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The Metabolic Effects of Ramadan Fasting in Type 2 Diabetics

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Abstract **Original Research Article**

Introduction: The objectives of our study are to analyze the effects of fasting during the month of Ramadan on metabolic control in well-balanced type 2 diabetics on oral antidiabetics or insulin. We analyzed the metabolic effects of fasting the month of Ramadan in 39 well-balanced type2 diabetics treated with diet or oral antidiabetics or insulin, with good metabolic control. Our patients were assessed before Ramadan and after the month of Ramadan. This evaluation included a clinical investigation and biological analyzes. Fasting for the month of Ramadan had no influence on blood pressure, blood sugar, and hemoglobin A1c. Body mass index (BMI), glycated hemoglobin, total cholesterol, HDL, LDL and triglycerides were recorded before the beginning and at the end of the month. Only 39 patients who were able to fast 4 weeks and responded to the proposed follow-up after Ramadan. Baseline mean body mass (BMI), glycated hemoglobin, total cholesterol, HDL, LDL and triglycerides were respectively; 30.25 kg / m2, 7.2%; 4.65mmol / l, 1.18mmol / l, 2.84mmol / l and 3.72mmol / l. A significant drop in LDL choleterol in the blood was observed during the fast at the end of Ramadan in 20 patients (52%) and the HDL-cholesterol level increased concomitantly in 16 patients (46%) without significant change in total cholestrol and triglycerides. The increase in HDL-cholesterol eliminates excess bad cholesterol by cleaning the tissues and bringing cholesterol back to the liver. In type 2 diabetes there is a significant drop in blood levels of HDL-cholesterol, which is an indicator of oxidative stress.

Keywords: Ramadan, Metabolic effect, Type 2 diabetes.

INTRODUCTION

Fasting during the holy month of Ramadan is one of the five pillars of Islam. It is practiced by hundreds of millions of Muslims around the world. It consists of stopping eating and drinking from sunrise to sunset. The duration of the fast varies from 10 to 18 hours per day and varies according to the geographical location and the season. According to Islam, sick people are exempt from fasting, especially people with chronic diseases like diabetes, but a significant number of them insist on observing this religious practice because of their personal beliefs and their satisfaction. According to an epidemiological study on diabetes and Ramadan carried out in 2000 in 13 countries of the Maghreb and the Middle East with 12,000 diabetic patients, 79% of type 2 diabetic patients fasted during Ramadan [1, 2] exclusively nocturnal and characterized by a large meal at the break of the fast with a light meal at dawn based on slow sugars [3, 4]. These changes in eating behavior are accompanied by changes in the rhythm of life and disturbances in the sleep cycle. There are concerns about the effect of Ramadan fasting on metabolics in patients with type 2 diabetes. Few studies have been published on the effects of fasting and its tolerance in type 2 diabetics, and in particular the effects of fasting on changes in plasma lipids and on food habits and consumption [5, 6].

Study design method:

This was a prospective comparative study of 147 patients; conducted during the month of ramadan 2019 and including patients with type 2 diabetes who attended the ramadan education open days in the department of endocrinology and diabetology of chu mohammed vi, before and after the month of Ramadan lasting 3 days. The education sessions included the recommended nutritional and health rules for that month. Instructions for frequent blood sugar monitoring and hypoglycemia and hyperglycemia self-management. The therapeutic adjustment was individualized according to the type and dose of treatment taken by each patient.

We followed type 2 diabetic patients with good metabolic control who chose to fast during the month of Ramadan and who were considered eligible for fasting, dietary advice and lifestyle modifications were performed according to the latest recommendations. of Diabetes and Ramadan - International Diabetes Federation (DAR-IDF). The collection of socio- demographic data, pathological history, duration, treatment and complications of diabetes were noted by a physician during face-to-face interviews using a pre-established questionnaire containing closed questions. Body mass index (BMI), blood pressure (BP), glycated hemoglobin, total cholesterol, HDL, LDL and triglycerides were recorded before the start and at the end of the month of Ramadan. Data were processed in Excel and statistical analyzes were performed using SPSS 16. The statistical significance level was set at 0.05.

RESULTS

A total of 81 (46%) of the147 type 2 diabetes patients included in this study chose to fast during Ramadan, but only 39 patients who were able to fast all month and responded to the follow-up offered 2 weeks after the month of Ramadan. 42 patients were lost to follow-up. The mean age of the patients was 57.18 ± 11 years. 79% were women and 21% were men. 72% were on antidiabetics; 10% on diet and or 13% on insulin therapy with or without combined oral antidiabetics. 67% of our study population had a duration of diabetes less than 10 years, 23% between 10-20 years and 10% greater than 20 years.

