# Management of Acute Stroke

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<th>Management of Acute Stroke</th>
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<td>National Clinical guideline for stroke. Prepared by the Intercollegiate Stroke Working Party. 5th Ed. October 2016</td>
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<td>Stroke and Transient Ischaemic Attack in over 16s: Diagnosis and Initial Management. Ng128 (1st May 2019)</td>
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*This guideline has been registered with the trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt contact a senior colleague or expert. Caution is advised when using guidelines after the review date or outside of the Trust.*
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1.0 Introduction

This guideline aims to summarise the initial investigation and treatment of acute stroke.

It is important to note that these are guidelines and may not be applicable in every clinical situation. All investigation and treatment decisions need to be made by the clinician assessing the patient taking into considering clinical presentation, current patient condition, any advanced directives and good medical practice.

If there is any uncertainty please escalate to the Medical SpR or Stroke Consultant on-call.

Please note: the management of subarachnoid haemorrhage, subdural and extradural haemorrhage are not part of the stroke syndrome and therefore not covered in this guideline

2.0 Acute management of suspected stroke

2.1 Acute Assessment

Airway Airway obstruction is usually due to decreased GCS. Perform airway opening manoeuvres and use simple airway adjuncts such as guedel and NPA. If clinically appropriate contact anaesthetist for intubation if GCS <8.

Breathing Monitor respiration rate and oxygen saturations. Maintain oxygen saturations ≥94% unless at risk of type 2 respiratory failure where target oxygen saturations 88-92%. Be cautious in performing ABG if considering thrombolysis or within 24 hours of thrombolysis.

Circulation Assess blood pressure and pulse. Check blood pressure in both arms if very hypo or hypertensive. Avoid large fluctuations in blood pressure. Prescribe IVI in those patients NBM, drowsy or hypotensive.

Disability Assess GCS. Nursing staff will perform NIHSS on admission to assess severity of stroke.
Exclude hypoglycaemia as cause of neurological symptoms. If blood glucose < 4 give 100ml 20% dextrose until blood sugar corrected (target 5-15) – see hypoglycaemia in patients with diabetes guidelines. If this causes complete resolution of neurological symptoms then don’t treat as stroke.

If type 1 diabetic and nil by mouth (NBM) start sliding scale for control of blood sugars.

Monitor temperature – if >37.2C (in the first 72 hours), prescribe regular paracetamol PO/NG/IV. Although pyrexia may be due to the acute stroke perform septic screen and start antibiotics as appropriate. After 72 hours, follow the NEWS2 recommendations.

Exposure Perform a full clinical examination to identify potential causes of stroke, looking for signs of recent trauma, and bleeding.

2.2 Investigations to be performed on admission

The following investigations should be requested for every patient admitted with a suspected stroke.

- CT head +/- CT angiogram (see next section)
- Bloods: FBC, UE, CRP, LFT, TFT, Bone, Clotting, Lipids, group and save, HbA1c
- ECG: looking for atrial fibrillation, left ventricular hypertrophy or ischaemic changes
- Chest x-ray: if suspicion of aspiration, hypoxic, chest signs on examination

2.2.1 Imaging: CT brain +/- CT angiogram

These are indications for immediate scanning:

- Candidate for potential intravenous thrombolysis or mechanical thrombectomy or both
- On anticoagulant therapy (warfarin, heparin, DOAC, i.e. apixaban, rivaroxaban, dabigatran)
- Patient with known bleeding tendency
- Reduced level of consciousness
- Fluctuating symptoms
- Papilloedema, neck stiffness or pyrexia
• Severe headache at onset of stroke symptoms

All patients should have a CT head as soon as possible, ideally within 1 hour.

The report of the scan should be reviewed as soon as possible and documented in the patient’s notes as proof report has been seen. It is the responsibility of the doctor requesting the scan to ensure it is performed, report reviewed and appropriate treatment instigated.

In all patients who satisfy the following criteria (applicable only Mon – Fri 0800 – 1600 hrs at present) should have biphasic CT angiogram (aortic arch to circle of Willis)

• Admission NIHSS score of ≥ 5
• Premorbid Rankin of ≤ 2
• Age 18 – 80
• ≤ 12 hours from symptom onset (up to 24 hours in specific cases) – including ‘wake-up’ strokes
• Suspicion of basilar artery occlusion

In patients presenting outside these hours, CT angiogram should be considered in those with features of basilar occlusion or in specific cases at the discretion of the on-call Stroke Consultant (this has to be a Stroke Consultant decision).

2.2.2 Imaging: MRI brain

MRI with stroke specific sequences (diffusion weighted imaging - DWI) should be performed in patients with suspected acute stroke when there is diagnostic uncertainty. Request on the advice of stroke consultant.

