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RESEARCH ARTICLE

THE IMPACT OF RAMADAN FASTING ON LEAN BODY MASS OF TYPE 2 DIABETICS

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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 lean body mass 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 impedanceometry. The study variables were: weight, height, body mass index (BMI), lean mass, 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 $\pm$ 11 years; 79% were women. Despite a similar BMI, there was a reduction in weight (before: 76.85 kg $\pm$ 12.8 against 76.21 kg $\pm$ 12.8; $p = 0.019$), from body fat (before: 28.43 kg $\pm$ 9.3 against 26.72 kg $\pm$ 8.3; $p = 0.015$) and visceral fat (before: 10.41 $\pm$ 3.36 against 9.95 kg $\pm$ 3.2; $p = 0.007$). Lean body mass has not changed, but stratification by sex showed a significant increase in women (before: 44.15 $\pm$ 5.7 against 44.71 kg $\pm$ 5.7; $p = 0.043$).

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.

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Introduction:-

Ramadan, one of the five pillars of Islam, is a 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 dietitian guidance and advice on safe practices in fasting based on the recommendations by the American Diabetes Association.

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Material And 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, visceral fat and lean mass) 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.

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.

Parameter	Number	%
Sex		
Women	31	79
Men	8	21
Age		
<40 years	3	7
40-60 years	23	58
>60 years	13	35
Diabetes duration		
< 10 years	26	67
10 à 20 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

Table 1:- Baseline Characteristics of Study Participants.

The majority (72%) of subjects were treated only with oral antidiabetics, the rest of the patients under insulin therapy with or without antidiabetics combined oral or hygieno-dietetic measures. Although the BMI has

not changed (before Ramadan: 30.25kg $\pm$ 4.9 against 30.21kg $\pm$ 4.2 after Ramadan; $p = 0.8$), we observed a significant reduction in body weight (before Ramadan: 76.85kg $\pm$ 11.3 against 76.2kg $\pm$ 12.8 after Ramadan; $p = 0.019$), visceral fat (before Ramadan: 10.41kg $\pm$ 3.3 against 9.95kg $\pm$ 3.2 after Ramadan; $p = 0.007$). As for Lean mass, it hasn't changed (before Ramadan: 46.5kg $\pm$ 5.5 against 46.9kg $\pm$ 5.7 after Ramadan; $p = 0.067$), but the stratification according to sex showed a significant increase in women (before Ramadan: 44.15kg $\pm$ 5.7 against 44.71kg $\pm$ 5.7 after Ramadan; $p = 0.043$).

Variables	Before Ramadan	After Ramadan	P
	(mean $\pm$ SD)	(mean $\pm$ SD)	
Weight	76.85 $\pm$ 12.8	76.21 $\pm$ 12.8	0.019
BMI			
Women	30.99 $\pm$ 5.1	30.93 $\pm$ 4.75	
			0.85
Men	27.33 $\pm$ 3.24	27.34 $\pm$ 3.31	
			0.67
Visceral fat mass	10.41 $\pm$ 3.36	9.95 $\pm$ 3.27	0.007
Lean mass			
Women	44.15 $\pm$ 5.72	44.71 $\pm$ 5.77	0.043
Men	55.98 $\pm$ 4.40	55.83 $\pm$ 4.41	0.41

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

Discussion:-

Our study showed that fasting during the month of Ramadan seems to confer benefits on the body composition among patients with type 2 diabetes, especially in women. 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, 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 fasting type 2 diabetics 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.

Our work did not objectify any change in BMI although there is a decrease in weight, this can be explained by the low weight reduction estimated at -0.64kg which can be correlated by the increase in lean mass on the one hand and the decrease in body fat on the other hand. In addition, other authors have demonstrated a reduction noticeable BMI in relation to a decrease greater weight and body fat without demonstrating a reduction in mass lean (6,7,8,9).

In the present research, the lean mass of women with diabetes has increased significantly, this could be explained in part by a increased physical activity of participants during the Ramadan fast. Indeed, in some authors, this change seems to be related to the intensity of housework among women (10). Because these, unlike men, continue activities daily, which consist in particular in preparing meals and looking after the children during the month of Ramadan. This explanation remains hypothetical in the case present, because we have not documented the expense energy related to physical activity before, during and after Ramadan. But other studies have found a decrease in lean body mass (11). These contradictory results can be explained by socio-economic differences between Moroccan women and the women of the Middle East (domestic and others).

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 diabetic patients. Future studies involving larger sample sizes will be useful to confirm our findings and elucidate the determinants of these changes in body composition.

Conclusion:-

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

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