Short-term systolic BP variability and functional outcome after acute ICH: analyses of pooled individual participant data

Tom Moullaali on behalf of:

Xia Wang, Else Charlotte Sandset, Lisa Woodhouse, Zhe Kang Law, Charlotte Hickman, Zien Zhou, Sohei Yoshimura, John Potter, Thompson Robinson, Rustam Al-Shahi Salman, Philip Bath, Craig Anderson *and the BASC collaborators*

Tom is a neurology trainee from Edinburgh, UK, who completed a British Heart Foundation-funded PhD about BP variability and ICH

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@Tom_Moullaali

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Background: Our systematic review and study-level meta-analysis found an association between higher short-term systolic BP variability (SBPV) and poor functional outcome after acute intracerebral haemorrhage (ICH), but it was prone to publication bias, and potential confounding by other aspects of SBP control and BP-lowering strategies.

Methods: We pooled individual participant data (IPD) from randomised controlled trials in the Blood pressure in Acute Stroke Collaboration (BASC). Short-term SBPV was defined as the standard deviation (SD) of SBP measures during 1-24 hours after randomisation. Primary outcome was function (distribution of scores on the modified Rankin scale) 90-180 days after randomisation. Meta-analysis used a one-stage approach, adjusted for pre-specified covariables, other summary measures of SBP control, and trial. We assessed the interaction effect of BP-lowering agent and BP-lowering strategy.

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Findings: 5,463 of 6,221 (88%) patients provided the minimum required data for adjusted analyses. A linear association existed between short-term SBPV during 1-24 h after acute ICH and functional outcome: adjusted OR (95%CI) for unfavourable shift in ordinal mRS scores per 10 mm Hg increase in SD of SBP 1.18 (1.11-1.27), p<0.001. Significant interactions existed for most frequently used BP-lowering agent (α-and β-adrenoreceptor blockers OR 1.30 95%CI [1.18-1.44], calcium channel blocker 1.51 [1.18-1.96], magnesium sulfate 1.05 [0.90-1.22], nitrate 1.05 [0.90-1.22], pinteraction<0.001) and for BP-lowering strategy (titrated target-based 1.32 [1.21-1.45], fixed class-based 1.04 [0.93-1.15], pinteraction<0.001).

Interpretation: Early variation in SBP after acute ICH is associated with worse functional outcome, especially in patients receiving intensive, targeted BP reductions with α-and β-adrenoreceptor blockers and calcium channel blockers.