2.3 Treatment post imaging

If brain imaging rules out intracerebral haemorrhage or structural central nervous system lesion such as tumour:

• Prescribe 300mg aspirin stat PO if able to swallow, otherwise NG/PR
• Aspirin 300mg PO/NG/PR should then be prescribed for 14 days
• If aspirin intolerant, prescribe clopidogrel 300mg stat then clopidogrel 75mg daily.
If brain imaging shows an intracranial bleed, space occupying lesion, possible abscess etc do not give aspirin but make contact with the on-call neurosurgeons at QMC for treatment advice

### 3.0 Management of ischaemic stroke

#### 3.1 Anti-platelet therapy

Patients should be prescribed 300mg aspirin and changed to clopidogrel after 14 days or at the time of discharge whichever is the earliest for long term secondary prevention.

Hold anti-platelets for 24 hours after thrombolysis.

Review PPI therapy given possible interaction with clopidogrel making it less effective

- Stop PPI if no longer indicated.
- Change to lansoprazole or give ranitidine if anti-acid treatment required

If both aspirin and clopidogrel intolerant prescribe dipyridamole 200mg twice daily.

Recent evidence suggests that dual antiplatelet should be considered for preventing early recurrence of stroke following TIA or minor stroke (NIHSS score of \( \leq 3 \)); in which case, aspirin 75 mg for 10 – 21 days and clopidogrel 75 mg once a day (long term).

#### 3.2 Anti-hypertensives and blood pressure management

If a patient is already on antihypertensive medication this should be continued assuming that oral or NG feeding is established and the patient is not dehydrated / hypotensive.

Anti-hypertensives should be started if any of the following apply:

- BP >185/110 and patient being considered for thrombolysis (see thrombolysis protocol)
- Hypertensive encephalopathy / nephropathy
- Concomitant heart failure or myocardial infarction
- Aortic dissection
3.3 Statin therapy

Patients with ischaemic stroke should be prescribed a statin irrespective of cholesterol level.

The treatment of choice is atorvastatin 80mg od (or atorvastatin 40mg if <50kg). If documented intolerance to statin consider trial of alternative statin or lower doses. In case of previous history of myopathy (myalgia or myositis), consider Fluvastatin MR 80 mg od.

3.4 Diabetes treatment/Blood sugar control

Avoid hypoglycaemic episodes (blood glucose < 4) if possible. Treat with 100mls 10% dextrose boluses until hypoglycaemia treated.

Aim for blood sugar 5-15. This may require starting oral hypoglycaemics.

In patients with type 1 diabetes who are NBM start insulin sliding scale.

3.5 Anticoagulation therapy (warfarin, heparin, DOACs)

Avoid the use of anticoagulation therapy in the first two weeks post acute stroke as there is high risk of haemorrhagic transformation.

Do not give any anticoagulants in the first 24 hours after thrombolysis.

In patients with prosthetic heart valves who have a significant ischaemic stroke and are at risk of haemorrhagic transformation NICE states anticoagulation can be held for 1 week and 300mg aspirin prescribed instead.

In patients with prosthetic heart valves who have a haemorrhagic stroke anticoagulation should be held.
In both cases there should be consultant to consultant discussion between stroke and cardiology team regarding safest management. Do not prescribe IV heparin in the acute stroke patient.

In patients with non-valvular AF or paroxysmal AF anticoagulation with a DOAC should be considered. Anticoagulation should be held for 14 days after an acute ischaemic stroke. The decision to start anticoagulation lies with the stroke consultant.

In patients with acute ischaemic stroke and acute diagnosis of PE or DVT treatment with therapeutic enoxaparin should be commenced after discussion with the stroke consultant. The patient will need hourly neuro obs for the first 24-48hrs after commencing treatment to monitor for signs of haemorrhagic transformation.

In patients with haemorrhagic stroke with an acute DVT/PE consideration should be made to IVC filter or anticoagulation.

4.0 VTE Prophylaxis

Prophylactic enoxaparin should not be routinely used on the stroke unit. If patients are immobile, cannot have IPC and do not have an intracerebral bleed, enoxaparin can be started after 3 days. If patients are mobile they do not require VTE prophylaxis.

Intermittent pneumatic compression (IPC) should be used in all patients with haemorrhagic stroke and those with ischaemic stroke who have significant limited mobility.

Treatment with IPC should:
- Start within 2 days of admission
- Be discontinued once patient is mobile, has any adverse effects or is discharged home
- Be prescribed on the drug chart asking nurses to tick when IPC is on

Contraindications to IPC:
- Severe congestive heart failure or peripheral vascular disease
- Significant skin disease/ulceration to lower limbs

TEDS should not be prescribed in stroke patients.
5.0 Management of intracerebral haemorrhage (ICH)

If intracerebral haemorrhage confirmed on CT:

- Stop all anti-platelets and anticoagulants
- Ensure FBC, Coag and G&S have been sent
- Reversal of anticoagulants should be performed as soon as possible (see guideline ‘managing acute non-traumatic intracranial haemorrhage in adult patients on warfarin or similar medication’)
  - If abnormal clotting and not on anticoagulants speak to on-call haematologist
  - If patient on warfarin: give vitamin K and octaplex
  - If patient on dabigatran: Discuss with haematology - reverse with idarucizumab
  - If patient on factor Xa inhibitor: give octaplex

Patients with ICH should be discussed with the on-call neurosurgeon at QMC to ensure all appropriate treatment has been considered. Please ensure any advice given and name of surgeon is clearly documented in the notes.

