Protective Role of Folic Acid In Oxidative Stress Induced by Methionine over Load on Lipids and Lipoproteins Levels in Female New Zealand Rabbits

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ABSTRACT

Objectives: The aim of this study was examine to know protective role of folic acid in oxidation stress that results by over load of methionine.

Methods: In these study used 18 female of New Zealand rabbits . the working including measuring the TC,TG,HDL,LDL and VLDL levels in blood after intubated over load of methionine and compered with control.

Results: The results show that a significant decrease (p<0.05) in HDL levels and a significant increase (p<0.05) in TC, TG, LDL and VLDL in G2 compared with G1 and G3.

Conclusion: From the results of the present study , we can be concluded that methionine overload state effects on lipids and lipoproteins and folic acid have protective role in oxidative stress that resulted by over load methionine.

INTRODUCTION

Methionine is essential amino acid witch contain sulfur , it is found in rice , cazain, cheese , eggs , meet and fish. Methionine considers essential source of sulfur and many compounds necessary for body and sulfur have important role in (lecithin) production witch it important in decrease the lipids in liver and methionine have important role in (urolithiasis)2, and it is source of homocysteine in blood and over load of methionine lead to Hyperhomocysteinemia (HHcy). HHcy lead to coronary arteries disease and myocardial infraction by oxidative stress3. Cholesterol is a fat, waxy substance and it is found in the cells of the body and it important to make hormones, vitamin D and help in digest foods4. Cholesterol is made in the body and also found in animals sources egg yolks, meat and cheese5. Triglyceride (TG) is a type of fat and found in adipose
tissue, and it Exogenous (in foods)and Endogenous (in liver), some studies suggested that TC and TG are risk factors to atherosclerosis. Lipoproteins are hydrophobic particles have important role in transition the fats in the body. In study on rats which eat food with high ration of methionine for 4 weeks lead to increase in TC,TG and LDL concentration. The Folic acid is a vitamin found in the food and it doesn't synthesis in the body, folic acid is a hydrophilic vitamin and it (co-enzyme) in many reaction, and folic acid have role in methionine synthesis from homocystine and B12, and deficiency of folic acid lead to decrease in methionine levels in blood and that causes HHcy.

**MATERIALS AND METHODS**

This study was carried out in the department of Biology from December, 2009 to January, 2010. In this study 18 female of New Zealand rabbits were divided into three groups (6/group) and were intubated for one month as follows: (control) G1, which were intubated tap water ordinary and animals in treated group G2 were intubated with 100 mg /kg .B.W .of methionine, while animals in third group G3 were intubated with 100 mg /kg .B.W of methionine orally plus oral intubation of folic acid 0.07mg/kg .B.W , and collection the fasting blood samples from this groups each 10 days for measuring: Total cholesterol (TC), Triglyceric (TG), Low density lipoprotein (LDL), High density lipoprotein (HDL) and very density lipoprotein (VLDL).

TC, TG, LDL, HDL and VLDL were measured each 10 days in groups after intubation methionine and methionine plus folic acid for 30 days. Serum (TC) level were measured by using (chelolitik BioLABO company, France). Serum (TG) level were measured by using (Triglyceride kit BIOLABO company, France). Serum (HDL-c) level were measured by using (Rondo.United Kingdom laboratories Ltd,co.Antrim) kit. Serum (LDL-c) level were measured by using: LDL=TC-(HDL+TG/5). The mean± Std. Error of all parameters measured from groups G1,G2 and G3 were determined with TC,TG, LDL, HDL and VLDL.

