

The effect of Ramadan fasting & Moderate exercise on body weight, serum glucose & lipid profile in healthy fasting subjects.

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Abstract

Ramadan fasting (RF), the body has regulatory mechanisms that activate during fasting, by efficient way of utilization of body fat. High blood cholesterol & uric acid have been considered as health risk factors for cardiovascular diseases & gout. A prospective study was carried out on doctors of Samara hospital. 30 normal healthy male doctors were participated in this study aging between 26 to 30 years, residing in the hostel of hospital (15 subjects in group 1 with only fasting & 15 subjects in group 2 fasting Ramadan with moderate exercise). Five ml of venous blood was drawn from each volunteer after about 10 hours of fasting on the first & 27th of Ramadan & serum was obtained. Body weight was measured to the nearest 100 gm. There is a slight decrease in body weight from 70.7 to 69.7 kg, but the difference is not significant in fasting subjects of fasting group only. The same finding was notice in group 2.

In regard to blood parameters, there is slight decrease in blood glucose in both groups, but this reduction in blood glucose is not significant reduction. Also, a significant decrease in serum LDL-cholesterol in fasting group with exercise from 102 at the beginning of Ramadan to 86 mg/dl at the end of Ramadan with a reduction rate equal to 15.7%. While the same result was notice in group 1 with fasting only & reduction rate in LDL equal to 35.8%. However, there is a significant increase in serum HDL-cholesterol in both groups.

Introduction

Fasting is prescribed by many religious of the world. Islam specifically outlines one full moon month of fasting during the month of Ramadan. It is physiological, psychological, as well as a spiritual experiences. It is generally accepted that a reward for self discipline of fasting is better health^(1,2,3). During Ramadan fasting (RF), the body has regulatory mechanisms that activate during fasting, by efficient way of utilization of body fat^(4,5). High blood cholesterol & uric acid have been considered as health risk factors for cardiovascular diseases & gout^(6,7,8,9). Conflicting results have been reported on the effect of dietary fat on changes in blood cholesterol levels during RF^(5,6,7,8,9,10,11). The aim of this study is to investigate the effect of RF on different Physiological & biochemical parameters with moderate exercise that deals with the changes in body weight, blood glucose, urea & cholesterol.

Subjects & methods:

A prospective study was carried out on doctors of Samara hospital. 30 normal

healthy male doctors were participated in this study aging between 26 to 30 years, residing in the hostel of hospital. All of them were engaged in similar type of physical activity & taking a same type of food. The volunteers were allowed to consume whatever they wanted & decrease fat intake in diet. 15 subjects participate in group 1 with fasting Ramadan only, & 15 subjects in group 2 participate in fasting Ramadan with moderate exercise as walking & jogging 30 minutes for 4 days per week. The study was conducted in the month of Ramadan from 26 of Oct. to 24 of November /2003. Average duration of the fast was about 12 hours & maximum temperature ranged from 10 to 15 C. Five ml of venous blood was drawn from each volunteer after about 10 hours of fasting on the first & 27th of Ramadan & serum was obtained. Body weight was measured to the nearest 100 gm. Descriptive statistics were carried out. Student T test was employed to compare the values of different parameters.

Results

Table 1 summarized the effect of Ramadan fasting on blood parameters & body weight & table 2 summarized the effect of Ramadan

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fasting with regular exercise on blood parameters & body weight. There is a slight decrease in body weight from 70.7 to 69.7 kg, but the difference is not significant in fasting subjects of fasting group only. The same finding was notice in group 2. In regard to blood parameters, there is slight decrease in blood glucose from 3.89 to 3.55 mmol/l. But this reduction in blood glucose is not significant reduction. However, there is significant reduction in fasting blood glucose from 5.42 to 4.21 mmol/ l in fasting subjects with exercise. Moreover, regarding blood urea, there is non significant increase in blood urea from 4.06 at the beginning of Ramadan to 4.52 mg/dl at the end of Ramadan. However, there is non significant decrease in blood urea from 5.55 to 4.41 mg/dl ($p<0.05$) in fasting subjects with exercise & reduction percentage equal to 20.5 % (table 3). However, the effect of RF on lipid profile was done in this study. It was found a significant decrease in serum cholesterol from 162.3 at the beginning of Ramadan to 147.7 mg/dl at the end of Ramadan with a reduction rate equal to 9 %.

Also, there is a significant decrease in serum cholesterol from 156.8 at the beginning of Ramadan to 136.4 mg/dl at the end of Ramadan in fasting subjects with exercise (table 2) & with a reduction rate equal to 9 % (table 3). Moreover, a significant decrease in serum LDL-cholesterol from 121.7 at the beginning of Ramadan to 78.1 mg/dl at the end of Ramadan with a reduction rate equal to 35.8 % (table 3). Also, a significant decrease in serum LDL-cholesterol in fasting group with exercise from 102 at the beginning of Ramadan to 86 mg/dl at the end of Ramadan with a reduction rate equal to 15.7 % (table 3). However, there is a significant increase in serum HDL-cholesterol in fasting subjects with fasting only from 26.1 at the beginning of Ramadan to 33.4 mg/dl at the end of Ramadan with a gain equal to 21.9 %. Also, there is a significant increase in serum HDL-cholesterol in fasting subjects with exercise from 28.1 at the beginning of Ramadan to 34.4 mg/dl at the end of Ramadan with a gain in the value of serum HDL equal to 18.3 %.

