

Does Care Bundling Improve Outcomes for Patients with Intracranial Hemorrhage?

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Resource Information

About This Resource

These slides are one component of a continuing education program available online at MedEd On The Go titled [What's New in Treating the Anticoagulated Patient with ICH?](#)

Program Learning Objectives:

- Describe the various therapies necessary to manage the care of anticoagulated patients with ICH in the neurocritical care setting, including reversal and repletion
- Illustrate the latest neurosurgical clinical trial data to optimize care for patients with ICH
- Categorize the specific recommendations from the recent ESO guidelines on the management of ICH in the anticoagulated patient and describe approaches to implement them
- Outline the 3 elements of ICH care bundling and how each optimizes the care of the anticoagulated patient

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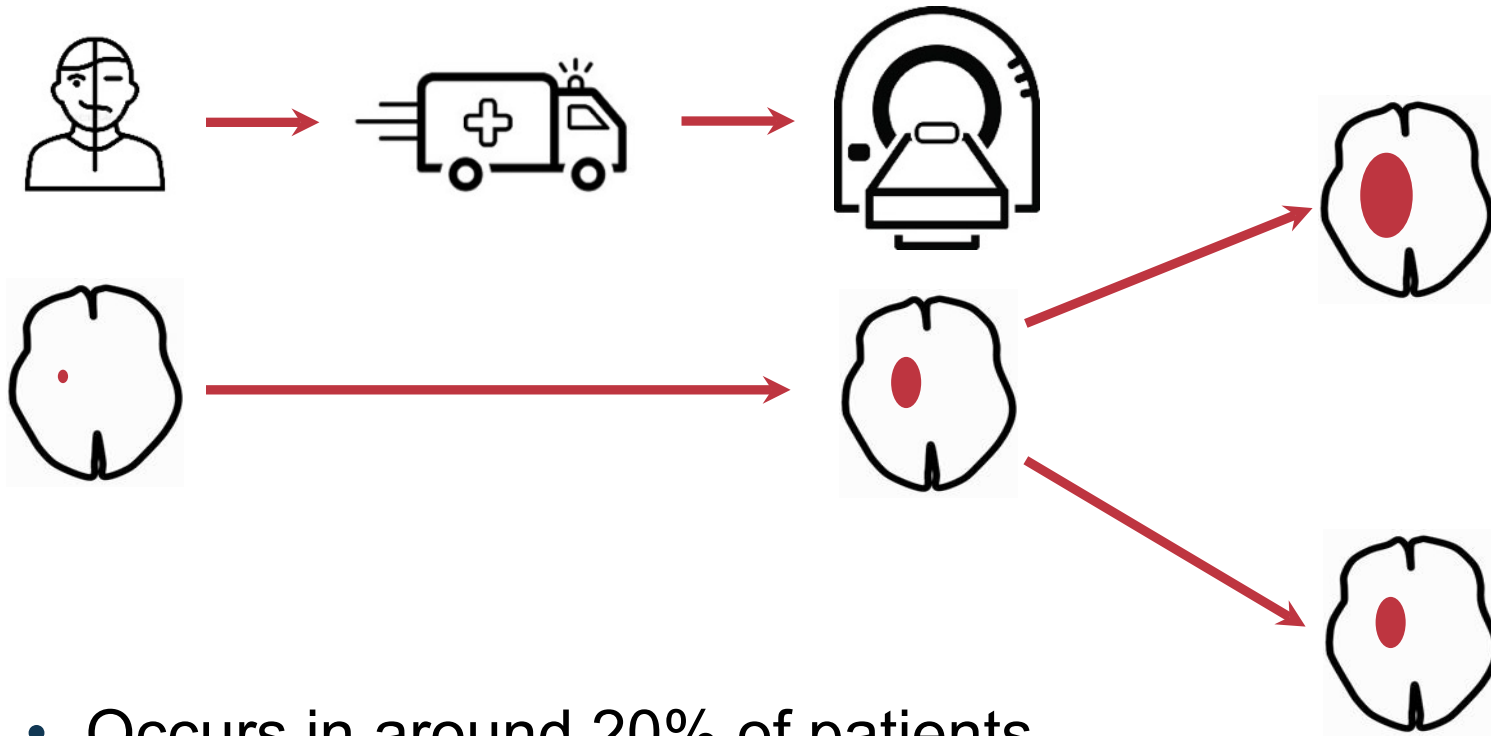


