



Blood pressure levels and brain volume reduction: a systematic review and meta-analysis

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Résumé en
anglais

Objective: High blood pressure (BP) levels may be associated with brain volume reduction and may contribute to brain atrophy in key brain regions involved in cognition and susceptible to neurodegeneration in Alzheimer's disease. The purpose of this work was to systematically review and quantitatively synthesize the association of BP levels with brain volume reduction in humans. Methods: An English Medline, Cochrane Library and PsycINFO search was conducted in June 2012 using the Medical Subject Heading terms 'Blood pressure', 'Hypertension', 'Brain mapping' and 'Brain atrophy'. Results: Of the 609 screened abstracts, 28 studies (4.6%) were included in the qualitative analysis. Twenty-six studies (92.9%) showed a significant association of higher BP levels and/or hypertension with total and/or regional brain volume reduction, the frontal and temporal lobes being particularly affected. In addition, four other studies reported an association between lower BP levels and brain volume reduction. Due to the heterogeneity of methodology and outcomes, random-effects meta-analyses of the mean difference of brain volume could be performed on only seven studies, with a total of 709 cases with hypertension and 1001 controls without hypertension. The findings showed no between-group difference regarding the whole-gray matter volume (summary mean difference = 2.42 cm³ [95% confidence interval (CI): -2.13 to 6.96]). Conversely, cases with hypertension exhibited lower hippocampus volume compared with controls [summary mean difference = -0.10 cm³ (95% CI: -0.17 to -0.02)]. Conclusion: These findings provide evidence that high BP levels lead to brain volume reduction, specifically in hippocampus, and may be an important factor that contributes to neurodegeneration in Alzheimer's disease.

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