**RESULTS**

Table 1 shows a significant increase (P<0.05) in TC concentration in G2 compared with G3 and G1, and significant decrease (P<0.05) in TC concentration in G3 compared with G2 within the time.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>shows a significant increase (P&lt;0.05) in TG concentration in G2 compared with G3 and G1, and significant decrease (P&lt;0.05) in TG concentration in G3 compared with G2 within the time.</th>
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<tr>
<td><strong>Table 3</strong></td>
<td>displays a significant decrease (P&lt;0.05) in HDL concentration in G2 compared with G3 and G1, and significant increase (P&lt;0.05) in HDL concentration in G3 compared with G2 within the time.</td>
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<tr>
<td><strong>Table 4</strong></td>
<td>shows a significant increase (P&lt;0.05) in LDL concentration in G2 compared with G3 and G1, and significant decrease (P&lt;0.05) in LDL concentration in G3 compared with G2 within the time.</td>
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<tr>
<td><strong>Table 5</strong></td>
<td>appears a significant increase (P&lt;0.05) in VLDL concentration in G2 compared with G3 and G1,</td>
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and significant decrease (P<0.05) in VLDL concentration in G3 compared with G2 within the time.

Table 5: Affects of methionine and folic acid intubation on levels of (VLDL) mg/dL in New Zealand females rabbits.

<table>
<thead>
<tr>
<th>Time</th>
<th>Control G1</th>
<th>G2</th>
<th>G3</th>
</tr>
</thead>
<tbody>
<tr>
<td>After 10 days</td>
<td>26.03±0.166</td>
<td>37.56±0.061</td>
<td>36.05±0.095</td>
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<tr>
<td>After 20 days</td>
<td>26.16±0.061</td>
<td>38.2±0.115</td>
<td>32.10±0.044</td>
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<tr>
<td>After 30 days</td>
<td>25.98±0.110</td>
<td>39.8±0.073</td>
<td>34.10±0.044</td>
</tr>
<tr>
<td>Total</td>
<td>26.06±0.068</td>
<td>38.52±0.232</td>
<td>34.08±0.392</td>
</tr>
</tbody>
</table>

Mean std. erro. The capital letters refers to horizontal Significant at (p<0.05). The small letters refers to vertical Significant at (p<0.05).

Discussion

The results show that oral tubated of 100mg/kg of methionine daily for female rabbits for 30 days due to significant increased (p<0.05) in TC, TG, LDL and VLDL concentration and significant decrease (P< 0.05) in HDL concentration and this results agreement with 16, 17 that found over load of methionine due to HHcy and that may be responding to Hyperlipidemia that observed in this study by increase in cholesterol synthesis by translation and transcription of 3- hydroxyl-3-methylglualryl co enzyme A reductase, and HHcy may be dysfunction of nitric oxide (No) by decrease in cysteine concentration in plasma 18 and by oxidative stress that results from HHcy may due to stress of endoplasmic reticulum membrane and that due to high levels of TC,TG and VLDL. 19 Hypercholesterolemia that induced by over load methionine may be due to mutation in LDL receptors and that due to decrease in this receptors and increase in LDL levels 20, and HDL concentrations in serum correlated oppositely with levels of TG and LDL in serum, HDL play role in transport cholesterol from tissues to liver and elevated in LDL levels lead to reduce in HDL concentrations, HHcy may be due to decrease in HDL concentrations in serum by reduce activity of (apo A-1,ABC A1) that responding to produce HDL 21.

Folic Acid Role: The results show the oral intubation of 0.07 mg/kg for 30 days lead to Hypocholesterolemic state (decrease in TC,TG,LDL and VLDL levels) and that by folic acid may be play role in reduce Hcy in plasma and reduce free radicles production 22 and folic acid may be lead to re-methylization of Hcy and methionine production 23. Folic Acid may be effected on (5-deoxy adenoyl colamine) that responding to produced (Succinyl CoA) from (L- methyl malonyl coA) and that reaction lead to release energy from lipids 24. Folic Acid decrease TC and TG levels by increase lipoprotein lipase activity 25.

Conclusions

From the results of the present study, we can be concluded that methionine overload state effects on lipids and lipoproteins and folic acid have protective role in oxidative stress that resulted by over load methionine.

REFERENCES