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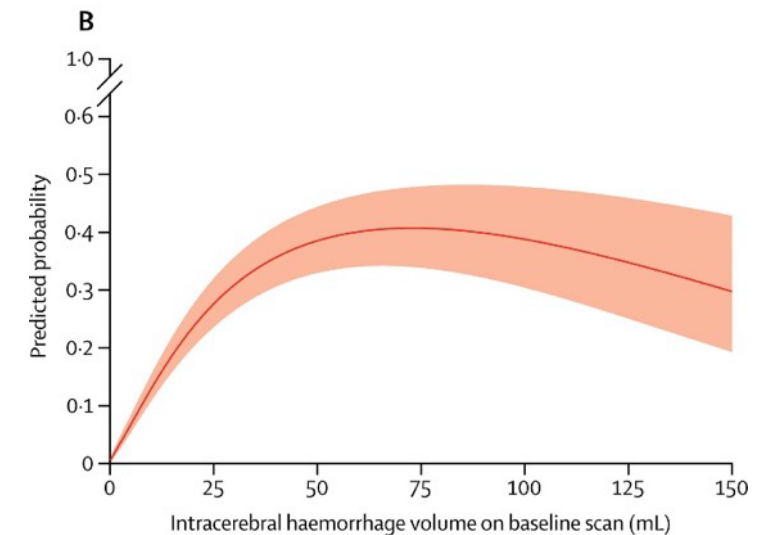
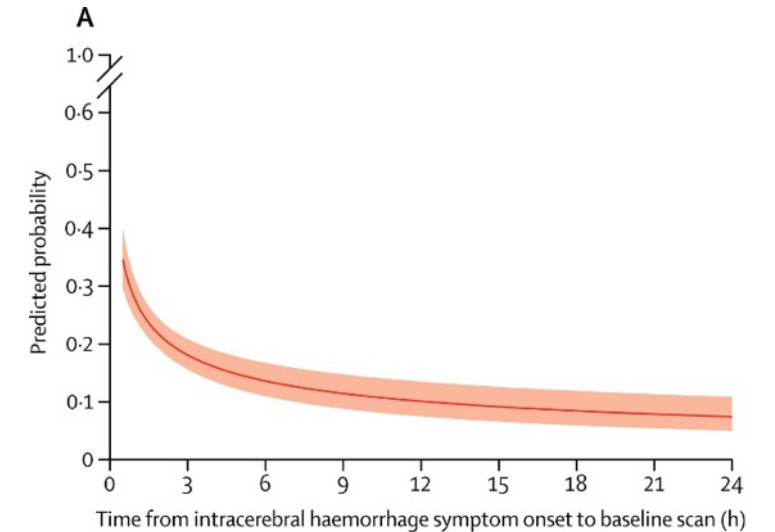
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Haematoma Expansion



- Occurs in around 20% of patients
- Clinical predictors: Time, size, antithrombotics
- Imaging predictors: Spot sign, NCCT signs



ABC Care Bundle for ICH

A

Anticoagulant reversal:

Reversal agents delivered as quickly as possible

B

Blood pressure lowering:

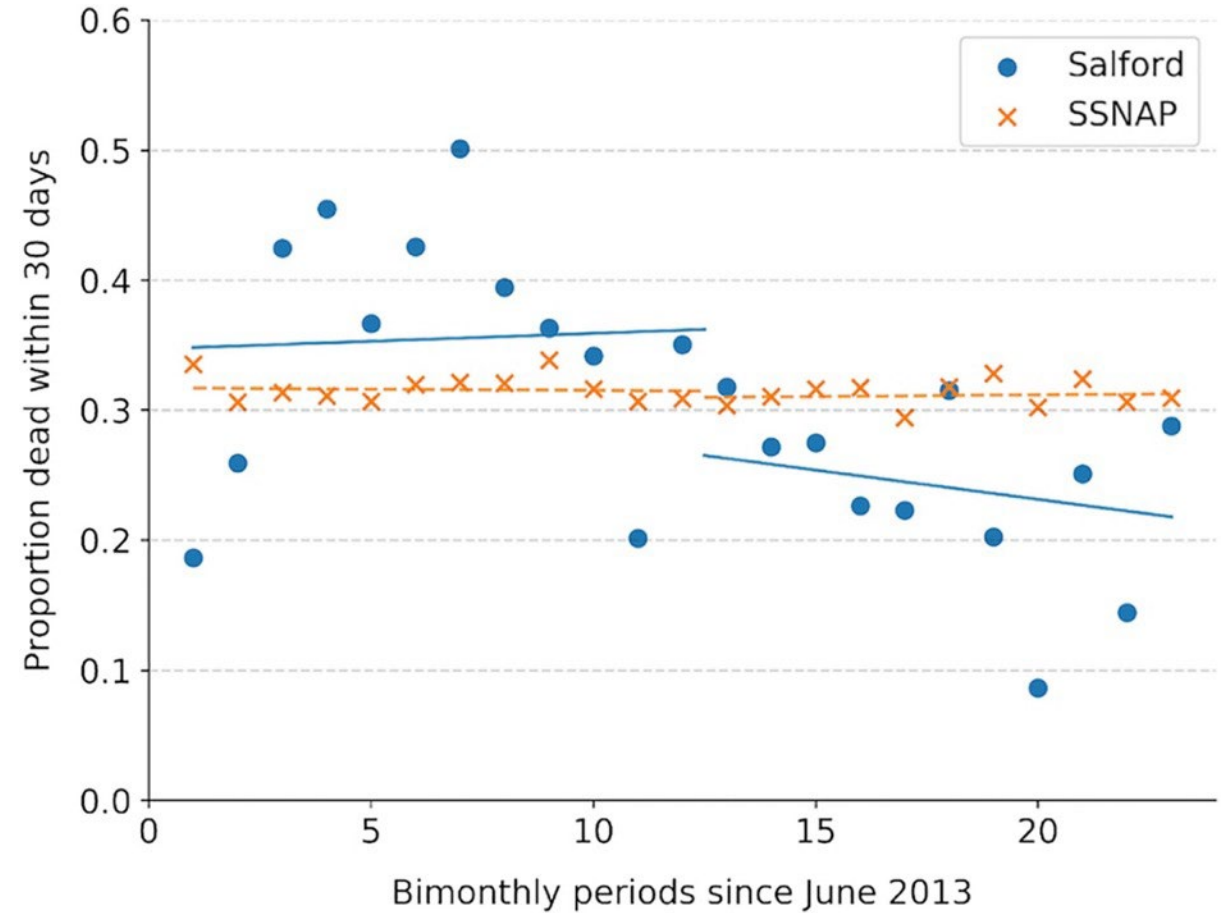
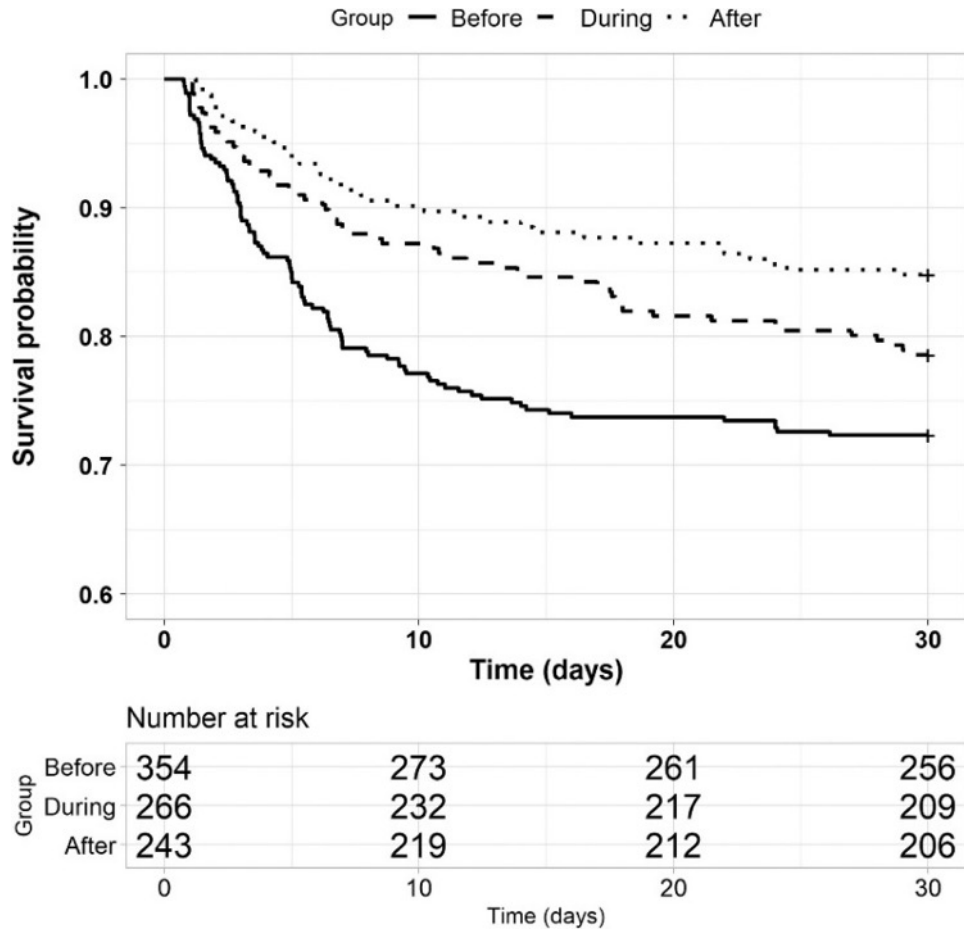
Using intravenous antihypertensives for rapid, intensive BP lowering

