Intracranial haemorrhage related to direct oral anticoagulant medications: Latest evidence for reversal strategies

Data updates
April 2025

Date of preparation: 22 April 2025

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Additional data on the risk of ICH with anticoagulant use (1/2)

	MORTALITY OF ICH DURING ORAL FXaI TREATMENT[1]	REAL-WORLD EFFECTIVENESS AND SAFETY OF DOACs AND WARFARIN IN PATIENTS WITH CVT[2]
Aims	**To assess the frequency of ICH during oral FXaI treatment, and the associated burden, using German claims data**	**To provide real-world insights into DOAC efficacy and safety for CVT**
Methods and outcomes	• A retrospective, observational study of claims data (2016 to 2021) for patients initiating FxaI treatment who experienced ICH during a 3-year treatment period • Outcome: Incidence of ICH and associated burden	• A retrospective cohort study based on propensity score matched data from TriNetX (n=551) • Primary outcome: recurrent CVT • Secondary outcomes included ICH and all-cause mortality
Results	• 78,086 patients initiated oral FXaI therapy; 530 experienced ICH **Cumulative incidence of ICH** • First 3 months: 0.64 events/100 PY (95% CI, 0.52–0.77) • Over 3 years: 0.50 events/100 PY (95% CI, 0.45–0.54) **3-month mortality** • ICH event: 39.4% (95% CI, 35.4–43.8%) • No ICH event: 5.9% (95% CI, 4.2–8.3%)	**DOACs vs warfarin** • Risk of ICH: HR, 0.62 (95% CI, 0.43–0.91) • All-cause mortality: HR, 1.03 (95% CI, 0.67-1.59)
Conclusions	**Incidence rates of ICH during oral FXaI therapy were within the range of other published real-world data; mortality was high and significantly higher for patients with ICH vs comparable patients without ICH**	**DOACs had a lower risk of ICH and comparable all-cause mortality vs warfarin**

CI, confidence interval; CVT, cerebral venous thrombosis; DOAC, direct oral anticoagulant; FXaI, Factor Xa inhibitor; HR, hazard ratio; ICH, intracranial haemorrhage; PY, patient year.

1. Huttner HB, et al. *Neurol Res Pract.* 2025;7:21; 2. Wu JY, et al. *J Stroke Cerebrovasc Dis*. 2025;34:108290.

Additional data on the risk of ICH with anticoagulant use (2/2)

	PATIENTS WITH AF RECEIVING EDOXABAN: 2-YEAR FOLLOW-UP OF THE GLOBAL ETNA-AF PROGRAMME[1]	DOACs vs NO ANTICOAGULATION IN PREVENTING STROKE IN SURVIVORS OF ICH WITH AF[2]
Aims	**To assess the long-term safety and efficacy of DOACs vs warfarin in patients with AF**	**To determine whether DOACs reduce the risk of ischaemic stroke without increasing the risk of recurrent ICH**
Methods and outcomes	• A prospective, observational non-interventional study of patients with AF being treated with edoxaban (N=26,805)* • Efficacy included all-cause mortality, MI and any stroke • Safety included major bleeding, ICH and GI bleeding	• A multicentre, open-label, phase III trial of patients with ICH, AF and an indication for anticoagulation (N=319) • Co-primary endpoints: first ischaemic stroke; first recurrent ICH
Results	• Annualized event rate of 0.27%/year for ICH (95% CI 0.23–0.32%/year) ICH CIF curves showed: • Accrual rates slowed between 0 and 24 months • At 24 months, the CIF was highest in Japan and in non-Japanese Asian areas, and lowest in Europe	Event rate for first recurrent ICH: • DOAC: 5.00 (95% CI, 2.68–8.39)/100 PY • No anticoagulant: 0.82 (95% CI ,0.14–2.53)/100 PY • HR: 10.89 (90% CI, 1.95–60.72), p=0.96) **The DOAC group failed to meet the prespecified HR non-inferiority margin of <1.735**
Conclusions	**Annualized event rates were low; regional differences in efficacy and safety at 2 years may reflect variations in baseline characteristics**	**DOACs prevent ischaemic strokes in survivors of ICH with AF, but there is an increased risk of recurrent ICH**

