

QTLs of factors of the metabolic syndrome and echocardiographic phenotypes: the hypertension genetic epidemiology network study.

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Abstract

BACKGROUND: In a previous study of the Hypertension Genetic Epidemiology Network (HyperGEN) we have shown that metabolic syndrome (MetS) risk factors were moderately and significantly associated with echocardiographic (ECHO) left ventricular (LV) phenotypes.

METHODS: The study included 1,393 African Americans and 1,133 whites, stratified by type 2 diabetes mellitus (DM) status. Heritabilities of seven factor scores based on the analysis of 15 traits were sufficiently high to pursue QTL discovery in this follow-up study.

RESULTS: Three of the QTLs discovered relate to combined MetS-ECHO factors of "blood pressure (BP)-LV wall thickness" on chromosome 3 at 225 cM with a 2.8 LOD score, on chromosome 20 at 2.1 cM with a 2.6 LOD score; and for "LV wall thickness" factor on chromosome 16 at 113.5 with a 2.6 LOD score in whites. The remaining QTLs include one for a "body mass index-insulin (BMI-INS)" factor with a LOD score of 3.9 on chromosome 2 located at 64.8 cM; one for the same factor on chromosome 12 at 91.4 cM with a 3.3 LOD score; one for a "BP" factor on chromosome 19 located at 67.8 cM with a 3.0 LOD score. A suggestive linkage was also found for "Lipids-INS" with a 2.7 LOD score located on chromosome 11 at 113.1 cM in African Americans. Of the above QTLs, the one on chromosome 12 for "BMI-INS" is replicated in both ethnicities, (with highest LOD scores in African Americans). In addition, the QTL for "LV wall thickness" on chromosome 16q24.2-q24.3 reached its local maximum LOD score at marker D16S402, which is positioned within the 5th intron of the cadherin 13 gene, implicated in heart and vascular remodeling.

CONCLUSION: Our previous study and this follow-up suggest gene loci for some crucial MetS and cardiac geometry risk factors that contribute to the risk of developing heart disease.