Blood pressure variability and outcome after acute intracerebral haemorrhage: a post-hoc analysis of INTERACT2, a randomised controlled trial.

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Abstract

Background: High blood pressure is a prognostic factor for acute stroke, but blood pressure variability might also independently predict outcome. We assessed the prognostic value of blood pressure variability in participants of INTERACT2, an open-label randomised controlled trial (ClinicalTrials.gov number NCT00716079).

Methods: INTERACT2 enrolled 2839 adults with spontaneous intracerebral haemorrhage (ICH) and high systolic blood pressure (150–220 mm Hg) without a definite indication or contraindication to early intensive treatment to reduce blood pressure. Participants were randomly assigned to intensive treatment (target systolic blood pressure <140 mm Hg within 1 h using locally available intravenous drugs) or guideline-recommended treatment (target systolic blood pressure <180 mm Hg) within 6 h of onset of ICH. The primary outcome was death or major disability at 90 days (modified Rankin Scale score ≥3) and the secondary outcome was an ordinal shift in modified Rankin Scale scores at 90 days, assessed by investigators masked to treatment allocation. Blood pressure variability was defined according to standard criteria: five measurements were taken in the first 24 h (hyperacute phase) and 12 over days 2–7 (acute phase). We estimated associations between blood pressure variability and outcomes with logistic and proportional odds regression models. The key parameter for blood pressure variability was standard deviation (SD) of systolic blood pressure, categorised into quintiles.

Findings: We studied 2645 (93·2%) participants in the hyperacute phase and 2347 (82·7%) in the acute phase. In both treatment cohorts combined, SD of systolic blood pressure had a significant linear association with the primary outcome for both the hyperacute phase (highest quintile adjusted OR 1·41, 95% CI 1·05–1·90; ptrend=0·0167) and the acute phase (highest quintile adjusted OR 1·57, 95% CI 1·14–2·17; ptrend=0·0124). The strongest predictors of outcome were maximum systolic blood pressure in the hyperacute phase and SD of systolic blood pressure in the acute phase. Associations were similar for the secondary outcome (for the hyperacute phase, highest quintile adjusted OR 1·43, 95% CI 1·14–1·80; ptrend=0·0014; for the acute phase OR 1·46, 95% CI 1·13–1·88; ptrend=0·0044).

Interpretation: Systolic blood pressure variability seems to predict a poor outcome in patients with acute intracerebral haemorrhage. The benefits of early treatment to reduce systolic blood pressure to 140 mm Hg might be enhanced by smooth and sustained control, and particularly by avoiding peaks in systolic blood pressure.

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