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Original Investigation

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Association of Intensive vs Standard Blood Pressure Control With Cerebral White Matter Lesions

The SPRINT MIND Investigators for the SPRINT Research Group

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Key Points

Question Is intensive blood pressure treatment associated with less progression of small vessel ischemic disease, as reflected by cerebral white matter lesion volume?

Findings In this substudy of a randomized clinical trial of 449 hypertensive patients with longitudinal brain magnetic resonance imaging, intensive blood pressure management to a target of less than 120 mm Hg, vs less than 140 mm Hg, was associated with a smaller increase in white matter lesion volume (0.92 cm³ vs 1.45 cm³).

Meaning More intensive blood pressure management was associated with less progression of cerebral small vessel ischemic disease, although the difference was small.

Abstract

Importance The effect of intensive blood pressure lowering on brain health remains uncertain.

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Objective To evaluate the association of intensive blood pressure treatment with cerebral white matter lesion and brain volumes.

Design, Setting, and Participants A substudy of a multicenter randomized clinical trial of hypertensive adults 50 years or older without a history of diabetes or stroke at 27 sites in the United States. Randomization began on November 8, 2010. The overall trial was stopped early because of benefit for its primary outcome (a composite of cardiovascular events) and all-cause mortality on August 20, 2015. Brain magnetic resonance imaging (MRI) was performed on a subset of participants at baseline (n=670) and at 4 years of follow-up (n=449); final follow-up date was July 1, 2016.

Interventions Participants were randomized to a systolic blood pressure (SBP) goal of either less than 120 mm Hg (intensive treatment, n=355) or less than 140 mm Hg (standard treatment, n=315).

Main Outcomes and Measures The primary outcome was change in total white matter lesion volume from baseline. Change in total brain volume was a secondary outcome.

Results Among 670 recruited patients who had baseline MRI (mean age, 67.3 [SD, 8.2] years; 40.4% women), 449 (67.0%) completed the follow-up MRI at a median of 3.97 years after randomization, after a median intervention period of 3.40 years. In the intensive treatment group, based on a robust linear mixed model, mean white matter lesion volume increased from 4.57 to 5.49 cm³ (difference, 0.92 cm³ [95% CI, 0.69 to 1.14]) vs an increase from 4.40 to 5.85 cm³ (difference, 1.45 cm³ [95% CI, 1.21 to 1.70]) in the standard treatment group (between-group difference in change, -0.54 cm³ [95% CI, -0.87 to -0.20]). Mean total brain volume decreased from 1134.5 to 1104.0 cm³ (difference, -30.6 cm³ [95% CI, -32.3 to -28.8]) in the intensive treatment group vs a decrease from 1134.0 to 1107.1 cm³ (difference, -26.9 cm³ [95% CI, 24.8 to 28.8]) in the standard treatment group (between-group difference in change, -3.7 cm³ [95% CI, -6.3 to -1.1]).

Conclusions and Relevance Among hypertensive adults, targeting an SBP of less than 120 mm Hg, compared with less than 140 mm Hg, was significantly associated with a smaller increase in cerebral white matter lesion volume and a greater decrease in total brain volume, although the differences were small.

Trial Registration ClinicalTrials.gov Identifier: [NCT01206062](https://clinicaltrials.gov/ct2/show/study/NCT01206062)

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