Effect of Ramadan Fasting on Metabolic Parameters of type 2 Diabetic patients

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Abstract

Background: Ramadan fasting exposes diabetic patients to glycemic exertion (mainly post prandial hyperglycemia in the night) and to metabolic dysregulation.

Objectives: To evaluate the effect of Ramadan fasting on metabolic parameters of type 2 diabetic patients.

Patients & Method: Twenty eight type 2 diabetic patients on oral antidiabetic drugs attending National Diabetes Center (NDC) at October 2006 were investigated before and during Ramadan fasting (1st, 2nd, 4th, week)of fasting for the following parameters (FPG; PPG; Lipid profile, urea and HbA1c).changes in the dose of medication were done during fasting.

Results: During Ramadan fasting the FPG increased to 173.4±25.4mg/dl and PPG show no changes at 183.3±43.5mg/dl. While HbA1c increased at the end of Ramadan to8.95±1.55%.Both Total cholesterol and LDL- c level decreased to the 218.2±53.9mg/dl and 121.5±19.9 mg/dl respectively.TG elevated non significantly and HDL–c level increased at end of Ramadan.

Conclusion: There is an improvement in most of metabolic control during Ramadan. Fasting Ramadan for type 2 diabetic patients will not expose them to an improper metabolic imbalance especially if they were followed up, education about diet and self monitoring were done.

Key words: Ramadan fasting; FPG; PPG; TC; LDL-c; HDL-c; TG.

Introduction:-

Diabetes Mellitus affects more than 120 million people world-wide and it is estimated that it will affect 220 million by the year 2020.Approximately 95% of diabetic people have type 2 diabetes mellitus which is associated with insulin resistance and obesity; so that type 2 diabetes is usually treated with diet and exercise [1].

Ramadan, the holy month, falls in the ninth lunar month of Islamic calendar, the majority of Muslims undergo absolute fasting (no food or drink) between dawn and sunset in the holy month of Ramadan [2]. The fasting month lasts for 28-30 days. The length of fast varies from 12-19 hours per day [3]. Eid-ul Fitre is the day on which Muslims finish their Ramadan fast [2, 3].

Muslims eat a greater variety of foods in their meals during Ramadan than other months [2,3]. Many physiological and psychological changes occur due to the changes in eating patterns, eating frequency and sleep pattern. [4].The stores of glycogen along with some degree of gluconeogenesis maintain normal limits of serum glucose when fasting follow a large pre-dawn meal.[5] Overweight person lose more weight than normal or under weight subjects [5].

Few studies have reported increase in high density lipoprotein (HDL) cholesterol in diabetes during Ramadan fasting. Blood urea show significant changes during fasting period[6,7,8] due to dehydration and metabolic adaptation**.**

To evaluate the effect of Ramadan fasting on metabolic parameters of type 2 diabetic patients, this study was conducted.

Patients & Method:

Twenty eight type 2 diabetic patients attending the NDC (National Diabetes Center) at October 2006(Islamic Hijri year 1427) treated by oral agents were included . The age average was 34.3±8.6 years, body weight was 92.16± 7.62 kg before Ramadan and the duration of diabetes was 6.2±1.3years. HbA1c level before Ramadan was 7.80±1.39%

Monitoring of blood glucose was done before Ramadan (non – fasting) and on the (1st, 2nd, 4th, week of Ramadan)

Necessary changes regarding timing and dosing of medication were made.

Moreover lipid profile; HbA1c; B. urea were taken before Ramadan and on the 4th week (26th) day of Ramadan .

(Dinner) and (2.5mg) at shour (early breakfast). 24 patients treated with Metformin continued this treatment with the same dose of 1500mg daily (1000 mg at iftar and 500 mg at shour) during the fasting month. Patients did not follow any dietary specification during fasting period

Statistical analysis: For statistical analysis of the measured data, correlation test was used. averaged data are presented in the form of mean ± standard deviation(SD) by using statistical software SPSS- version 12 and Excel-2003.an estimate was considered to be statistically significant if P-value≤0.05

Results:.

Compared to the values before Ramadan the body weight decreased at the end of Ramadan(Table 1).

Fasting plasma glucose had increased (Table 1); Post prandial plasma glucose level did not change significantly during Ramadan (Table1).

Serum blood urea level was elevated, HbA1c increased by 0.3±0.1% at the end of fasting (Table 1).

The total cholesterol, LDL-C level decrease was statistically significant (table 1).

HDL increased , TG showed slight increase was statistically not significant at end of Ramadan (Table 1).

(Table 1)Body weight and other metabolic profile parameters in patients with type 2 D.M in pre-Ramadan and at end of Ramadan

Measurement	Pre-Ramadan	End of Ramadan	
Body weight (kg)	92.16 ± 7.62	80.42 ± 6.2	P < 0.001
FPG mg/dl	149 ± 28.1	173.4 ± 25.4	P < 0.001
PPG mg /dl	184.0 ± 86.0	183.3 ± 43.5	P 0.51
Hb A1c%	7.80 ± 1.39	8.95 ± 1.55	P < 0.05
Cholesterol mg /dl	253.0 ± 78.7	218.2 ± 53.9	P < 0.001
LDL – c mg /dl	127.5 ± 32.9	121.5 ± 19.9	P < 0.001
TG mg /dl	147.0 ± 33.9	148.1 ± 53	P 0.94
HDL mg /dl	40.0 ± 9.9	42.9 ± 8.7	P < 0.05
B. Urea mg /dl	31.4 ± 7.0	34.2 ± 22.0	P < 0.001
Creatinine mg /dl	0.7 ± 0.3	0.7 ± 0.4	P < 0.5

Discussion:

Significant reduction in body weight was observed at end of Ramadan which coincided with studies that reported weight loss during Ramadan fasting [9,10].

Some patients show rise in their FPG which may be due to increase in dietary intake, type of food consumption, irregularity in taking medication and decreased physical activities and also increase in gluconeogenesis in the liver with rise in glucagons[5,11].

Increase blood urea may be due to relative dehydration due to complete prohibition of water during the day [12] .

There is efficient utilization of fat [14] and decrease in basal metabolic rate [14] during fasting so significant reduction in total cholesterol, LDL-c were observed despite the tendency to consume fried foods [13], it appeared as if quality and quantity of food intake during Ramadan govern blood cholesterol level [15]

HDL–c profile improved during Ramadan fasting which agrees with the finding of Kamal study 2006 ,and other studies [14,16,17] insignificant elevation of serum TG may be due to lipolytic effect of prolonged fasting which agrees with Tarek study 2007 [18] who observed increase in serum TG at end of Ramadan fasting.

Mean glucose profile during fasting was characterized by a small peak in early morning corresponding to pre –dawn meal and lower glucose for the part of the day and with a large peak in the evening (evening meal).

Conclusion:

We conclude that Ramadan fasting appears to have significant effect on LDL-C that should be translated into a significant reduction in coronary risk. Ramadan fasting contributed to better blood lipid profiles by limiting energy intake. High fat intake is one of contributing factors that affect the pathophysiological changes in Ramadan fasting.

Recommendations:

Change long acting antidiabetic drugs to short acting drugs to prevent hypoglycemia and encourage proper physical activity and avoid dehydration. Home blood glucose monitoring should be preformed just before the sunset meal and two hours after wards. Also it should be performed before the pre-dawn meal to adjust the drug dose.

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