*Europe n=13,164; Japan n=10,342; non-Japanese Asian regions n=3,299.[1]
AF, atrial fibrillation; CI, confidence interval; CIF, cumulative incidence function; DOAC, direct oral anticoagulant; GI, gastrointestinal; HR, hazard ratio; ICH, intracranial haemorrhage; MI, myocardial infarction; PY, patient year.
1. De Catarina R, et al. *Clin Cardiol.* 2025;48:e70091; 2. Veltkamp R, et al. *Lancet.*. 2025;405:927–36.

Latest data on the efficacy and safety of AA vs PCC in ICH

	EFFICACY AND SAFETY OF AA vs 4F-PCC TO REVERSE FXaI-ASSOCIATED ICH[1]	EFFICACY AND SAFETY OF AA FOR FXaI -ASSOCIATED ICH[2]	EFFICACY AND SAFETY OF AA AND PCC IN REVERSING FXaI-RELATED ICH[3]
Aims	**To provide insight into the comparative efficacy and safety of AA and 4F-PCC in the emergent reversal of FXaI-associated ICH**	**To assess the efficacy and safety of AA vs usual care* for the treatment of FXaI-associated ICH**	**To assess the effectiveness and safety of AA and PCC following ICH-associated with DOACs**
Methods and outcomes	• A systematic review/meta-analysis of 16 studies including patients treated with AA or 4F-PCC to reverse FXaI-associated ICH (N=2,977) • Primary outcomes: anticoagulation reversal, overall mortality and TEs	• A systematic review/meta-analysis of RCTs and observational studies of AA (n=1,567) vs usual care (n=1,969) • Primary outcome: haemostatic efficacy (haematoma expansion of ≤35% or ≤6 mL)	• A multicentre, retrospective, observational study of patients with apixaban or rivaroxaban-related ICH (N=1,096) • Primary efficacy outcome: patients (%) with excellent or good haemostasis • Primary safety outcome: occurrence of a TE in hospital
Results	• **Haemostatic efficacy** favoured AA: RR=1.10 (95% CI, 1.01–1.20), p=0.02 • **Overall mortality** is lower for AA: RR=0.67 (95% CI, 0.51–0.88), p=0.004 • **TEs** are higher for AA: RR=1.47 (95% CI, 1.01–2.15), p=0.046	• Likelihood of **haemostatic efficacy** favoured AA: RR=1.16 (95% CI, 1.06–1.26) • **Haemostatic efficacy and functional outcome** for AA vs usual care were similar • Rates of **mortality and TEs** were similar for AA vs usual care	**Efficacy: OR of achieving excellent/good haemostasis** • AA (88%) vs PCC (82%) OR=1.60 (95% CI, 1.00–2.56), p=0.048 **Safety: OR for a TE** • AA (7.9%) vs PCC (4.2%) OR=1.91 (95% CI, 1.13–3.20), p=0.014
Conclusions	**AA is superior to 4F-PCC in enhancing the haemostatic efficacy and reducing overall and in-hospital mortality rates, but is associated with a higher risk of TEs**	**AA is associated with improved haemostatic efficacy vs usual care, with no significant differences observed in functional and safety outcomes**	**AA was associated with statistically higher odds of achieving haemostatic efficacy vs PCC, but also with higher odds of a TE**

*Including, but not limited to, 4F-PCC, other PCC products, fresh frozen plasma and tranexamic acid.[2]

4F, four factor; AA, andexanet alfa; CI, confidence interval; DOAC, direct oral anticoagulant; FXaI, Factor Xa inhibitor; ICH, intracranial haemorrhage; OR, odds ratio; PCC, prothrombin complex concentrate; RR, risk ratio; TE, thromboembolic event.

