

Correlations between Folate, Homocysteine Levels, and Markers of Brain Atrophy in Elderly Male and Female Rats

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Abstract : The present study was designed to induce hyperhomocysteinemia (HHcy) in elderly male and female rats. Also, to evaluate, the effect of (HHcy) as a risk factor for cerebrovascular disease and brain atrophy and folate supplementation on serum levels of Hcy, total cholesterol, low density lipoprotein cholesterol (LDLc), high density lipoprotein cholesterol (HDLc), triglycerides, pyridoxal phosphate, folate also, histopathological examination of brain and cerebrovascular vessels. In this work 50 male and 50 female elderly albino rats were used and divided into five groups. The first group served as control, the second and third group received two different dose of L-methionine, the fourth and fifth group received fortified diet with folate powder plus L-methionine. Our results showed that homocysteine levels in male and female rats that received low and high dose of methionine were higher than in the control group, while the levels of folate significantly decreased in male rats only. Induced hyperhomocysteinemia in elderly male and female rats led to significant increase in serum level of cholesterol, LDLc and triglycerides but serum level of HDLc were significantly lower in methionine treated male and female rats than in control. Our results showed that a strong positive correlation between all these parameters and homocysteine except HDLc levels which correlate negatively to Hcy levels. Administration of folate to methionine treated male rats led to insignificant changes in the level of cholesterol when compared to control group but this level was found to be significantly decrease in female rats received small dose of methionine. When the level of cholesterol compared to the same dose of methionine treated group we found a significant decrease in both male and female rats. LDLc and triglycerides level significantly decrease in male rats only versus the control rats, while when compared to low and high dose of methionine a significant decrease occurs. A significant increase in serum level of HDLc in male and female rats when compared to both control and methionine treated groups. In male and female rats supplemented with folate we found an increased serum levels of folate when compared to rats received both dose of methionine. The levels of pyridoxal phosphate significantly decreased in all treated rats compared to the control group and its level were increased with supplementation of folate versus the rats received small and large dose of methionine. It can be concluded that hyperhomocysteinemia may be an additional risk factor for cerebrovascular atherosclerosis and brain atrophy in elderly people and dietary supplementation with folate blocking the activity of homocysteine and may be considered as a therapeutic possibility.

Keywords : hyperhomocysteinemia, brain atrophy, cerebrovascular, L-methionine, pyridoxal phosphate

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