce by 0.6 mL/hr	-300 units/hr
3.1-4.0	Reduce by 0.2 mL/hr	-100 units/hr
2.6-3.0	Reduce by 0.1 mL/hr	-50 units/hr
1.5-2.5	No change	0
1.2-1.4	Increase by 0.4 mL/hr	+200 units/hr

Preparation of Infusion

- Use an **unfractionated heparin (UFH) 20,000 units in 20 mL ampoule**, add **20 mL NaCl 0.9%** to make a **total of 40 mL**. Invert syringe at least 5 times.
- Infusion line should be primed with this UFH solution.
- **Heparin syringe must be changed after 24 hrs**
- Nurses/Doctors: Make sure aPTTr has been requested and add time to table above; check results*; alter infusion

	<1.2	Increase by 0.8 mL/hr	+400 units/hr	rate according to schedule. *__If unable to obtain sample__ unfractionated heparin must be stopped and alternative anticoagulation **must** be discussed with senior medical/surgical staff

8. Equality Impact Assessment (EIA)

Type of function or policy	Existing

Division	Medical	**Department**	Stroke
Name of person completing form	Silvia Marroqui	**Date**	

Equality Area	Potential Negative Impact	Impact Positive Impact	Which groups are affected	Full Impact Assessment Required YES/NO
Race				NO
Pregnancy & Maternity				NO
Disability				NO
Religion and beliefs				NO
Sex				NO
Gender reassignment				NO
Sexual Orientation				NO
Age				NO
Marriage & Civil Partnership				NO
EDS2 – How does this change impact the Equality and Diversity Strategic plan (contact HR or see EDS2 plan)?				

- **A full assessment will only be required if: The impact is potentially discriminatory under the general equality duty**
- **Any groups of patients/staff/visitors or communities could be potentially disadvantaged by the policy or function/service**
- **The policy or function/service is assessed to be of high significance**

IF IN DOUBT A FULL IMPACT ASSESSMENT FORM IS REQUIRED

The review of the existing policy re-affirms the rights of all groups and clarifies the individual, managerial and organisational responsibilities in line with statutory and best practice guidance.