1. Sarhan K, et al. *Neurocrit Care*. 2025;42:701–14; 2. Tsivgoulis G, et al. *J Neurol Neurosurg Psychiatry*. 2025. doi: 10.1136/jnnp-2024-335558 (Epub ahead of print); 3. Panos NG, et al. *Crit Care Med*. 2025. doi: 10.1097/CCM.0000000000006656 (Epub ahead of print).

Safety of idarucizumab and AA in older patients

	SAFETY OF DOAC REVERSAL AGENTS IN OLDER PATIENTS
Aims	**To assess the frequency, characteristics, and clinical and demographic factors of ADRs associated with the use of idarucizumab and AA**
Methods and outcomes	• A retrospective observational analysis of suspected ADRs in VigiBase® for idarucizumab or AA up to 31 May 2023 (N=1,095; 72% idarucizumab; 28% AA) • Key outcomes: probability of serious ADR, death and TEs
Results	• ADRs were serious in 88.6% of cases, with a total of 56.1% fatal cases **Compared with patients not receiving concomitant medications**: • There was a higher probability of **serious ADRs and death** for patients treated with idarucizumab + ≥5 concomitant medications (ROR: 4.04 and 1.66, respectively) and in those receiving AA + 1–4 concomitant medications (ROR: 5.66 and 4.80, respectively) • The probability of **TEs** was significantly lower in patients aged 75–84 years (ROR: 0.55) and ≥85 years (ROR: 0.50)
Conclusions	**Clinicians should pay particular attention when managing individuals needing these DOAC reversal agents, especially if vulnerable and requiring polytherapy**

AA, andexanet alfa; ADR, adverse drug reaction; FXaI, Factor Xa inhibitor; ROR, reporting odds ratio; TE, thromboembolic events.
Crescioli G, et al. *Aging Clin Exp Res*. 2025;37:120.

Latest data on the efficacy and safety of PCC

	PCC FOR REVERSAL OF OACs IN PATIENTS WITH OAC-RELATED CRITICAL BLEEDING[1]	3F- vs 4F-PCC FOR THE REVERSAL OF ORAL FXaI[2]
Aims	**To evaluate the benefits and harms of PCC in patients with OAC-related critical bleeding (internal or external haemorrhage)**	**To compare the haemostatic effectiveness and safety of 3F- vs 4F-PCC for oral FXaI-associated bleeding**
Methods and outcomes	• Systematic review of 3 RCTs (N=291) comparing PCC vs two active comparators in patients with VKA-related critical bleeding, and 2 RCTs (N=534) evaluating PCC vs two active comparators in patients with FXaI-critical bleeding • Primary outcomes: All-cause mortality, HRQoL and SAEs	• A retrospective, observational, multicentre study (N=125) • Primary outcome: haemostatic effectiveness • Secondary outcomes: TEs, in-hospital mortality, and length of hospital/ICU stay
Results	• **VKA-related critical bleeding**: No difference between PCC vs FFP for all-cause mortality, HRQoL or SAEs • **FXaI-related critical bleeding**: PCC was neither superior nor inferior to other reversal strategies (FFP or AA) on any outcome • Available data are sparse	• **Haemostatic effectiveness**: 84% of all patients; no differences between the groups (p=0.81) • **Secondary outcomes**: no difference between the groups in length of hospital/ICU stays, in-hospital mortality or incidence of TEs
Conclusions	**Evidence from RCTs is insufficient to establish if PCC is superior or inferior vs other interventions in decreasing adverse outcomes or improving HRQoL**	**No significant differences were found in the effectiveness or safety of 4F-PCC and 3F-PCC in the management of oral FXaI-associated bleeding**

3F, three factor; 4F, four factor; AA, andexanet alfa; DOAC, direct oral anticoagulant; FFP, fresh frozen plasma; FXaI, Factor Xa inhibitor; HRQoL, health-related quality of life; ICU, intensive care unit; OAC, oral anticoagulant; PBO, placebo; PCC, prothrombin complex concentrate; RCT, randomized control trial; SAE, serious adverse event; TE, thromboembolic events; VKA, vitamin K antagonist.

