Whole blood folate, homocysteine in serum, and risk of first acute myocardial infarction

I read with interest the study reported by Christensen et al. in the December 1999 issue of Atherosclerosis [1]. The authors concluded that smoking lowers whole blood folate status and in this way increases homocysteine concentrations which could be risk factors for first acute myocardial infarction. Interestingly, correlations were observed between the risk of myocardial infarction, total homocysteine levels and alcohol intake. However, alcohol consumption has been reported to have both beneficial and harmful effects on the incidence of artery diseases, including myocardial infarction and stroke, and it has been found that heavy alcohol intake is an independent risk factor for all major subtypes of cardiovascular diseases [2,3]. Furthermore, elevated homocysteine levels has been found in patients suffering from myocardial infarction [4]. Thus, Dr Christensen’s observations are in agreement with other studies. However, the underlying mechanisms leading to the increased risk are still unclear.

Arterial hypertension, cardiac disease and heavy alcohol use are important risk factors in the development of cardiovascular diseases [3,5], but the significance of alcohol in the pathogenesis of these diseases is less well defined. It has been suggested that an increased homocysteine concentration causes abnormal metabolism of Mg$^{2+}$ in cerebral vascular smooth muscle cells priming these cells for homocysteine-induced atherogenesis, cerebral vasospasm and stroke [6]. Recently, it has been shown that chronic alcoholism is associated with hyperhomocysteinemia, possibly through its effect on vitamin status [7]. In addition, hyperhomocysteinemia was observed in chronic alcoholics who underwent withdrawal from alcohol, whereby the plasma homocysteine concentration was positively correlated with the blood alcohol concentration [8]. In contrast, a moderate alcohol consumption seems to be associated with a lower total homocysteine level [3].

Dr Christensen and colleagues have demonstrated increased plasma homocysteine concentrations in patients with myocardial infarction and it is well known that chronic alcoholism leads to an elevation of blood pressure. Thus, the association between alcohol and myocardial infarction or coronary artery disease might be both a blood pressure effect of alcohol and an ethanol-induced hyperhomocysteinemia.

In summary, there is growing evidence that chronic alcoholism is associated with a derangement in this sulfur amino acid metabolism. The balance of evidence from observational studies suggests that elevated levels of homocysteine are associated with an increased risk of carotid artery disease and stroke. I believe that ethanol-induced hyperhomocysteinemia could be a significant risk factor in coronary artery disease and/or myocardial infarction induction. This would explain the increased incidence of coronary artery disease related to high alcohol consumption, as well as the increased risk of myocardial infarction during alcohol withdrawal. Hyperhomocysteinemia is a treatable condition taking into account that folate therapy will reliably reduce plasma homocysteine levels [3]. Furthermore, the administration of NMDA receptor antagonists such as flupirtine might be beneficial in these risk patients [9]. Nevertheless, further investigations and controlled studies are wanted to clarify a possible risk assessment between alcohol and homocysteine and the role of therapeutic agents in patients with the risk of the development of different cardiovascular diseases.

References


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