Homocysteine, Renal Disease and Cardiovascular Disease in a Remote Australian Aboriginal Community

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Abstract

Background: Rates of renal and cardiovascular disease are high among Aboriginal Australians living in remote communities. Nutritional problems, in particular low folate levels, are also common. This suggests that increased homocysteine concentrations might be widespread, and a possible contributor to the high rates of cardiovascular disease.

Aims: To examine homocysteine concentrations, and their relationships to folate levels, and to markers of renal disease and cardiovascular disease in a remote Aboriginal Australian community.

Methods: As part of a cross-sectional survey among adults in one community, homocysteine concentrations, concentrations of the crucial determinants (red blood cell (RBC) folate, vitamin B12 and the C677T methylene tetrahydrofolate reductase polymorphism) and cardiovascular risk factors were examined.

Results: Among 221 people, geometric mean homocysteine concentration was 11.8 µmol/L (range: 11.1–12.5 µmol/L), with 57/221 (26%) values ≥15.0 µmol/L. Higher concentrations were associated with older age, male gender, lower RBC folate and lower vitamin B12 concentrations and homozygosity for C677T. Homocysteine concentrations were not related to the presence of albuminuria, other than over the overt albuminuria range. Homocysteine concentrations were inversely correlated with calculated glomerular filtration rate (GFR). Carotid intima-media thickness, however, was not related to homocysteine concentration. In multivariate analyses, age, male gender, lower RBC folate concentrations, lower vitamin B12 concentrations, lower calculated GFR and the C677T polymorphism were all associated with homocysteine concentrations.

Conclusions: Homocysteine concentrations were consistent with previous limited reports in Aboriginal communities. Although superficially they are similar to reports from non-Aboriginal settings, the younger age of this cohort and the association of homocysteine concentrations with age suggest that age-specific concentrations are higher among Aboriginal Australians. In addition to dietary determinants, the high prevalence of apparently reduced renal function renal disease appears to be an important determinant of homocysteine concentrations in remote Aboriginal communities. The role of homocysteine concentrations as a potential mediator of the high rates of cardiovascular disease remains to be determined.

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