A study of the fasting diabetic patients during the month of Ramadan

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Summary

Twenty two Muslim diabetic patients on oral hypoglycaemic agents were studied during the fasting month of Ramadan to determine the effect of fasting on their diabetic control. All the patients completed their fast during the month. Their mean (± standard deviation) blood glucose, serum fructosamine and body weight before the fasting month were 10.7 ± 4.6 mmol /1, 6.64 ± 3.64 mmol /1 and 60.5 ± 12 .6 kg and by the end of the fasting month were 10.9 ± 4.4 mmol / 1, 4.34 ± 1.08 mmol /1 and 59.8 ± 12.3 kg respectively. There was no significant difference between the blood glucose levels but there were significant reductions in the mean body weight and fructosamine values (p=0.01 and p=0.03 respectively). The mean decrease in body weight and fructosamine were 0.7 ± 1.3 kg and 2.29 ±3.09 mmol /1 respectively. There were also statistically significant differences between the mean daily calorie content before the fasting and during the fasting month (1480 ± 326 vs 1193 ± 378 Cal /day - $p < 0.005$) and between the mean daily carbohydrate content (389 ± 298 vs 187 ± 46 gm /day - $p < 0.005$). In conclusion, fasting was safe for diabetic patients on oral hypoglycaemic agents and it was associated with weight reduction and improvement in the overall diabetic control. This was most likely due to decrease in food intake.

Key Words : Diabetes Mellitus, Ramadan fasting, Diabetic control.

Introduction

Every year during the 9th month of the Muslim calender - the month of Ramadan - a Muslim is required to fast everyday from the beginning of dawn until dusk. In Malaysia, the average duration of fasting is 13.5 hours and during this period, a person is required to abstain from any oral intake including medications. While Islam does provide for its followers with serious illness not to fast, most Muslims diabetics would choose to fast. No proper study on the effect of fasting in diabetics is available at present .Most commentaries were restricted to letters to the editor [1-3] and abstracts [4] Sulimani et al [5] in a review, provided guideliness for the management of fasting diabetic patients and these were based on personal experiences. While most diabetics were able to fast during the fasting month, their diabetic control during this period is not known. This study was

undertaken to determine the effect of fasting on diabetics, the control of their diabetes during the fasting month and to evaluate dietary alterations that could influence the diabetic control.

Material and Methods

Subjects

Twenty two Muslim diabetic patients attending the Diabetes Clinic, Hospital Universiti Sains Malaysia were included in this study. After recording their body weights, blood was taken for plasma glucose, fructosamine and cholesterol estimation just before the beginning and the end of the fasting month in 1989.

Methods

At the end of the fasting month, the patients were interviewed to assess their health during the fasting month. Adjustments of the oral hypoglycaemic agents and symptoms of hypoglycaemia and / or that of uncontrolled diabetes mellitus were also recorded. Their dietary intakes were assessed by a dietitian using 24 hour diet recall.

Plasma glucose: This was measured by the glucose-oxidase method using a Beckman glucose analyser.
Cholesterol: Serum cholesterol was measured by cholesterol esterase, cholesterol oxidase peroxidase method (CHOD - PAP) using a Hitachi 705 analyser.
Fructosamine: Plasma fructosamine was measured by reaction of plasma proteins with nitroblue tetrazolium and assayed with Cobas - Bio analyser.
Statistical Analysis: Mean, standard deviation (S.D.) and Student's paired t-test were used and analysis was done using Microstat statistical programme on an IBM/PC Computer.

Results

The twenty two subjects consisted of twelve males and ten females with the mean age of 49.0 years (range 24 to 75 years). They were all able to fast the full duration and did not experience significant hypoglycaemia necessitating breaking of fast. Seven patients reduced their medication to twice daily instead of their normal thrice daily whilst the rest continued with the same frequency but took the medications during the evening and night. The mean ($\pm$S.D.) random plasma glucose, plasma cholesterol, fructosamine, body weight, the estimated total calorie intake, estimated carbohydrate content and the percentage of the estimated simple carbohydrate foods, before and during fasting are shown in Table 1. There was statistically significant differences between the means of body weight, serum fructosamine , total calorie intake, total carbohydrate intake and percentage of simple carbohydrate intake before and during fasting. The mean ($\pm$S.D.) changes in body weight, serum fructosamine and total calorie intake were 0.7 ± 1.3 kg. (range -2.2 to +3.7 kg.), 2.29 ± 3.09 mmol /1 (range - 9.35 to $\pm$ 0.60 mmol /1) and $389 \pm$ 298 Cal /day (range - 1100 to $\pm$ 85 Cal /day).

Discussion

All the patients were able to complete their fast everyday until the end of the fasting month. None of the patients suffered from hypoglycaemia which required them to break their fast. None had symptoms to suggest worsening of glycaemic control eg. increased thirst and polyuria. There was a significant decrease in the mean daily calorie intake and carbohydrate content of food during

Table 1: Body Weight, biochemical and dietary parameters before and during fasting in diabetics in the month of Ramadan. (n=22 subjects)

	Before fasting		During fasting		P value
	mean	S.D.	mean	S.D.	
Body weight (kg)	60.5	12.6	59.8	12.3	0.01
Plasma glucose (mmol /1)	10.7	4.6	10.9	4.4	n.s
Fructosamine (mmol /1)	6.64	3.64	4.34	1.08	0.03
Cholesterol (mmol /1)	5.59	1.02	5.81	0.94	n.s
Total daily calaorie intake (Cal /day)	1480	326	1193	378	< 0.005
Total carbohydrate intake	187	46	149	37	< 0.005
Simple carbohydrate intake (%)	8.4	8.4	14.0	9.5	< 0.005

the fasting month. This is expected as food and water are not allowed to be consumed during the day. This was associated with a significant fall in the mean body weight by the end of the fasting month. However, there was a significant increase in the intake of refined sugars contained in local delicacies ('kueh') which are available in abundance during the fasting month in this region. Diabetics are advised to avoid these foods because of the high sugar content, but dietary indiscretion was obvious during the fasting month.The significant fall in the serum fructosamine level implied that the overall glycaemic control was significantly better during the fasting month than before. This could be related to the reduction in the calorie intake and a fall in body weight. Both these factors have been shown to influence glycaemic control [6] There was no significant differences between the random plasma glucose and cholesterol levels before and during the fasting month. As blood glucose is influenced by many factors, overall glycaemic control is best monitored with the use of glycosylated haemoglobin (HbA1) or fructosamine [7,8] Fructosamine was used in preference to glycosylated haemoglobin(HbA1) because it reflected glucose levels over a more recent period (about 2 weeks) as opposed to HbA1 which represented the glucose levels over the preceding 6 - 8 week period [9]. In conclusion, this study shows that for non-insulin dependent diabetic patients, fasting in the month of Ramadan is possible and is associated with an

improvement in the diabetic control. This improvement was most probably related to a decrease in the total calaorie intake and the consequent weight reduction.

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