

ACUTE STROKE MANAGEMENT GUIDANCE

Swansea Bay University Health Board

HYPERACUTE PHASE – Immediate actions for all suspected **STROKE**:

Consider **eligibility** for thrombolysis and thrombectomy

Follow the **stroke thrombolysis booklet/pathway** – consider immediate imaging if potentially eligible for thrombolysis or thrombectomy

FAST alert via switchboard if considered eligible for thrombolysis or thrombectomy

- This will trigger stroke co-ordinator/advanced clinical practitioner to attend (Mon-Sun 7.30am - midnight)

Note current National Clinical Guideline (2023) on thrombolysis

Adult patients with acute ischaemic stroke, **regardless of age or stroke severity**, in whom treatment can be started within 4.5 hours of known onset should be considered for thrombolysis.

Thrombolysis may be indicated beyond 4.5 hours in certain circumstance with the assistance of advanced imaging – liaise with stroke team and neuroradiology.

Onset time	Time window	Advanced imaging required	Imaging criteria
Known	< 4.5 hours	Nil	No contraindication
Known	4.5 – 9 hours	CT/MRI perfusion	Mismatch ratio > 1.2 Mismatch volume > 10 ml Ischaemic core < 70 ml
Wake up	> 4.5 hours last known well	MRI DWI-FLAIR	DWI lesion + ve FLAIR lesion – ve
Wake up or unknown onset	> 4.5 hours last known well and < 9 hours from midpoint of sleep	CT/MR perfusion	Mismatch ratio > 1.2 Mismatch volume > 10 ml Ischaemic core < 70 ml

Request **CT head +/- CT angiogram (aortic arch to vertex)**

Imaging to be completed within 1 hour of arrival.

CT angiogram should be performed if patient is potentially eligible for thrombectomy, meets all criteria:

- NIHSS ≥ 6 (or disabling/fluctuating deficit)
- Pre-stroke modified Rankin Score 0 – 2
- Thrombectomy service available – currently 6 am – 10 pm, 7 days a week (Southmead, Bristol)

Obtain IV access and request **initial investigations**

Chest X ray

ECG

Bloods: FBC, U&E, LFT, glucose, lipids, HbA1c, coagulation screen, young stroke screen in selected cases (discuss with stroke physician first)

If not for thrombolysis - give **aspirin** 300mg (PO or PR or NG) immediately once haemorrhage excluded by CT head

Continue aspirin for 14 days to be followed by clopidogrel 75mg od

If allergic or genuine intolerance to aspirin – consider alternative anti platelets e.g. **stat dose** of clopidogrel 300mg, then 75mg to continue

Add PPI if previous dyspepsia associated with aspirin (lansoprazole if patient will be on clopidogrel in the long term)

For minor ischaemic stroke with no high risk of bleeding or contradiction consider Dual Antiplatelet Treatment (in liaison with stroke team, with a PPI):

- Clopidogrel (stat 300mg followed by 75mg od long term) plus aspirin (stat 300mg followed by 75mg od for 21 days) or
- Ticagrelor (180mg followed by 90mg bd) plus aspirin (stat 300mg followed by 75mg od for 30 days) followed by ticagrelor 90mg bd or clopidogrel 75mg od or
- If dual antiplatelet therapy not appropriate: Clopidogrel 300mg followed by 75mg od

Consider referral for **mechanical thrombectomy** – if appropriate refer immediately via **referapatient.org**
Thrombolysis should still take place in a timely manner if no relevant contraindications present

Currently, service is available in **North Bristol Trust Monday to Sunday 8 AM to 10 PM**

Referral Criteria:

- Patients with a proximal intracranial **large vessel occlusion** (clot) seen on plain CT head
- Disabling neurological deficit (**NIHSS 6 or more**)
- Procedure can be started within **6 hours** of known symptom onset
- Those with contraindications to intravenous thrombolysis should also be considered for intervention
- Take into account pre-stroke functional status (**mRS 0 – 2** is more favourable)
- Treatment can also be considered beyond 6 hours:
 - If a favourable salvageable brain tissue on imaging has been proven where **treatment up to 24 hours** after onset may be appropriate.
 - If it is a **posterior circulation large artery occlusion**, **treatment up to 24 hours** after onset may be appropriate.

Vessel occluded	Last known well	mRS	NIHSS	Imaging required	Imaging Criteria
Anterior circulation	< 6 hours	0 - 2	≥ 6	CT CTA	
ICA/M1	6 – 12 hours	0 – 1	≥ 6	CT CTA	ASPECTS ≥ 3
ICA/M1	12 – 24 hours	0 – 1	≥ 10	CT CTA CT/MR perfusion	ASPECTS ≥ 3 and CT/MR perfusion mismatch > 15 ml
Basilar or vertebral (intracranial)	< 24 hours		≥ 10	CT CTA	PC-ASPECTS and Pons-Midbrain Index favourable

Due to limitations of current service, patients presenting late in the day/overnight may not be eligible for immediate treatment. However, these patients **may still be suitable for treatment the following morning** (if they still meet referral criteria above).