1. Ovesen C, et al. *Scand J Trauma Resusc Emerg Med.* 2025;33:19; 2. Hays WB, et al. *J Thromb Thrombolysis*. 2025;58:276–83.

Intracranial haemorrhage related to direct oral anticoagulant medications: Latest evidence for reversal strategies

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Additional data on the risk of ICH with anticoagulant use (1/2)

	SAFETY AND EFFECTIVENESS OF DOACS VS WARFARIN FOR VTE[1]	RISK OF ICH WITH DOAC VS ANTIPLATELET THERAPY[2]
Aims	**To assess the effectiveness and safety of DOACs compared with warfarin using data from real-world practice settings**	**To determine whether DOAC therapy, vs single-agent antiplatelet therapy, was associated with an increased risk of ICH and major haemorrhage**
Methods and outcomes	• A systematic review and meta-analysis of observational studies of DOACs vs warfarin in patients with acute VTE (680,695 patients) • Effectiveness: risk of VTE recurrence • Safety outcomes: major bleeding, clinically relevant non-major bleeding, intracranial haemorrhage, gastrointestinal bleeding and all-cause mortality	• A systemic review and meta-analysis of randomized controlled trials (45,494 patients) • Primary outcome: ICH • Secondary outcomes: major haemorrhage, fatal haemorrhage, GI haemorrhage, ischaemic stroke and cardiovascular mortality
Results	• Risk of VTE recurrence (DOACs vs warfarin): **24% reduction** • Safety: ICH risk (DOAC vs warfarin): **31% reduction** ; however, no significant difference in incidence of ICH in studies reporting number of events/arm	• DOAC therapy not associated with significantly higher odds of ICH vs antiplatelet therapy: **0.55% vs 0.48%, OR 1.15** • DOAC therapy was associated with significantly higher odds of major haemorrhage vs antiplatelet therapy: **2.41% vs 1.76%, OR 1.39**
Conclusions	**DOACs demonstrate favourable effectiveness and safety vs warfarin but clinicians should evaluate pts for bleeding risk factors before initiating DOAC therapy**	**DOAC therapy was not associated with a significantly higher risk of ICH vs antiplatelet therapy, but was associated with a higher risk of major haemorrhage**

DOAC, direct oral anticoagulant; ICH, intracranial haemorrhage; OR, odds ratio; VTE, venous thromboembolism.

1. Alshahrani WA, et al. *Am J Cardiovas Drugs*. 2024;24:823–39; 2. Coyle, M et al. *JAMA Network Open.* 2024;7:e2449017.

Additional data on the risk of ICH with anticoagulant use (2/2)

	ICH IN PATIENTS TAKING DIFFERENT TYPES OF OAC[1]	CDM FOR RISK FOR ANTICOAGULANT-INDUCED ICH[2]	REAL-WORLD PHARMACOVIGILANCE STUDY OF OAC-INDUCED ICH[3]
Aims	**To assess outcomes in patients with ICH according to prior OAC or no anticoagulation**	**To investigate incidence and risk factors for OAC-induced sICH in a real-world setting**	**To describe the national post-market cases of OAC-induced ICH**
Methods and outcomes	• Observational study using two prospective national stroke registries (11,349 patients) • Main outcomes: favourable functional outcome (modified Rankin scale 0–2) and mortality at 3 months	• A retrospective study of the clinical data warehouse from the SNUH (12,821 patients) • Used a CDM to analyse incidence and risk factor of sICH	• Analysis of the FAERS-reported cases of OAC-related ICH (11,201 cases)
Results	• Favourable outcome (DOAC vs no anticoagulation): **adjusted OR 0.64** • 3-month mortality (DOAC vs no anticoagulation): **adjusted OR 1.28**	• Incidence of sICH: **warfarin 0.5%** and **NOAC 0.2%** • Risk factors: warfarin over NOAC, hypertension, diabetes, brain tumours, decreased duration of OAC	• Median time to onset: **181 days** • Median age at onset of ICH: **75 years** • After adjusting for confounding factors, lower ICH risks observed with DOACs vs VKAs
Conclusions	**Prior DOAC is independently associated with lower odds of a favourable outcome and higher odds of 3-month mortality**	**NOACs demonstrated a lower risk of sICH vs warafarin in a real-world setting; use of a CDM may be beneficial in clinical studies**	**DOACs demonstrated a robust lower risk of ICH vs VKAs. The majority of OAC-induced ICH occurred within 5 months and in elderly patients**

