

## Elevated fasting insulin predicts incident hypertension: the ARIC study

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**Objective:** The prospective association of insulin and hypertension has been under debate in the context of the development of the insulin resistance or multiple metabolic syndrome. We examined the predictive associations of fasting serum insulin with incident hypertension occurring alone or as part of the multiple metabolic syndrome.

**Design:** Analyses were restricted to 5221 middle-aged participants of the Atherosclerosis Risk in Communities Study cohort who were free of component disorders of the multiple metabolic syndrome (hypertension; diabetes; high triglycerides and/or low HDL cholesterol (dyslipidaemias)) at baseline.

**Outcome:** A total of 1018 individuals developed hypertension, 801 in the absence of components of the metabolic syndrome and 217 in combination with diabetes or dyslipidaemias, between 1987 and 1993.

**Results:** Elevated fasting insulin (top quartile versus lowest quartile) was associated with overall incident hypertension in European Americans [hazard rate ratio (HRR) 2.0, 95% confidence interval (CI) 1.7-2.4] but the results were inconclusive in African Americans (HRR 1.3, 95% CI 0.9-1.8) after adjusting for age, gender and study centre. Among European Americans, body mass index and abdominal girth only partly explained the observed association. Elevated fasting insulin was more strongly predictive of hypertension occurring as a component of the multiple metabolic syndrome (HRR 2.4, 95% CI 1.5-3.9) than of hypertension occurring alone (HRR 1.3, 95% CI 1.0-1.7) adjusting statistically for age, gender, study centre, body mass index and abdominal girth.

**Conclusions:** The results are consistent with the concept of an aetiological heterogeneity for hypertension and may explain previously reported inconsistent findings on the association of insulin with incident hypertension.

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