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	

► **Urgently request** point of care INR and coagulation screen if taking vitamin K antagonist

► **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	

ICH location

Brainstem		Cerebellum		Lobar		Deep	

ICH dimensions (cm) [2]

A:		B:		C:	

Calculate the ICH volume from the dimensions above

Volume = ABC/2 =	mL

Extension of ICH into ventricles (lateral/third/fourth)

Y		N	

Hydrocephalus

Y		N	

Imaging features suggesting an underlying macrovascular cause

Y		N	

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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GUIDANCE FOR FIRST ASSESSMENT

► **Calculate the ICH score** by circling and summing the categories below [3]

Age ≥80 years					**Y**	+1	**N** 0
GCS score	**13-15**	0	**5-12**	+1	**3-4**	+2	
ICH volume ≥30mL					**Y**	+1	**N** 0
Extension of ICH into ventricles					**Y**	+1	**N** 0
Infra-tentorial (i.e. brainstem/cerebellum) origin of ICH					**Y**	+1	**N** 0

► **ICH total score =** | Corresponding estimated risk of death at 30 days [4] = | %

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**

To guide referral, placement, treatment and treatment escalation plan.

► **Haematology** **Y** **N**

If anticoagulation was taken until ICH onset.

► **Radiology for CT angiogram/venogram** (after establishing venous access) **Y** **N**

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**

If airway protection, intravenous BP lowering, or neurosurgery is needed and appropriate.

C CONSULTATION (guided by your assessments above), continued

► **Neurosurgery** | Y | | N | |

If hydrocephalus and GCS score dropping – external ventricular drain should 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 | |

► **Anti-emetic if nauseated or vomiting** | Y | | N | |

► **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 | |

Consider any Advance Directive or the patient's wishes. Discuss the Treatment Escalation Plan with a stroke consultant, and document in the patient record.

► **If not DNACPR, avoid anticipatory care planning** <5 days after ICH onset [4] | Y | | N | |

Unless death after ICH appears imminent, or discussed with a stroke consultant and documented in a Treatment Escalation Plan in the patient record.

► **Stop anticoagulant & urgently reverse** [5] | Y | | N | | **Reversal started:** ___ : ___

Unless: intracranial venous thrombosis is confirmed by CTV

Reversal agent(s) used:

Vitamin K		Beriplex		Idaracizumab		Andexanet alfa	

► **Lower BP** to target systolic 130-139 mmHg within 1 hour and for ≥7 days [6] | Y | | N | |

Unless:

- *>6hrs since ICH onset; 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*
- *systolic BP <150 mmHg; or*
- *systolic BP >200mmHg (in which case consider a less intensive target as reductions of >60mmHg in one hour are associated with harm); or*
- *there is another contraindication to acute BP treatment.*

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

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 D McKean [clinical director], Prof A Gray), Acute Medical Unit (Prof E Reynish [associate medical director], Dr D Noble [SJH clinical director], Dr J Crane [WGH clinical director]), Critical Care (Dr K Kefala, clinical director), Radiology (Dr G Ritchie, RIE lead clinician; Dr D Summers, DCN lead clinician; Dr J Taylor, WGH/SJH lead clinician), Neurosurgery (Mr P Brennan, clinical director), Stroke (Dr A Barugh, [clinical director]; Dr F Doubal [MCN lead clinician]; Ms Zara Tumblety [Stroke liaison service lead]), Neurology (Dr C Derry, clinical director), Haematology (Dr J Anderson, lead clinician), and NHS Lothian's medical director (Dr C Whitworth).
- This guidance was compiled by Professor Rustam Al-Shahi Salman, honorary consultant neurologist. Contact Rustam.Al-Shahi@nhslothian.scot.nhs.uk 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. For patients taking dabigatran, idarucizumab should be used. If idarucizumab is unavailable, 4-factor PCC may be considered. For those taking factor Xa inhibitors, 4-factor PCC should be considered. Discuss with Haematology.

[6] Peripheral IV labetalol first line (please refer to NHS Lothian *IV Labetalol protocol for early management of hypertension in acute stroke*). Peripheral IV glyceryl trinitrate second line (please refer to NHS Lothian *IV GTN protocol for early management of hypertension in acute stroke (up to 48 hours)* guidance).

[*] National Clinical Guideline for Stroke for the UK and Ireland. London: Intercollegiate Stroke Working Party; 2023 May 4. Available at: www.strokeguideline.org

[†] 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

[‡] 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