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The Impact of Ramadan Fasting on the Body Fat Mass of Type 2 Diabetics

F. El Gharroudi[1*], W. Douali[1], S. Rafi[1], G. El Mghari[1], N. El Ansari[1]

[1]Department of Endocrinology, Diabetology, Metabolic Diseases and Nutrition CHU Mohamed VI Marrakech

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***Corresponding Author:** F. El Gharroudi

Abstract

***Introduction*:** Despite being exempt, many Diabetic Muslims observe fasting during the month of Ramadan. We carried out this work to study the impact of this practice on body composition in this group of patients. ***Material and methods*:** We studied 176 Moroccan Muslim with type 2 diabetes. The study data were collected through a questionnaire, clinical examination and bioelectrical impedancemetry. The study variables were: weight, height, body mass index (BMI), body fat and visceral fat. ***Results*:** All patients who fasted the entire month of Ramadan and who met the study monitoring deadlines have been included. The average age was 57 years +/- 11 years; 79% were women. Despite a similar BMI, there was a reduction in weight (before: 76.85kg +/- 12.8 against 76.21kg +/- 12.8; p = 0.019), body fat (before: 28.43kg +/- 9.3 against 26.72kg +/- 8.3; p = 0.015) and visceral fat (before: 10.41 +/- 3.36 against 9.95kg +/- 3.2; p = 0.007). ***Conclusion*:** Ramadan fasting can be practiced in all safety with prior patient education and adjustment therapeutic. It also confers an improvement in the body composition, especially in women.

Keywords: Type 2 diabetes, Ramadan, body fat, visceral fat, education.

I. INTRODUCTION

Ramadan, one of the five pillars of Islam, is a holy month during which fasting must be observed from sunrise to sunset. It corresponds to the 9th month of the lunar calendar. From this fact, the period of Ramadan varies every year, everything like the hours of abstinence. About 132 million Muslims with diabetes in the world, of which more than 100 million fast during the month of Ramadan, even if they are exempted by their religion [1]. The Epidemiology of Diabetes and Ramadan Study (EPIDIAR), a large epidemiological study conducted among Muslims with diabetes in 13 countries Muslims and with more than 12,000 participants, showed that fasting during Ramadan was associated with changes in body composition even in healthy individuals, which has been postulated to be due to either a change in nutritional habits during Ramadan or a response to starvation [2]. Despite its worldwide practice, the effect of fasting during Ramadan on the body composition of diabetics has not been adequately studied, and conflicting evidence has been reported in the literature. The aim of our study was to assess the impact of fasting of Ramadan on body composition in people with type 2 diabetes at the center Mohammed VI University Hospital of Marrakech. In addition, we aim to evaluate the safety of fasting in this group of people with the provision of physician and dietician guided advice on safe practices in fasting based on the recommendations by the American Diabetes Association.

II. MATERIAL ET METHODS

This was a prospective cross-sectional study conducted during the month of Ramadan 2019 and having included the type 2 diabetic patients followed in the department of endocrinology and diabetology of the hospital university center Mohammed VI of Marrakech, and having benefited from a stratification of fasting a month before Ramadan. All subjects with type 2 diabetes according to accepted criteria, which expressed the intention to fast the month of Ramadan 2019, in addition to being judged eligible for fasting based on recommendations of their attending physician, were qualified for recruitment. Affected subjects end-stage renal disease, acute illness during Ramadan as well as pregnant women and nursing mothers were excluded from the study. All subjects received training with a doctor and dietician on diabetes management during Ramadan. These education sessions included nutritional advice, frequent blood sugar monitoring, management acute hypoglycemia and hyperglycemia. Adjustment of drug dosage has been individualized according to the patients. Collecting information about the data socio-demographic of participants (age, sex, occupation, level

of study), background, diabetes duration and its treatment, complications associated was performed by a physician during face-to-face interviews with the help of a pre-established questionnaire containing questions closed. The clinical examination was performed by the doctor processing and allowed to specify the weight and size of sick. The other variables of the study (BMI, fat body and visceral fat) were analyzed by bioelectric impedance method multi-frequency (TANITA Corporation, tokyo, japan) one month before and one month after Ramadan. The data was entered and coded in Excel 2017 under digital coding, to obtain the description of the study population and perform a univariate analysis. The descriptive analysis consisted of the calculation of absolute and relative frequencies for variables qualitative, and values of central tendency and dispersion for quantitative variables (mean, standard deviation or extended median). The bivariate analysis used the usual techniques comparison of means and comparison of percentages. Student's t test was used for comparison of two means on two samples independent. A *P* value <0.05 was considered statistically significant.