Table 1: The descriptive characteristics of the patients

	Effective	Percentage
Sex		
Women	31	79
Man	8	21
Age		
<40 year	3	7
40-60 year	23	58
>40-60 year	13	35
Duration of diabetes		
< 10 year	26	67
10 - 20 year	9	23
> 20 year	4	10
Treatment of diabetes		
Oral antitidiabetics	28	72
Oral antidiabetics+insulin	5	13
BMI		
Normal	5	14
Overweight	17	43
Obesity	17	43
PA (arterial pressure) normal	19	49
Type 1	13	33
Type 2	4	10
Type 3	3	8

Table 2: Analytical data of the study

Variations	Before ramadan	After ramadan	Percentage
Weight (kg)	76,85 ± 12,8	76,21 ± 12,8	
Glycated hemoglobin (%)	7.2 ± 5,8	7.7 ± 6,6	
Total cholestérol (mmol/l)	4.57 ± 3,8	4.39 ± 3,8	
HDL-cholestérol (mmol /l)	1.13 ± 0,70	1.44 ± 0.87	
LDL-cholestérol (mmol /l)	3.77 ± 1,8	2.58 ± 1,2	
Triglycérides (mmol/l)	2.32 ± 2	2.5 ± 1,2	

A significant decrease in LDL-choleterol in the blood was observed during fasting at the end of Ramadan in 20 patients (52%) and the HDL-cholesterol level was concomitantly increased in 16 patients (46%) without significant change in blood. total cholestrol and triglycerides.

DISCUSSION

Indeed, our results showed a significant reduction in weight, as objectified in the study by m.sebbani et co. [7] carried out on 71 young people with type 2 diabetes at the mohamed vi university hospital in marrakech during ramadan 2010. According

to modibotraore et co. [8] The decrease in weight observed during Ramadan is explained by the restriction of water intake during fasting and dehydration during the day rather than by a variation in nutritional intake as such. Our study has shown that Ramadan fasting seems to confer benefits on the body composition of type 2 diabetics. All the more so if they have received prior training in the necessary dietary advice, glycemic monitoring and therapeutic adaptation. This weight loss has also been documented in several studies [9-11] and is attributed to reduced frequency of meals during Ramadan, which often results in reduced energy intake and loss of energy. body mass and body fat. Other contributing factors are the contraction of extracellular volume secondary to lower sodium and fluid intake and moderate degree of dehydration.

In type 2 diabetes, there is a significant drop in the level of HDL-cholesterol in the blood, which is an indicator of oxidative stress. The small sample size does not allow us to draw definitive conclusions about fasting during Ramadan in well-controlled type 2 diabetic patients. Studies on a large number of patients are necessary. A significant increase in HDL-cholesterol was observed during Ramadan as observed by r.bouguerra et co. [12]. In their study, after 20 days of fasting, 23% of diabetic patients had an increase in HDL-cholesterol which would therefore be related to the consumption of a heavy meal at sunset "gorgingdiet model". In addition, in other studies, there was a significant increase in HDL-cholesterol, which could be explained by several mechanisms: first, A diet rich in monounsaturated fatty acids and carbohydrates with a low and poor glycemic index in saturated fatty acids could have better metabolic effects on lipoproteins in diabetics second, weight loss, physical exercise with subsequent improvement in heart function. Finally, glycemic control and smoking cessation [13]. In our study, there was also a significant change such as a positive reduction in LDL-cholesterol during the month of Ramadan, compared to before and after Ramadan, but there was no significant change in total cholesterol, and triglycerides. We did not note any statistically significant difference at the end of Ramadan in fasting glucose, blood pressure, and glycated hemoglobin. There was also no clinical or laboratory hypoglycemia in our study. The glycemic balance in type 2 diabetics does not change during the fast in the month of Ramadan [5, 14].

CONCLUSION

However, in people with T2DM, there is conflicting data on the change in biochemical and biophysical variables. This study indicated that fasting in Ramadan resulted in weight loss. Although there was a significant reduction in the frequency of meals, a significant decrease in LDL and an increase in HDL was noted during Ramadan. It appears that the effect of Ramadan fasting on serum lipid levels may be closely related to diet. This study concludes that fasting in Ramadan may be one of the factors that lower LDL.

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