Table 1: The effect of Ramadan fasting on the mean & standard deviation of body weight & various blood parameters.

Parameters	1st of Ramadan	End of Ramadan	P value
Body weight (Kg)	70.7 ± 13.2	69.7 ± 13	NS
Glucose, mmol/l	3.89 ± 0.44	3.55 ± 0.29	NS
Urea, mg/dl	4.06 ± 0.67	4.52 ± 0.38	NS
Cholesterol (total), mg/dl	162.3 ± 33.7	147.7 ± 42.6	0.05
LDL- cholesterol, mg/dl	121.7 ± 33.4	78.1 ± 43.2	0.05
HDL-cholesterol, mg/dl	26.1 ± 4.6	33.4 ± 9.1	0.05

Table 2: The effect of Ramadan fasting with regular exercise on the mean & standard deviation of body weight & various blood parameters.

Parameters	1st of Ramadan	End of Ramadan	P value
Body weight (Kg)	65.5 ± 5.4	63.6 ± 4.5	NS
Glucose, mmol/l	5.42 ± 1.04	4.21 ± 0.65	P< 0.05
Urea, mg/dl	5.55 ± 0.81	4.41 ± 0.65	P<0.05
Cholesterol (total), mg/dl	156.8 ± 16.2	136.4 ± 20.4	P<0.05
LDL- cholesterol, mg/dl	102 ± 21.9	86 ± 22.1	P<0.05
HDL-cholesterol, mg/dl	28.1 ± 3.51	34.4 ± 2.6	P<0.05

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Table 3: The Reduction percentage of Ramadan fasting & fasting with regular exercise in the value of body weight, glucose, urea, cholesterol & LDL & gain in HDL.

Parameters	% of reduction & gain after Fasting only	% of reduction after Fasting & exercise
Body weight (Kg)		
Glucose, mmol/l	8.7	
Urea, mg/dl	<i>Gain</i> 10.2%	20.5
Cholesterol (total), mg/dl	9 %	13%
LDL- cholesterol, mg/dl	35.8 %	15.7 %

Discussion

In the present study, there is non significant change in body weight . So, there is no clear effect of Ramadan fasting on body weight. This may be due to short duration of fasting (30 days) & does not inflict any change on body weight. This result agree with previous works done on normal healthy subjects & found a statistically non significant reduction in body at the end of Ramadan ^(12,13).

Blood glucose level showed a non significant change with RF. This result agree with previous studies ⁽²³⁾. However, the present result do not agree with those studies who reported a significant decrease in blood sugar toward the end of Ramadan. These differences may attributed to the fact that they gave a hypo caloric diet to the volunteers ^(6, 8, 10). Whereas in our study, the volunteers were free to consume any thing they wanted. Other possible explanations may be the gender differences of volunteers & environmental / climatic factors ^(8,10). Both fasting & exercise lead to glucose metabolism by a number of hormonal alterations, leading to glycogenolysis & lipolysis ^(13,14).

A non significant increase in blood urea was observed toward the end of Ramadan, This increase in blood urea may be attribute to the effect of dehydration during fasting & increase in triglycerides due to lipolytic effect ^(5,7). Different studies conducted on the effect of RF on blood urea revealed conflicting results. They observed no significant change or increased in this parameter ^(6, 11, 12).

Serum total cholesterol, triglycerides & LDL-cholesterol levels show a significant decrease toward the end of Ramadan. While, HDL-cholesterol level was significantly increased. It appears that as if the quality & quantity of fat intake in Ramadan govern blood cholesterol level ^(2, 6, 7, 8, 9, 14, 15). In the present study, all volunteers were instructed to consume whatever they wanted & decrease fat intake in diet.

The increased in HDL- cholesterol at the end of Ramadan in the present study can be explained by decreased saturated fatty acid intake & decrease in circulating insulin & arise in catecholamine concentration from lipolysis in adipose tissue in response to hypoglycemia of Ramadan fasting ^(2,5,7, 9, 16).

HDL- cholesterol removes excess cholesterol from body cell & transport to liver by preventing accumulation of cholesterol in blood, so HDL is associated with a decreased risk of coronary heart disease. For this reason, Ramadan fasting is a good protection of cardiovascular system.

The present study indicate that light to moderate exercise during Ramadan fasting is harmless & has beneficial effects on all measured body parameters. It has been found that fasting does not interfere with tolerance to exercise ⁽¹⁷⁾. During Ramadan fasting with exercise, the body develops adaptive mechanisms & there is an increased & decreased in oxidation of fat & carbohydrate respectively ⁽¹⁸⁾.

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