



Standard Operating Procedure (SOP):

**Intracerebral haemorrhage: Greater Manchester care pathway
and Neurosurgical referral guidelines**

Key Messages

This document provides guidance on the following aspects of acute ICH care:

- Referral to neurosurgery
- Transfer to a Hyperacute Stroke Unit (HASU) from a District Stroke Centre (DSC)
- Initial angiographic imaging

Background & Scope

ICH accounts for around 10% of strokes. The most recent Royal College of Physicians Stroke Guidelines¹ (2016) recommend that:

- Anticoagulants are urgently reversed.
- Intensive blood pressure lowering should be given within 6 h of onset if the systolic blood pressure (SBP) is over 150 mmHg, aiming for a target of < 140 mmHg.
- Acute stroke services “should have protocols for the monitoring, referral and transfer of patients to regional neurosurgical centres for...surgical management of intracranial haemorrhage and the management of symptomatic hydrocephalus including external ventricular drain insertion.”
- Patients with ICH should be admitted to a hyper acute stroke unit.

Delivering these interventions in a safe, timely and equitable manner across the Greater Manchester and Cheshire stroke pathway requires a system-wide pathway. This guideline aims to address this need, drawing on existing national and international guidelines, individual patient data meta-analyses and expert opinion.

This guideline applies to all patients with acute spontaneous intracerebral haemorrhage presenting to acute hospitals involved within the Greater Manchester and East Cheshire stroke pathway.

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1. Presenting hospital and treatment priorities

Although FAST test positive patients within 48 h of symptom onset are transferred directly to the nearest HASU, ICH patients may present to DSCs if FAST test negative or stroke pathway exclusions necessitate diversion to the nearest Emergency Department. ICH patients may thus present to three types of centre:

1. HASU with on-site Neurosurgery (Salford Royal Hospital)
2. HASU without on-site Neurosurgery (Fairfield General Hospital, Stepping Hill Hospital)
3. DSC (all other acute hospitals in region)

Acute transfers may be required if accepted by Neurosurgery or to receive HASU care. Flowcharts summarising treatment priorities specific to the type of centre the patient first presents to are provided in Section 8 (DSCs) and Section 9 (HASUs).

2. Initial assessment

ICH may cause reduced consciousness. Once brain imaging has confirmed the diagnosis of ICH, the current Glasgow Coma Scale (GCS) score should be determined and documented (appendix 1). In comatose patients (GCS \leq 8), there is considerable risk of airway and/or respiratory compromise and input should be sought from an anaesthetist, critical care physician or emergency physician.

3. Anticoagulant reversal

Around 10% of ICH patients are taking an anticoagulant at onset. After stabilising the patient, this should be the first management priority. Any history of pre-morbid anticoagulant use should be actively sought and immediately reversed using locally agreed protocols. Wherever possible, this should be performed prior to transfer to another hospital to reduce the risk of haematoma expansion and neurological deterioration *en route*.

4. Neurosurgical referral

Patients meeting the following criteria must be referred acutely to the Neurosurgical Registrar on-call at Salford Royal Hospital:

- Modified Rankin Scale score \leq 2 in the 4 weeks prior to onset (appendix 2)

AND **any** of the following:

- GCS \leq 8
- Posterior fossa ICH (brainstem and/or cerebellum)
- Obstruction of the 3rd and/or 4th ventricle(s)
- Haematoma volume $>$ 30 ml (measured by ABC/2 method*)

The Neurosurgical team on call will then decide whether the patient should be transferred to Neurosurgery for further care. Patients not meeting these criteria are unlikely to be candidates for surgery, but may be referred at the managing clinician's discretion.

*A short instructional video describing the ABC/2 method is freely available [here](#). If the haematoma volume still cannot be reliably measured and there is no other indication for referral to neurosurgery, the decision to refer to neurosurgery should be made at the managing clinician's discretion.