C

Care pathway:

Prompt referral of appropriate patients to neurosurgery

ABC-ICH: Results



Difference in difference (Salford vs. England and Wales): **-10.8 pp (95% CI -17.9 to - 3.7), p = 0.003**

Mediation Analysis



	Total Effect		NIE		NDE		% mediated
	Estimate (p-value)	95% CI	Estimate (p-value)	95% CI	Estimate (p-value)	95% CI	
Access to HDU	-0.0593 (0.02)	(-0.1097, -0.01)	-0.0073 (0.03)	(-0.0167, 0.00)	-0.0519 (0.04)	(-0.1019, 0.00)	12.3%
DNR within 24 h	-0.0594 (0.03)	(-0.1090, -0.01)	-0.0352 (<0.01)	(-0.0616, - 0.01)	-0.0242 (0.36)	(-0.0669, 0.03)	59.3%

Non-significant effects: anticoagulant reversal (DNT), intensive blood pressure lowering (y/n, DTT, Δ SBP 0-4 h), ICU (y/n), surgery (y/n, onset-to-surgery)

CI, confidence interval; DNR, do not resuscitate; DNT, door-to-needle time; DTT, diffusion tensor tractography; HDU, high dependency unit; ICU, intensive care unit; NDE, natural direct effect; NIE, natural indirect effect; SBP, systolic blood pressure.

Parry-Jones AR, Sammut-Powell C, Paroutoglou K, et al. *Ann Neurol*. 2019;86(4):495-503

INTERACT3: Aim

Aim: Does goal-directed care bundle protocol in hospital improve outcomes after ICH?