For such patients please consider a **repeat CT head and CT angiogram** (arch of aorta to vertex) **at 5 am**, followed by referral in the usual manner.

Admit directly to **ward F - Acute Stroke Unit** (within 4 hours)

Transfer to ward F as long as medically stable and does not require urgent intervention in Emergency Department.

For example - warfarin related intracerebral bleeds **should be reversed immediately** in Emergency department with vitamin K and prothrombin complex concentrate before transfer to the ward as any delay in reversal can be life threatening due to risk of increase in haematoma size.

Or IV BP lowering treatment for intracerebral bleeds which must be started immediately in ED prior to transfer.

Screen **swallow**

Please follow the current local swallow screen for all acute stroke patients (within 4 hours of arrival) prior to providing oral food, fluid or medication.

Refer to SALT if fails swallow screen. Commence IV fluids, amend route/formulation of necessary medications and **consider** NG feeding within 24 hours (**avoid placement of NG tubes out of hours or in first 24 hours post thrombolysis**)

Refer to a dietitian for specialist nutritional assessment, advice and monitoring.

Consider indications for referral to **neurosurgery**

Ischaemic Stroke – for decompressive hemicraniectomy:

Patients with middle cerebral artery (MCA) infarction who meet the criteria below should be referred to neurosurgery within 24 hours of stroke onset (intervention within 48 hours):

- Pre-stroke modified Rankin Scale score of less than 2 (independent for ADLs);
- Clinical deficits indicating infarction in the territory of the MCA;
- National Institutes of Health Stroke Scale (NIHSS) score of more than 15;
- a decrease in the level of consciousness to a score of 1 or more on item 1a of the NIHSS;
- signs on CT of an infarct of at least 50% of the MCA territory with or without additional infarction in the territory of the anterior or posterior cerebral artery on the same side.

Haemorrhagic stroke:

- Superficial haemorrhages with signs of significant swelling or midline shift
 - Suspected underlying vascular abnormality
 - Symptomatic hydrocephalus
- Discuss with Neurosurgical SPR at UHW, Cardiff.

Following scenarios **DO NOT necessarily** need Neurosurgical referral and should be treated medically initially (NICE CG68)

- small deep haemorrhages

The DESTINY II trial of decompressive hemicraniectomy for **older patients** with severe space-occupying MCA territory infarction has shown a substantial **survival benefit** for patients over the age of 60 years, similar to that seen in young patients. Decisions to undertake major life-saving surgery need to be carefully considered on an individual basis, but ***patients should not be excluded from treatment by age alone.***

- lobar haemorrhage without either hydrocephalus or rapid neurological deterioration
- a large haemorrhage and significant co morbidities before the stroke
- a score on the Glasgow Coma Scale of below 8 unless this is because of hydrocephalus or posterior fossa haemorrhage.

Reversal of anticoagulation following acute intracerebral haemorrhage

Liaise with haematologist

Consider the use of:

- **Intravenous vitamin K and prothrombin complex concentrate** if associated with **warfarin** treatment
- **Idarucizumab** (Praxbind) if associated with **dabigatran** treatment
- **Prothrombin complex concentrate** if associated with **factor Xa inhibitor** treatment

Initial blood pressure management after acute **ischaemic** stroke

- ✓ Maintain BP <185/110 **post thrombolysis** for **acute ischaemic stroke** with rapid blood pressure lowering agents if needed (e.g. IV labetalol or nitrate)
- ✓ Treat with rapid blood pressure lowering IV agents only if hypertensive emergency present following **non-thrombolysed** ischaemic stroke:
 - Hypertensive encephalopathy
 - Hypertensive nephropathy
 - Hypertensive cardiac failure/myocardial infarction
 - Aortic dissection
 - Pre-eclampsia/eclampsia

Initial blood pressure management after acute **haemorrhagic** stroke:

- ✓ Maintain BP <140/90 following **haemorrhagic stroke** (INTERACT trial)

Offer rapid blood pressure lowering with IV labetalol or nitrate as needed for up to 7 days post onset of symptoms if needed if:

- Patient presents with systolic BP 150-220 mmHg

Target **systolic BP 130 – 139 mmHg** within 1 hour of treatment

Do not offer rapid blood pressure lowering if:

- Underlying structural cause (e.g. tumour, AVM, aneurysm)
- GCS < 6
- Early neurosurgical intervention planned
- Massive haematoma with poor prognosis

ACUTE PHASE – ongoing management for all patients with confirmed stroke

Initial Investigation

Investigate for (in appropriate situations):

- Symptomatic carotid artery stenosis – carotid Doppler once suitable (patient transferring independently)
- Atrial fibrillation – e.g. ECG, 24 hour Holter, prolonged Holter
- Structural cardiac disease – e.g. Echo, bubble echo, contrast echo, TOE

Refer for carotid endarterectomy if appropriate

Consider immediate referral to vascular surgery if:

- Non disabling carotid artery territory stroke or TIA
- Symptomatic internal carotid artery stenosis 50 – 99% (NASCET)

Consider **lipid lowering** agents

Continue if already taking

Avoid starting statins in haemorrhagic stroke, unless required for other indications (eg. ischaemic heart disease).