CDM, common data model; CI, confidence interval; DOAC, direct oral anticoagulant; FAERS, US Food and Drug Administration Adverse Event Reporting System; ICH, intracranial haemorrhage; NOAC, novel oral anticoagulant; OAC oral anticoagulant; OR, odds ratio; pts, patients; s, spontaneous; SNUH, Seoul National University Hospital; VKA, vitamin K antagonist.

1. Siepen BM, et al. *Stroke Vas Neurol*. 2024;9:e002813; 2. Hong, N et al. *J Clin Neurosci.* 2025;8:133:111039; 3. Chen J, et al. *Expert Opin Drug Saf.* 2024 Dec 11:1–10. doi: 0.1080/14740338.2024.2430320 (Online ahead of print).

Real-world evidence for the effectiveness and safety of andexanet alfa

	EFFECTIVENESS OF ANDEXANET ALFA (ASTRO-DE STUDY)[1]	EFFECTIVENESS OF ANDEXANET ALFA IN AN ITALIAN POPULATION[2]
Aims	**To assess the real-world evidence for AA in mitigating haematoma expansion and altering the prognosis rivaroxaban- or apixaban-treated patients with ICH**	**To review outcomes for Italian patients treated with AA as a reversal agent for FXaI-related major bleedings**
Methods and outcomes	• Prospective, non-interventional cohort study (137 patients) • Primary outcomes: HVC; proportion of patients with haematoma growth ≤33% within 12-72h or until first control imaging • Secondary outcomes include in-hospital TE; mortality up to 90 days	• Retrospective collection of real-world data of FXaI-related haemorrhage (51 patients) • Predominant bleeding type: ICH, particularly intracerebral: 68.6%
Results	• At first control imaging: mean HVC **2.3 mL** and haematoma growth ≤33% **90.3% of patients** • Within 12-72h: mean HCV **1.8 mL** and haematoma growth ≤33% **90.5% of patients** • TEs: **8.0%** (n=11/137) and 90-day mortality: **36.7%** (n=47/128)	• In patients with ICH, median haematoma volume expansion was **12.34%** • Successful haemostasis rate: **77%** of patients (**53.7%** with intracerebral haemorrhage) • OR for 30-day mortality in patients with ICH: **1.87** • TEs: **9.8%**
Conclusions	**Treatment with AA showed favourable haemostasis and minimal mean haematoma volume growth in patients with ICH and DOAC treatment**	**This analysis provide a comprehensive overview of FXaI-related bleeding events in Italy managed with AA and contribute to the existing evidence**

AA, andexanet alfa; DOAC, direct oral anticoagulant; FXaI, Factor Xa inhibitor; h, hours; HVC, haematoma volume change; ICH, intracranial haemorrhage; OR, odds ratio; TE, thromboembolic events.

1. Diener H-C, et al. *Int J Stroke*. 2025 Jan 20: doi: 10.1177/17474930251317385 (Online ahead of print); 2. Simioni P, et al. *Thrombosis Res*. 2025: 245:109241.