III. RESULTS

We recruited 176 type 2 diabetics, including 81 patients were eligible for fasting after stratification of the risk. One month after Ramadan, 39 patients had met the required monitoring times and been included in the study. The average age of the subjects was 57.18 ± 11 years. 79% were female and 21% were men. A significant proportion (72%) of our study population had a duration of diabetes less than 10 years. The majority (72%) of subjects were treated only with oral antidiabetics, the rest of the patients were under insulin therapy with or without antidiabetics combined oral or hygieno-dietetic measures. Although the BMI has not changed (before Ramadan: 30.25kg +/- 4.9 against 30.21kg +/- 4.2 after Ramadan; p = 0.8), we observed a significant reduction in body weight (before Ramadan: 76.85kg +/- 11.3 against 76.2kg +/- 12.8 after Ramadan; p = 0.019), body fat (before Ramadan: 28.4kg +/- 7.2 against 26.7kg +/- 6.8 after Ramadan; p = 0.015), and visceral fat (before Ramadan: 10.41kg +/- 3.3 against 9.95kg +/- 3.2 after Ramadan; p = 0.007).

Table 1: Baseline Characteristics of Study Participants

Variables	Before Ramadan	After Ramadan	P
	(mean±SD)	(mean±SD)	
Weight	76.85 ± 12.8	76.21 ± 12.8	**0.019**
BMI			
Women	30.99 ± 5.1	30.93 ± 4.75	
			0.85
Men	27.33 ± 3.24	27.34 ± 3.31	
			0.67
Body fat mass	28.43 ± 9.3	26,72 ± 8,57	**0.015**
Visceral fat mass	10,41 ± 3,36	9,95 ± 23,27	**0.007**

Table II: Body Composition Variables of Study Participants Pre- and post-Ramadan Fasting

Parameter	Nomber	%
Sex		
Women	**31**	**79**
Men	**8**	**21**
Age		
<40years	**3**	**7**
40-60 years	**23**	**58**
>60 years	**13**	**35**
Diabetes duration		
< 10 years	**26**	**67**
10à20 years	**9**	**23**
> 20 years	**4**	**10**
Treatment		
DHM	**4**	**10**
Oral agents	**28**	**72**
Insulin therapy	**2**	**5**
Oral agents+insulin	**5**	**13**
BMI		
Normal	**5**	**14**
Overweight	**17**	**43**
Obesity	**17**	**43**

IV. DISCUSSION

Our study showed that fasting during the month of Ramadan seems to confer benefits on the body composition among patients with of type 2 diabetes. The more so if they have received training prior to dietary advice, monitoring glycemic and therapeutic adjustment required. Indeed, our results showed a significant reduction in weight, body fat and visceral fat after Ramadan. These changes can be explained by carbohydrate intake and insufficient and deficient calories for fasting people as objectified in a published study previously by the service, carried out on 71 type 2 diabetics young people, within the CHU Mohamed VI of Marrakech during Ramadan 2010 [3]. According to Modibo Traore et al. weight reduction noted during Ramadan is explained by the restriction of fluid intake during fasting and dehydration during the day than by a variation in nutritional intake as such [4].

The study by Mohd Adzim Khalili Rohin et al. found weight reduction with no effect on fat mass, explained by an increase in physical activity despite the increased calorie intake [5]. According to Ester CK Yeoh *et al.*, [6] the fast of Ramadan contributes to a significant reduction in weight, body fat with no effect on visceral fat, While others noted no difference [7, 8].

The limitations of our study include the small size of the sample and the lack of quantification of the activity physical and food intake. Despite these limitations, this study presents important results given the high prevalence of fasting during Ramadan in patients diabetics. Future studies involving larger sample sizes will be useful to confirm our findings and elucidate the determinants of these changes in body composition.

V. CONCLUSION

We underline through this work the beneficial effect of Ramadan fasting on the body fat mass of the type 2 diabetic. Especially if this practice is preceded by a prior education and therapeutic adjustment.

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