



Acute stroke due to intracerebral haemorrhage (ICH) insert: Assessment, Consultation and Treatment (ACT)



GUIDANCE FOR FIRST ASSESSMENT

1. Use this guideline for adults with acute stroke due to spontaneous (i.e. non-traumatic) intracerebral haemorrhage (ICH) when first seen in hospital
2. Use this as a supplement to p.1 of Acute Stroke Pathway
3. Do not use this for patients who have definite exclusively traumatic or subarachnoid haemorrhage
4. Complete the shaded areas

Please affix patient label here

A ASSESSMENT ¹

- ▶ **Start** with p.1 acute stroke pathway (symptoms, onset, anticoagulation, BP, NIHSS, & swallow)
- ▶ **Assess and record** Glasgow Coma Scale (GCS) score:

E		V		M	
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- ▶ **Urgently request** point of care INR and coagulation screen if taking oral anticoagulation
- ▶ **Request** FBC, coagulation screen, U&E, LFT, glucose, CRP, and ESR
- ▶ **Request** urine sympathomimetic drug screen, if appropriate
- ▶ **Request** pregnancy test for women of childbearing age
- ▶ **Review brain imaging** and report ± discussion with radiologist to determine:

ICH confirmed (not haemorrhagic transformation of ischaemic stroke etc)

Y		N	
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ICH location

Brainstem		Cerebellum		Lobar		Deep	
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ICH dimensions (cm) ²

A:		B:		C:	
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Calculate the ICH volume from the dimensions above

Volume = ABC/2 =		mL
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Extension of ICH into ventricles (lateral/third/fourth)

Y		N	
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Hydrocephalus

Y		N	
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Imaging features suggesting an underlying macrovascular cause

Y		N	
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Enlarged vessels or calcifications along the margins of the ICH, hyper-attenuation within a dural venous sinus or cortical vein along the presumed venous drainage path of the ICH, or ICH±SAH close to aneurysm locations (e.g. circle of Willis, middle cerebral artery in the Sylvian fissure)



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- ▶ Calculate the ICH score by circling and summing the categories below ³

Age ≥80 years

Y	+1	N	0
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GCS score

13-15	0	5-12	+1	3-4	+2
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ICH volume ≥30mL

Y	+1	N	0
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Extension of ICH into ventricles

Y	+1	N	0
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Infra-tentorial (i.e. brainstem/cerebellum) origin of ICH

Y	+1	N	0
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- ▶ ICH total score =

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 Corresponding estimated risk of death at 30 days ⁴ =

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 %

In a recent study which avoided DNACPR orders within 5 days of ICH, the risk of dying by 30 days after ICH onset varied by ICH Score: 0 = 0%, 1 = 8%, 2 = 14%, 3 = 21%, ≥4 = 50%.

A ASSESSMENT

- ▶ Consider four factors (circle categories), to help guide consultation and treatment decisions:

Pre-ICH DNACPR in place	No	-	-	-	Yes
Pre-ICH dependent on others	No	A little	Moderate	A lot	Totally
Pre-ICH major co-morbidities	None	1-2	3-4	4-5	>5
ICH score	0	1	2	3	≥4

- ▶ Consider where the overall balance lies between categories that do (to the left), or do not (to the right), favour intensive management decisions, to guide consultation and treatment...

C CONSULTATION (guided by your assessments above)

- ▶ **Stroke**

Y		N	
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To guide referral, treatment and placement decisions.

- ▶ **Haematology**

Y		N	
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If anticoagulation was taken before ICH.

- ▶ **Radiology for CT angiogram/venogram** (after establishing venous access)

Y		N	
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If age ≤50 years or CT brain suggests an underlying macrovascular cause (see page 1), perform immediately. If not, discuss whether CTA or CTV is merited at the daily DCN or weekly stroke imaging meeting.

- ▶ **Critical care**

Y		N	
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If airway protection, intravenous BP lowering, or neurosurgery is needed.



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C CONSULTATION (guided by your assessments above), continued

- ▶ **Neurosurgery**

Y		N	
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*If hydrocephalus and GCS score dropping – external ventricular drain may be considered.
 If cerebellar ICH ± brainstem compression ± hydrocephalus from ventricular obstruction ± deteriorating neurologically; or supratentorial ICH and the patient is deteriorating and life-saving measures are appropriate – haematoma evacuation may be considered.
 If GCS score ≤8; or clinical evidence of transtentorial herniation (and pupils not fixed and dilated); or heavy ventricular blood load – intracranial pressure monitoring may be considered.*

T TREATMENT (all of these should be guided by your assessments of appropriateness on page 1)

- ▶ **Analgesia if in pain:** paracetamol (or one that is not opiate/opioid/NSAID)

Y		N	
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- ▶ **Anti-emetic if nauseated or vomiting**

Y		N	
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- ▶ **DNACPR if already in place pre-ICH, if your assessment of pre-ICH status indicates that DNACPR is appropriate, or if death from ICH appears imminent**

Y		N	
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Consider any Advance Directive or the patient's wishes. Discuss with a stroke consultant.
- ▶ **If not DNACPR, avoid anticipatory care planning <5 days after ICH onset** ⁴

Y		N	
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Unless death after ICH appears imminent, or discussed with a stroke consultant.
- ▶ **Stop anticoagulant & urgently reverse** ⁵

Y		N	
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Reversal started:

___	:	___
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Unless: intracranial venous thrombosis is confirmed by CTV
- ▶ **Lower BP to target systolic <140mmHg for ≥7 days** ⁶

Y		N	
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Unless: >6hrs since ICH onset; or systolic BP <150mmHg; or GCS score <6; or ICH is very large and death is expected; or a structural cause for the ICH is identified; or immediate surgery to evacuate the ICH is planned; or there is a contraindication to acute BP treatment.