Additional data for the efficacy and safety of andexanet alfa and other DOAC reversal agents

	EFFICACY AND SAFETY ANDEXANET ALFA VS SOC*[1]	A UK-BASED AUDIT OF THE USE OF DOAC-REVERSAL AGENTS (ANDEXANET ALFA, PCC OR IDARUCIZUMAB)[2]
Aims	**To evaluate the efficacy and safety of AA vs SOC* for the reversal of DOAC-induced ICH**	**To assess the use of DOAC-reversal agents, as well as associated mortality and thrombosis rates**
Methods and outcomes	• A systematic review and meta-analysis using prospective or retrospective cohort studies or RCTs (4,330 patients) • Primary efficacy outcome: haemostatic efficacy • Primary safety outcomes: rates of thrombotic complications; mortality	• A retrospective, observational audit of patients who received AA, PCC or idarucizumab for DOAC reversal (2,477 patients) • Primary outcome: patients receiving a reversal agent who had major bleeding defined by ISTH criteria • Secondary outcomes: 90-day mortality; 30-day TE rate
Results	• Haemostatic efficacy, pooled RR: **1.1** favouring AA • TE, pooled RR: **1.22** • Mortality, pooled RR: **0.81** • Subgroup analysis of AA vs 4F-PCC: similar results for haemostatic efficacy and thrombotic complications, but significant mortality risk reduction favouring AA	• **40.8%** of patients had an ICH • **91.1%** of treated patients fulfilled ISTH criteria • 13.0% received AA,† 82.3% PCC and 4.7% idarucizumab • 90-day mortality rate: **45.8%** in patients with ICH • 30-day TE rate: **3.0%**
Conclusions	**Treatment with AA offers improved haemostatic efficacy vs SoC, with no effect on thrombotic complications and mortality rates**	**Most patients fulfilled the ISTH definition of major bleeding; high mortality rates confirm the cohort is enriched for severe presentations of bleeding**

*Standard of care in included trials was 4- or 3-factor PCC, activated PCC or tranexamic acid. †AA use restricted to gastrointestinal haemorrhage in most of the UK.
AA, andexanet alfa; DOAC, direct oral anticoagulant; ICH, intracranial haemorrhage; ISTH, International Society of Thrombosis and Haemostasis; PCC, prothrombin complex concentrate; RCT, randomized control trial; RR, risk ratio; SOC, standard of care; TE, thromboembolism.
1. Xiang AJ, et al. *Blood*. 2024;144 (Suppl. 1):5089–90; 2. Buka, RJ, et al. *Blood*. 2024;144 (Suppl. 1):2637–8.

Intracranial haemorrhage related to direct oral anticoagulant medications: Latest evidence for reversal strategies

Data updates
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There is new evidence for the efficacy and safety of DOAC reversal agents and for monitoring their efficiency

	EFFICACY AND SAFETY OF 4F-PCC[1]	EFFICACY AND SAFETY OF ANDEXANET ALFA VS 4F-PCC[2]	MONITORING THE EFFICIENCY OF REVERSAL ON ANTI-FXa DOACs[3]
Aims	**To evaluate outcomes in patients treated with PCC for FXaI-associated bleeding or urgent surgery**	**To assess the comparative efficacy and safety of AA and 4F-PCC in the reversal of FXaI-associated ICH**	**To assess point-of-care viscoelastic testing as a method of detecting DOAC concentrations before/after reversal**
Methods	• Single-centre retrospective study • Patients receiving 4F-PCC* for FXaI-associated major bleeding or surgery • Primary outcome: haemostatic efficacy • Safety outcome: 30-day risk of TE	• Systematic review and meta-analysis of studies until 16 May 2024 (N=2,977) • Primary outcomes: Haemostatic efficacy; overall mortality; TE events • REM used to pool data	• Case series of three patients requiring DOAC reversal for bleeding • POC VET lab assays (RVV clotting time test) used to measure DOAC effects after reversal with AA