Otherwise consider Atorvastatin (20-80 mg) after 48 hours.

Target fasting LDL-cholesterol to < 1.8 mmol/l

Review at 4 – 6 weeks and if not achieved consider:

- Adherence and tolerability
- Dietary and lifestyle optimisation
- Increase dose of statin
- Add ezetimibe 10mg od
- Alternative treatment options

Ongoing **blood pressure** control

Initial therapy:

- 55 years old or African/Caribbean: **calcium channel blocker** or **thiazide like diuretic**
- < 55 years old and not African/Caribbean: **ACEi/ARB**

Long term target systolic BP < 130 mmHg (unless severe bilateral carotid stenosis)

Maintain **blood glucose** between 5 – 15 mmol/l

Follow variable rate insulin infusion as per local protocol if patient is nil by mouth and normally on insulin, with close monitoring to avoid hypoglycaemia. Once oral/NG feed established, recommence routine diabetic medications as per advice from diabetic specialist team

Refer to **physiotherapy**

For consideration of early mobilisation

Order **repeat CT head** 24 hours following thrombolysis

A 24 hour CT brain will need to be performed after thrombolysis or earlier if any neurological decline (as per pathway).

Prescribe 300 mg of **aspirin** on drug chart/HEPMA if the repeat CT has excluded haemorrhage

Use intermittent pneumatic compression devices

Do not give heparin (in any dose) routinely for the prevention of DVT and PE in patients who are immobile after acute stroke (unless minor stroke where case by case decision will have to be made)

Initiation of oral anticoagulation post-acute ischaemic stroke for atrial fibrillation:

AF related ^{strokes} are highly likely to recur if not anticoagulated appropriately. For people with ischaemic stroke or TIA and paroxysmal, persistent or permanent atrial fibrillation (AF: valvular or non-valvular) or atrial flutter, anticoagulation should be the standard treatment. Anticoagulation:

- should not be given until brain imaging has excluded haemorrhage;
- should not be commenced in people with uncontrolled hypertension (BP > 180/110);
- for people with moderate to severe stroke, consider anticoagulation 6-7 days after symptom onset, if appropriate (use aspirin 300 mg in the meantime);
- For people with mild stroke, anticoagulation within 48 hours may be appropriate² (use aspirin 300 mg in the meantime).
- For people with TIA (symptoms resolved within 1 hour) who are in AF, anticoagulation should start the same day after brain imaging has excluded ICH.

First line treatment should be anticoagulation with a DOAC.

People with stroke or TIA in sinus rhythm should not receive anticoagulation unless there is another indication.

For further information, refer to:

1. National Clinical Guideline for Stroke. 2023. www.strokeguideline.org
2. Fischer U, et al. Early versus Later Anticoagulation for Stroke with Atrial Fibrillation. N Engl J Med 2023/05/24.DOI:10.105



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Authorisation Form for Publication onto COIN

PLEASE ENSURE THAT ALL QUESTIONS ARE ANSWERED – IF NOT APPLICABLE PLEASE PUT N/A

COIN ID.	CID1636
Document Title.	Acute Stroke Management Guidance
Name of Author.	Dr. Manju Krishnan, Consultant Stroke Physician Dr. Tal Anjum, Consultant Stroke Physician Dr. Peter Slade, Clinical Lead, Stroke Services
Name of Lead Pharmacist.	N/A
Is the document New, Revised or a Review of a previous version.	Revised
Where on COIN do you want the document to be published.	Neurology and Stroke – Stroke
Is the document relevant to the GP Portal.	No
Sign to confirm that the document has been authorised by an approved governance process in a specialty or delivery unit.	Stroke Team, Morriston Hospital.
If NICE guidance been considered/referenced when producing this document, please provide the title or reference number.	NICE128
Please provide a brief description/abstract of the document.	Guidance for Management of a Suspected Acute Stroke, NAOC, Decision Aid.
Equality Statement. (All policies and procedures need to comply with CID76 Policy for the Management of Health Board Wide Policies, Procedures and other Written Control Documents (WCD)).	N/A
Published Date.	September 2015
Last Reviewed Date.	May 2025
Next Review Due/Expiry Date.	May 2028