Blood pressure in treated hypertensive individuals with the MTHFR 677TT genotype is responsive to intervention with riboflavin: findings of a targeted randomized trial.


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BACKGROUND: Intervention with riboflavin was recently shown to produce genotype-specific lowering of blood pressure (BP) in patients with premature cardiovascular disease homozygous for the 677C→T polymorphism (TT genotype) in the gene encoding the enzyme methylenetetrahydrofolate reductase (MTHFR). Whether this effect is confined to patients with high-risk cardiovascular disease is unknown.

OBJECTIVE: The aim of this randomized trial, therefore, was to investigate the responsiveness of BP to riboflavin supplementation in hypertensive individuals with the TT genotype but without overt cardiovascular disease.

METHODS: From an available sample of 1427 patients with hypertension, we identified 157 with the MTHFR 677TT genotype, 91 of whom agreed to participate in the trial. Participants were stratified by systolic BP and randomized to receive placebo or riboflavin (1.6 mg/d) for 16 weeks.

RESULTS: At baseline, despite being prescribed multiple classes of antihypertensive drugs, >60% of participants with this genotype had failed to reach goal BP (≤140/90 mm Hg). A significant improvement in the biomarker status of riboflavin was observed in response to intervention (P<0.001). Correspondingly, an overall treatment effect of 5.6±2.6 mm Hg (P=0.033) in systolic BP was observed, with pre- and postintervention values of 141.8±2.9 and 137.1±3.0 mm Hg (treatment group) and 143.5±3.0 and 144.3±3.1 mm Hg (placebo group), whereas the treatment effect in diastolic BP was not significant (P=0.291).

CONCLUSION: In conclusion, these results show that riboflavin supplementation targeted at hypertensive individuals with the MTHFR 677TT genotype can decrease BP more effectively than treatment with current antihypertensive drugs only and indicate the potential for a personalized approach to the management of hypertension in this genetically at-risk group.

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