5. Transfer to HASU

If a patient has not met the criteria for referral to Neurosurgery or has been referred but not accepted, they should then receive their hyperacute stroke care and monitoring at a HASU. Patients initially presenting to a DSC should be transferred to a HASU after discussion with the HASU team if **all** the following criteria are met:

- Presented < 48 h after symptom onset
- Remains for active treatment and monitoring
- No 'high risk' features are present (see section 6, below)

Patients not meeting all of these criteria may still be discussed with the HASU team if the DSC team feel they may still benefit from HASU care. Whether to transfer will be decided between the HASU team and referrer at the DSC on a case-by-case basis.

6. Identifying patients at high risk of deterioration

In the hyperacute phase of ICH, there is a considerable risk of neurological or respiratory deterioration. The following features may indicate patients at high risk:

- GCS \leq 8
- Airway / respiratory compromise
- Decline in GCS by \geq 2 points in last 1 h
- Posterior fossa ICH with brainstem signs
- Uncontrolled seizures

Patients with any of these features may need intubation and ventilation and additional support during any inter-hospital transfer (anaesthetic escort) following existing local and national guidance^{2,3}. Such patients should also be considered for transfer to a critical care unit for further care.

7. Early angiographic imaging

Physicians and radiologists at each hospital must continue to make an assessment in each case as to whether further imaging is required and the urgency of this. For those meeting the criteria for referral to Neurosurgery, guidance may also be offered by the Neurosurgical on-call team. However, general guidance on the need or otherwise of angiographic imaging is provided here and specific guidance will be provided for all cases referred to and reviewed by the Neurovascular ICH MDT at Salford Royal Hospital.

Angiographic imaging NOT required:

Patients aged \geq 45 years with hypertension and non-traumatic intracerebral haemorrhage in the basal ganglia or thalamus, do not require angiographic imaging because of the low likelihood of identifying a macrovascular cause. Hypertension is considered to be present when at least one of three criteria is met:

- documented history of hypertension
- use of antihypertensive drugs before the ICH
- Evidence of left ventricular hypertrophy on an admission electrocardiogram

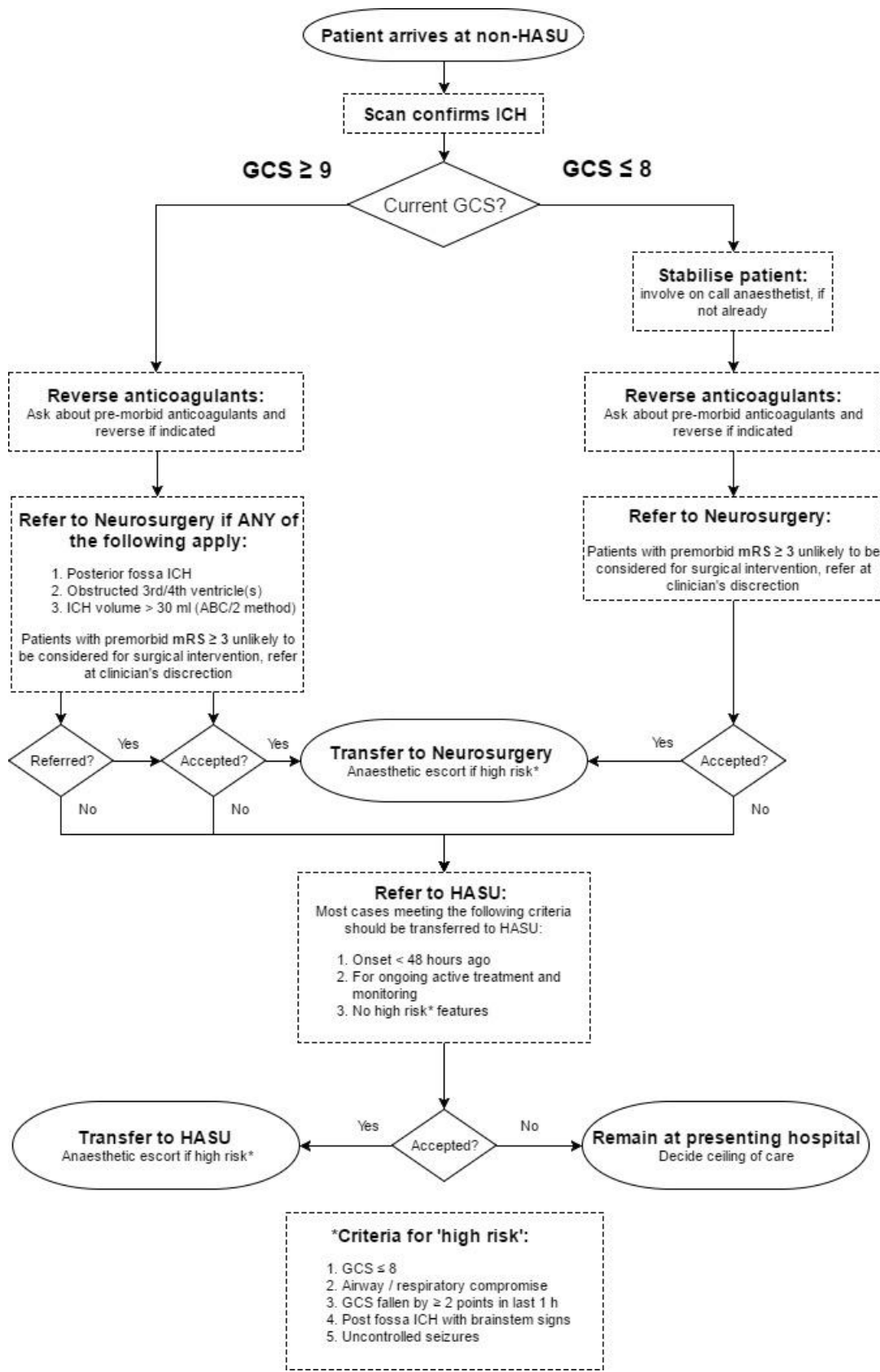
Urgent angiographic imaging required:

Patients meeting ALL of the following criteria require an urgent CT angiogram within 72 h of arrival in hospital:

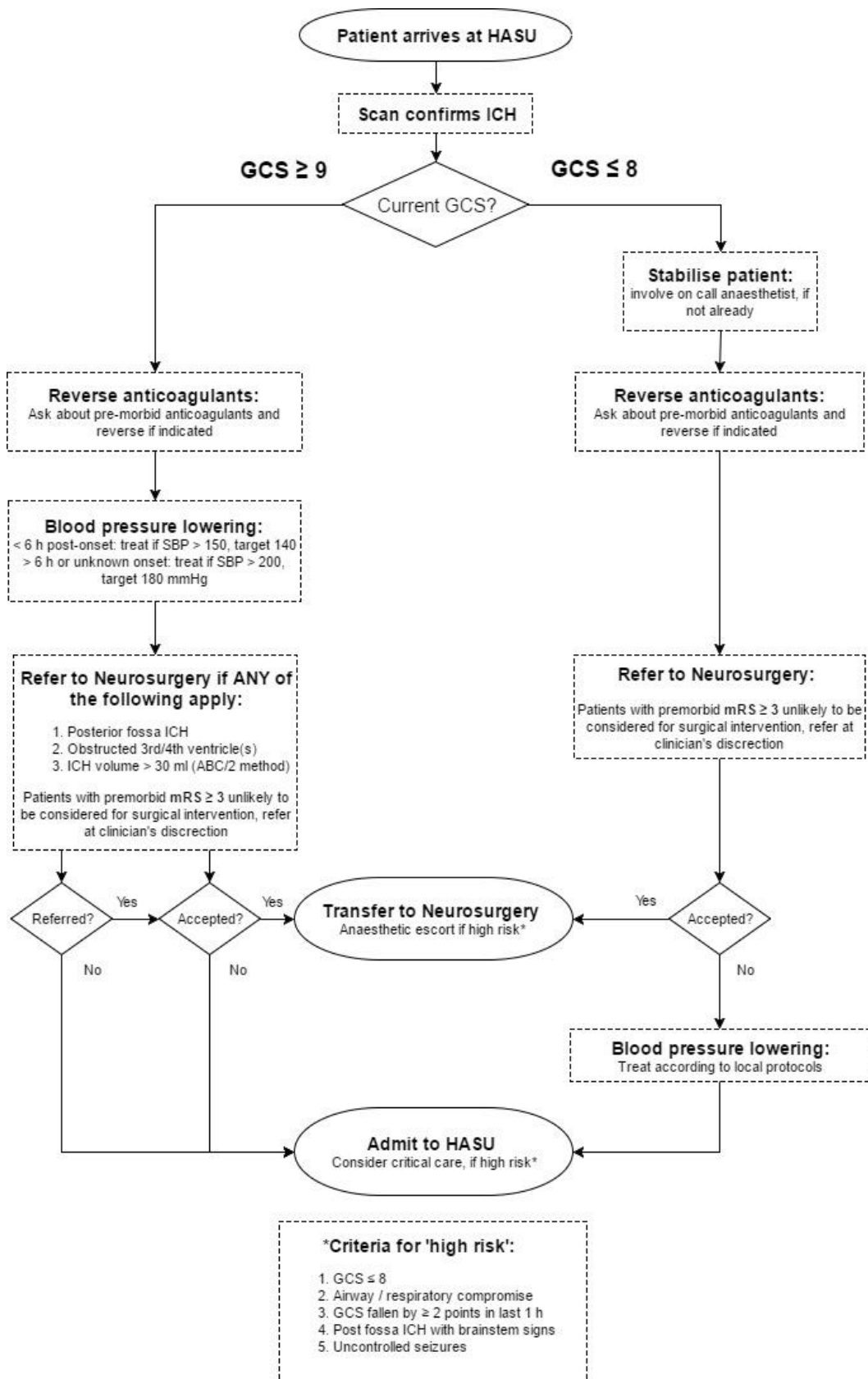
- Modified Rankin Scale \leq 2
- Aged 18-70
- Any subarachnoid haemorrhage