Results	• FXaI-associated bleeding, n=83†
	  • **32 (39%)** had ICH
	  • Effective haemostasis in **67%** of patients with bleeding
	• 30-day risk of TE was **8%** overall
		• Haemostatic efficacy in favour of AA: **RR 1.10**, 95% CI 1.01–1.20 **(p=0.02)**
		• Lower overall mortality with AA: **RR 0.67**, 95% CI 0.51–0.88 **(p=0.004)**
		• More TE events with AA: **RR 1.47**, 95% CI 1.01–2.15 **(p=0.046)**
			RVV clotting time assays were able to:
			• Detect and quantify DOACs
			• Confirm haemostatic effect of reversal agents *(clotting time after AA infusion:* ***90–91s***‡*)*
			• Identify late DOAC rebound

Conclusions	**PCC for FXaI-associated bleeding was associated with haemostatic efficacy in two-thirds of patients; 30-day TE event rate was <10%**	**AA is superior to 4F-PCC in terms of haemostatic efficacy and reducing overall mortality. More TE events are associated with use of AA vs 4F-PCC**	**If confirmed in large validation studies, utilization of RVV-CT in routine emergency care will streamline the care of DOAC patients**

*25–50 IU/kg; †Urgent surgery, n=22; ‡Results for patients 1 and 3; patient 2 received low-dose AA as rescue therapy.
4F-PCC, four-factor of prothrombin complex concentrate; AA, andexanet alfa; DOAC, direct oral anticoagulant; FXaI, Factor Xa inhibitor; GI, gastrointestinal; ICH, intracranial haemorrhage; POC, point-of-care; REM, random effects model; RR, risk ratio; RVV, Russell viper venom; TE, thromboembolism; VET, viscoelastic testing.
1. Shaw JR, et al. *Thromb Res.* 2024;243: 109172; 2. Sarhan K, et al. *Neurocrit Care.* 2024. DOI: https://doi.org/10.1007/s12028-024-02130-y. Online ahead of print;
3. Heubner L, et al. *Thromb J.* 2024;22:89.

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INTERACT trial updates demonstrate the importance of blood pressure and blood sugar control in ICH