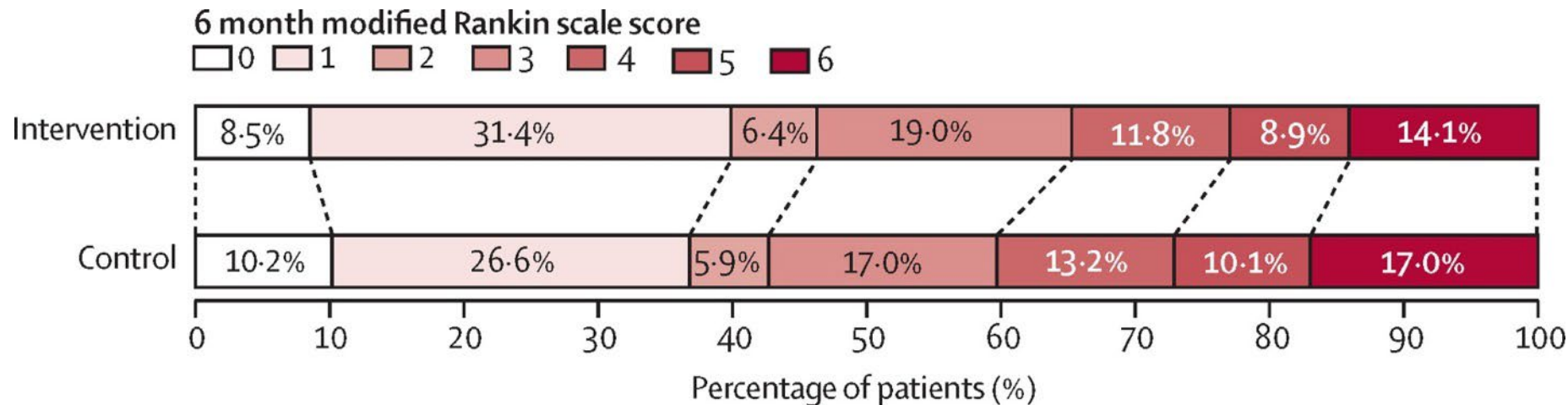
INTERACT3 bundle (for 7 days):

Early intensive blood pressure lowering (SBP < 140 mmHg)
management algorithms for:

- Hyperglycaemia (non-DM: 6.1-7.8, DM: 7.8-10 mmol/l)
- Pyrexia ($\leq 37.5^{\circ}\text{C}$)
- Abnormal anticoagulation (reversal warfarin, INR < 1.5)

INTERACT3: Results

- 3221 patients 'care bundle' group; 3815 'standard care'
- Primary outcome mRS at 6 months – 88-90% complete



common OR 0.86, 95%CI 0.76 to 0.97; p=0.015

Fewer SAEs with care bundle (16.0% vs. 20.1%; p=0.0098)

INTERACT3: Comparison to ABC-ICH Cohort

	INTERACT3 (bundle group)	ABC-ICH (after implementation)
Neurosurgery performed (%)	26.4%	7.1%
Intensive care unit (%)	34.6%	18.3%
Palliated (%)	0.7% (< 7 days)	4.9% (< 1 h)
IV antihypertensives (%)	78.9%	24.1%
Median time to reaching BP target (IQR)	2.3 (0.8 to 8.0)	0.8 (0.6 to 1.1)
Anticoagulant	0.9%	12.7%
Time to achieving reversal target (h)	27.0 (24.0 to 48.0) <i>*Door to INR < 1.5</i>	1.8 (1.3 to 3.3) <i>*Door to needle</i>

IV, intravenous; IQR, interquartile range.

Parry-Jones AR, Sammut-Powell C, Paroutoglou K, et al. *Ann Neurol.* 2019;86(4):495-503; Ma L, Hu X, Song L, et al. *Lancet.* 2023;402(10395):27-40.

Conclusions

- Bundled care provides a framework and supports buy-in for quality improvement
- Mechanisms mediating benefit may differ in different healthcare systems
- Indirect effects on supportive care may be at least as important as specific interventions
- Implementation is very context specific – sites should work to achieving process targets governed by local barriers

Multiple Choice Question

Which of the following were part of the protocol for a care bundle for intracerebral hemorrhage in the INTERACT3 trial?

- A. Reversal of DOACs with appropriate antidotes (andexanet alfa/ idarucizumab)
- B. Intensive BP lowering to a target to 140 mmHg
- C. Treatment of body temperature $> 38.0^{\circ}\text{C}$
- D. Neurosurgical hematoma evacuation if hematoma volume > 30 ml



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