All other patients: Refer to Neurovascular ICH MDT at Salford for review ((E-mail: salford.ich@nhs.net, see Appendix 3 for standard referral form).

8. ICH care pathway for patients presenting directly to non-HASUs (DSCs)



9. ICH care pathway for patients presenting directly to HASUs (Salford, Bury, Stockport)



10. Explanation of terms & definitions

ICH Intracerebral haemorrhage
 HASU Hyperacute stroke unit
 DSC District stroke centre
 GCS Glasgow Coma Scale
 mRS Modified Rankin Scale
 SBP Systolic blood pressure
 FAST Face Arm Speech Time test

11. References and Supporting Documents

1. Intercollegiate Stroke Working Group (2016), National Clinical Guideline for Stroke, Royal College of Physicians, 5th Edition
2. The Association of Anaesthetists of Great Britain and Ireland (2006), Recommendations for the Safe Transfer of Patients with Brain Injury, 2nd Edition
3. Intensive Care Society (2011), Guidelines for the transport of the critically ill adult (3rd edition 2011)

Appendices**Appendix 1 – Glasgow Coma Scale**

Eyes		Verbal		Motor	
Spontaneous	4	Orientated	5	Obey commands	6
To sound	3	Confused	4	Localising	5
To pressure	2	Words	3	Normal flexion	4
None	1	Sounds	2	Abnormal flexion	3
		None	1	Extension	2
				None	1

Appendix 2 – Modified Rankin Scale

Description of premorbid disability	Score
No symptoms at all	0
No significant disability despite symptoms; able to carry out all usual duties and activities	1
Slight disability; unable to carry out all previous activities, but able to look after own affairs without assistance	2
Moderate disability; requiring some help, but able to walk without assistance	3
Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance	4
Severe disability; bedridden, incontinent and requiring constant nursing care and attention	5

Appendix 3 – ICH Referral Form

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NHS Foundation Trust

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Name (in full)		
DOB:		
NHS No.		
PC:		
Onset:	Date:	Time:
PMH:		
Hypertension:	Y/N	
Anticoagulation:		
GCS:	E=	V= M=
Current ward:		

Doctor Referring:	
Contact number:	

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Version 1

Responsible Consultant:	
Date of referral:	

Please email completed forms to: Salford.ich@nhs.net