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EVIDENCE

Evidence informing this guidance

- Clinical guidelines* † ‡ §
- A hierarchical approach to the best available evidence to inform treatment decisions**
- Consensus with colleagues in NHS Lothian, after review of the ICH-ACT guidance and supporting evidence by representatives of the Emergency Department (Dr S Robinson [clinical director], Kate Easterford), Acute Medical Unit (Dr Andrew Coull [associate medical director], Dr Helen Gillett, SJH clinical director), Critical Care (Dr M Gillies, associate medical director for diagnostics, anaesthetics and critical care), Radiology (Dr F Perks, RIE lead clinician; Dr P Keston, WGH DCN lead clinician; Dr P Maclean, SJH lead clinician), Neurosurgery (Mr P Brennan and Mr M Fitzpatrick [clinical director DCN]), Stroke (Prof M Dennis, lead clinician), Neurology (Dr C Derry, lead clinician), Haematology (Dr Julia Anderson, lead clinician), MOE/Stroke and Integrated Older Peoples service (Billie Flynn, clinical service manager) and NHS Lothian's medical director (Dr Brian Cook).
- This guidance was compiled by Professor Rustam Al-Shahi Salman, honorary consultant neurologist. Contact Rustam.Al-Shahi@nhs.net with any comments or questions. His Brain Haemorrhage Team are available for ICH advice, consultation, and audit/research enquiries via **07872-416010**.

Footnotes to the guidance

¹ These items are additional to the assessments already made and documented on the acute stroke pathway up to the result of brain computed tomography (CT).

² When a radiologist measures ICH dimensions (in centimetres), the largest cross-sectional diameter is A, a second diameter drawn at right angles to the first is B, and the height of the ellipsoid (C) is estimated from the number and thickness of the slices in which the ICH is visible (Newman GC. Clarification of abc/2 rule for ICH volume. *Stroke* 2007;38:862).

³ The ICH score was derived in 1997-1998 (Hemphill JC 3rd *et al.* The ICH score: a simple, reliable grading scale for intracerebral hemorrhage. *Stroke* 2001;32:891-7). It has been externally validated in many settings.

⁴ Morgenstern LB, Zahuranec DB, Sánchez BN, Becker KJ, Geraghty M, Hughes R, Norris G, Hemphill JC 3rd. Full medical support for intracerebral hemorrhage. *Neurology* 2015;84:1739-44.

⁵ Refer to the warfarin reversal protocol on the LUHT intranet: withhold warfarin, give vitamin K 5mg IV and 4-factor PCC (Beriplex P/N) immediately, according to body weight and INR. Discuss specific reversal of other anticoagulants with Haematology.

⁶ Peripheral IV glyceryl trinitrate (50mg in 50ml): start at 1.5mL/hr, monitor BP every 15 minutes and increase rate by 1mL/hr according to achieved systolic BP, maximum rate 12mL/hr. Peripheral IV labetalol second line: dilute to 1mg/ml in glucose 5% or sodium chloride 0.9% and administer initially 15mg/hr and titrate.

* Intercollegiate Stroke Working Party. National clinical guideline for stroke. Fifth Edition. 2016

† Frontera JA, Lewin JJ 3rd, Rabinstein AA, Aisiku IP, Alexandrov AW, Cook AM, del Zoppo GJ, Kumar MA, Peerschke EI, Stiefel MF, Teitelbaum JS, Wartenberg KE, Zerfoss CL. Guideline for Reversal of Antithrombotics in Intracranial Hemorrhage: A Statement for Healthcare Professionals from the Neurocritical Care Society and Society of Critical Care Medicine. *Neurocrit Care* 2016;24(1):6-46

‡ Hemphill JC 3rd, Greenberg SM, Anderson CS, Becker K, Bendok BR, Cushman M, Fung GL, Goldstein JN, Macdonald RL, Mitchell PH, Scott PA, Selim MH, Woo D; American Heart Association Stroke Council; Council on Cardiovascular and Stroke Nursing; Council on Clinical Cardiology. Guidelines for the Management of Spontaneous Intracerebral Hemorrhage: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke* 2015;46(7):2032-60

§ Steiner T, Al-Shahi Salman R, Beer R, Christensen H, Cordonnier C, Csiba L, Forsting M, Harnof S, Klijn CJM, Krieger D, Mendelow AD, Molina C, Montaner J, Overgaard K, Petersson J, Roine RO, Schmutzhard E, Schwerdtfeger K, Stapf C, Tatlisumak T, Thomas BM, Toni D, Unterberg A, Wagner M. European Stroke Organisation (ESO) guidelines for the management of spontaneous intracerebral haemorrhage. *Int J Stroke* 2014;9:840-55

** Oxford Centre for Evidence-Based Medicine 2011 Levels of Evidence. <https://www.cebm.net/wp-content/uploads/2014/06/CEBM-Levels-of-Evidence-2.1.pdf>