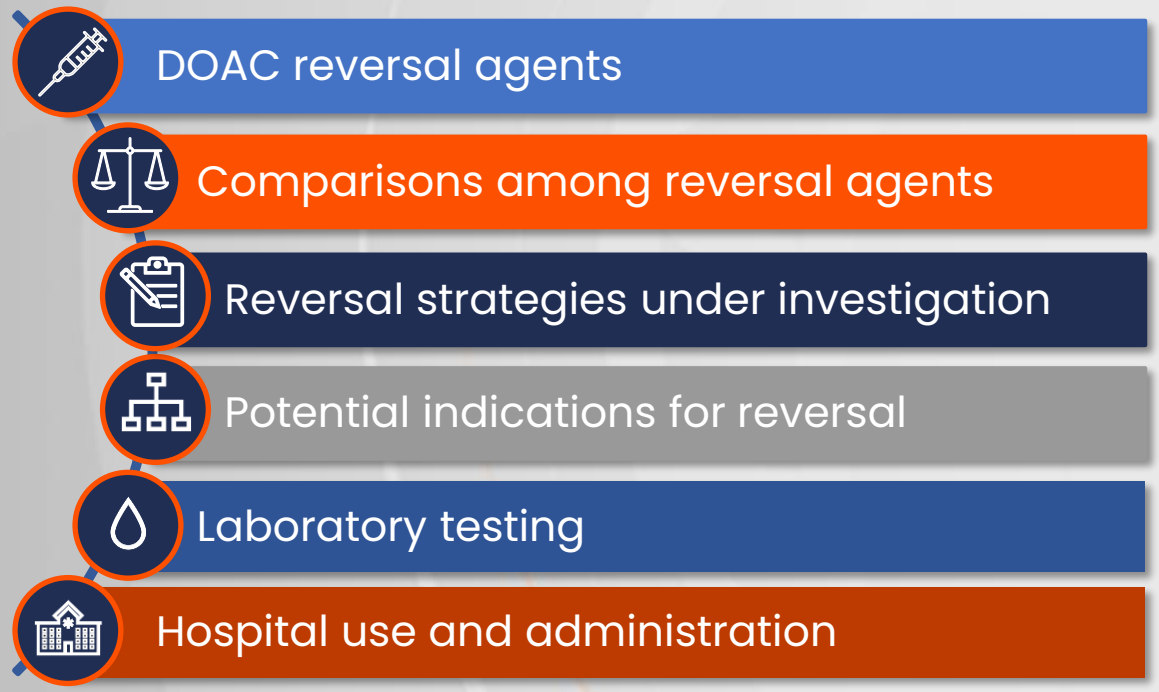
	POOLED ANALYSIS OF ALL FOUR INTERACT TRIALS[1] *Impact of timing of blood pressure lowering*	INTERACT3 TRIAL SUBANALYSIS[2] *Impact of blood glucose levels*
Aims	**To assess the heterogeneity in the treatment effect of BP lowering, based on treatment time in ICH**	**To determine associations of BG and unfavourable functional outcome in patients with ICH without diabetes**
Methods	• Individual patient data pooled analysis of INTERACT1, 2, 3 and 4 trials • N=2,921 patients with ICH • Ordinal logistic regression model used to define heterogeneity in treatment effect on 90-d efficacy (mRS)	• Post hoc analysis of INTERACT3, an RCT where BL characteristics were collected at ICH hospital admission • Logistic regression models used to determine associations of BG as continuous and categorical exposures and 6-month functional outcome (mRS)*
Results	• Treatment, n=1,467; control, n=1,454 • Significant heterogeneity in treatment effect by treatment time (p for interaction, **0.005**) • More benefit if BP-lowering therapy given within 3 hours of onset	• n=6,306; median BG 7.1 mmol/L • No association between BG and functional outcome: **aOR 1.01**, 95% CI 0.98-1.04 **(p=0.64)** • Higher BG increased the risk of death: **aOR 1.08**, 95% CI 1.04-1.12 **(p<0.0001)** • BG >10mmol/L group: **aOR 1.50**, 95% CI 1.15-1.96 vs the <7.8 mmol/L group **(p=0.0019)**
Conclusions	**Individual patient data pooling aims to provide robust evidence for informing clinical guidelines regarding early BP lowering**	**In patients with ICH without diabetes, very high BG (>10.0 mmol/L) is associated with death over 6 months. Glycaemic control should be applied in such patients**

*Adjusted for study-design, patient and management variables. aOR, adjusted odds ratio; BG, blood glucose; BL, baseline; BP, blood pressure; CI, confidence internal; d, day; ICH, intracranial haemorrhage; INTERACT, Intensive Blood Pressure Reduction in Acute Cerebral Hemorrhage Trials; mRS, modified Rankin Scale; RCT, randomized controlled trial.

1. Ren X. Presented at the 16th World Stroke Congress, 23–26 October 2024, Abu Dhabi, UAE. Available at: https://cslide.ctimeetingtech.com/wsc24/attendee/confcal/session/list (accessed 24 October 2024); 2. Ouyang M. Presented at the 16th World Stroke Congress, 23–26 October 2024, Abu Dhabi, UAE. Available at: https://cslide.ctimeetingtech.com/wsc24/attendee/confcal/session/list (accessed 24 October 2024).

The Scientific and Standardization Committee of the ISTH has updated its guidance on reversal of DOACs

2024 update to the prior 2016 guidance includes:



DOAC, direct oral anticoagulant; ISTH, International Society on Thrombosis and Haemostasis.

Levy JH, et al. *J Thromb Haemost.* 2024;22:2889–99.

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