Blood pressure control

Patients who present within 6 hours of onset with a systolic BP >150mmHg should be treated urgently with IV labetolol 25mg, aiming systolic BP 140 – 150 mmHg.

Hold aggressive antihypertensive treatment if:

- GCS <5/15
- Haematoma very large and death is expected
- A structural cause of the haematoma is identified
- Immediate surgery to evacuate the haematoma is planned

Clinical observation

Patients require neuro obs for 24-48 hours after diagnosis of intracerebral bleed. A 2 point drop in GCS or new neurology is an indication for urgent repeat CT head and re-discussion with the neurosurgeons.
Patient with prosthetic heart valves
Hold anticoagulation and discuss with the cardiologist on-call at the earliest opportunity.

Statin therapy
Should be held in all patients with intracerebral haemorrhage. Re-start on advice of stroke consultant

6.0 References


NICE. Stroke and Transient Ischaemic Attack in over 16s: Diagnosis and Initial Management. ng128. 1st May 2019
**Suspected stroke or TIA?**

- Ongoing symptoms and less than 4.5 hours since symptom onset?

**THROMBOLYSIS PROTOCOL**

- Symptoms completely resolved and lasted < 24 hours?

**TIA PROTOCOL**

- Symptoms ongoing but not a thrombolysis candidate?

Request a CT head immediately to ideally be performed immediately

**Scans which need to be completed within 1 hour:**

- Candidate for thrombolysis
- Fluctuating neurological symptoms or GCS < 13
- On anticoagulant therapy
- Papilloedema, meningism, pyrexia
- Known bleeding tendency
- Severe headache at symptom onset

Arrange the following URGENT investigations:

- Bloods: FBC, U&E, LFT, Bone, TFT, Coag, Lipids, glucose
- ECG
- Nurse led swallow assessment (keep patient NBM until complete)
- CXR if possibility of aspiration prior to admission

**Evidence of intracranial haemorrhage (ICH) on CT head?**

**NO**

**YES**

**Treat as ischaemic stroke**

- Give 300mg aspirin PO/NG/PR for 14 days then give 75mg Clopidogrel long term. If TIA or minor stroke (NIHSS < 4), consider DAPT (see above)
- If aspirin intolerant: give 300mg Clopidogrel then 75mg Clopidogrel from day 2
- Avoid anticoagulants acutely including LMWH. Stop warfarin and discuss with consultant within 24 hours about when to restart
- Hourly neuro obs for first 24 hours

**Treat as haemorrhagic stroke**

- Stop statin, antiplatelets, anticoagulation
- Reverse any anticoagulants: See intranet guidelines
  - Warfarin: give vitamin K + octaplex
  - Dabigatran: give idarucizumab (discuss with Haem)
  - Factor Xa inhibitor: octaplex
- Treat BP with iv labetolol if BP >150 systolic.
- Target BP < 140 systolic
- Neuro obs hourly for first 24 hours
- Discuss with neurosurgical team on call

**Ongoing acute management:**

- Aim blood glucose 4-11. Start sliding scale if T1DM and NBM
- Keep NBM until nurse led swallow assessment or SALT assessment
- Consider early NG tube placement if likely NBM > 24hours (avoid in first 24hours post thrombolysis)
- Give IV fluids 2 litres over 24 hours until feeding established
- Use IPC for VTE prophylaxis for all strokes (unless contraindicated) - priority is given to haemorrhagic strokes.
- Give enoxaparin after 3 days if no IPC available and ischaemic stroke
- Avoid big swings in BP. Continue regular antihypertensives (orally or via NG). Avoid GTN patch for first 6 hours. If BP still uncontrolled consider IV GTN
- If evidence of infection perform full septic screen and prescribe antibiotics as per stroke antibiotic guidelines
- Avoid urinary catheter. If painless retention, for intermittent catheter. Do not catheterise within 24 hours of thrombolysis

**Indications for urgent repeat CT head:**

- Deteriorating consciousness (2 point drop in GCS)
- Seizure or new neurology post thrombolysis
- New or worsening severe headache
- New or worsening neurological signs
- Clinical signs of mass effect

**Indications for neurosurgical referral:**

- Intracerebral haemorrhage
- Declining consciousness and:
  - MCA stroke >50% MCA territory if age ≤ 60
  - Large MCA stroke with significant midline shift
  - Cerebellar stroke with effaced 4th ventricle

Between Mon – Fri in hours
Please inform the stroke consultant on BSU1 of all stroke admissions.

Out of hours
Please inform the Medical SpR on-call of all stroke admissions.

Patients should have a senior review within 6 hours of admission.

Any deteriorating patient needs review by medical SpR and discussion with on-call consultant as appropriate