Journal of Fasting and Health
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JFH

Diabetes Management during Ramadan

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ARTICLE INFO

Article type:
Commentary Article

Article History:
Received: 16 Dec 2015
Published: 30 Dec 2015

► *Please cite this paper as*:
Azizi F. Diabetes Management during Ramadan. J Fasting Health. 2015; 3(4): 140-143.

The Islamic fast during the month of Ramadan is strictly observed worldwide by millions of Muslims. Ramadan is the 9th month of the Islamic lunar calendar and fasting during Ramadan is the religious duty of all healthy adult Muslims. A whole month of intermittent fasting, from dawn to dusk, every year is particular only to Islam and considering that Islam has over 1.5 billion followers worldwide, it can be assumed that a few hundreds of million people observe Ramadan fasting each year. The experience of fasting teaches Muslims self-discipline and self-restraint and enables them to empathize with those less well off, the suffering and the impoverished. Fasting is not obligatory for children, menstruating women, or the sick and travelers; pregnant and lactating women are also exempt and permitted to postpone their fasting to an appropriate time when it can be observed without it affecting their maternal obligations (1).

Islamic fasting provides a unique model of intermittent fasting daily for one month. It is also distinct from regular voluntary or experimental fasting in that the faster does not drink during fasting hours. Not only does Ramadan fasting discipline the body to restrain from eating food and drinking water, it also requires restraining every part of one's physical body, the mouth and ears from gossip and profanity; all sexual thoughts and activities during fasting hours are also forbidden. Thereby, a Muslim engages his or her entire body in the physical observance of the Ramadan fast. The eyes, the ears, the tongue, and even the private parts are equally obligated to be restrained. Therefore, one may assume that physiological changes occurring during Islamic fasting would differ from those observed during an experimental fast (2).

The metabolic effects of fasting during Ramadan, may be affected by genetic and environmental factors, such as nutrition habits and the length of fasting day. Therefore, differences in the effects of Ramadan fasting may occur between seasons and countries. Serum glucose may decrease slightly in the first few days of Ramadan fasting, normalizing by the 20th day and showing a slight rise by the 29th day (3). The lowest serum glucose level in this study was 63 mg/dl. Other studies have shown a mild increase or variation in serum glucose concentration. During longer fasting days of >16h, which follow a rather heavy meal taken before dawn (Sahur), the stores of glycogen, along with some degree of gluconeogenesis, maintain serum glucose levels within normal limits (4). Since gluconeogenesis becomes the only source of glucose after 16–24 h of fasting, it is recommended that observers of fasts do not skip Sahur, their predawn meal, because of the possibility of extended gluconeogenesis.

Approximately half of the patients with type 1 and two thirds of the patients with type 2 diabetes observe Islamic fasting in Muslim countries (5). The majority of studies on Islamic fasting indicate that no major problems are encountered by patients with type 2 and even well-controlled type 1 diabetes during Ramadan fasting. The amount of energy intake is unchanged or decreased in most patients during fasting and weight loss may be observed. There are no significant

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changes in fasting plasma glucose (FPG), HbA1c, fructosamine, insulin and C-peptide levels during fasting, although some studies do show a trend towards better glycemic control while others indicate an increase in FPG and poor control of diabetes during this month of fasting (6, 7). Changes in FPG may occur due to the changes in body weight and exercise habits, amount and type of foods consumed, gorging after breaking of the fast, or irregularity of medication compliance. Although increases in total cholesterol levels have been reported, most patients with either type 1 or type 2 diabetes do not show significant changes in lipid profiles during Islamic fasting. In diabetic patients, serum concentrations of blood urea nitrogen, creatine, uric acid, alanine aminotransferase, aspartate aminotransferase, protein and albumin values show no significant changes during Ramadan fasting (8, 9). Although some reports do not show any increase in the rate of hypoglycemia, a study of 13 Muslim countries reported an increased frequency in the occurrence of severe hypoglycemic episodes in both type 1 and 2 diabetes patients during this month of fasting, in particular in those who had changed their dose of oral hypoglycemic agents or insulin or had modified their levels of physical activity (5).

Almost all articles concerned with recommen-dations of Ramadan and diabetes are based on expert opinion; as randomized controlled studies in regard to best treatment regimens during Ramadan in diabetic patients are scarce. The ADA working group for adaption of recommendations for management of diabetes during Ramadan published their report in 2005 and updated in 2010 (10). Recently, Ibrahim et al, published their recommendations as update 2015 (11). They aimed to update lifestyle intervention and use of new pharmacological agents for the treatment of diabetes during Ramadan. They focused on the literature and reports on newly published dated on diabetic education, medical nutrition therapy, and recently introduced antidiabetic drugs.

This latest update on the management of diabetes during Ramadan contains previously published recommendations in this regard. The authors state that: *"Patients at high risk of hypoglycemia advised against prolonged fasting. Agents such as metformin, α-glucosidase inhibitors, TZDs, and DPP4 inhibitors appear to be safe and do not need major dose adjustments. Sulfonylureas and insulin secretagogues should be used with extreme caution during Ramadan fasting, in particular chlopropamide or glyburide, which are associated with increased risk of hypoglycemia. The dose of sulfonylureas should be reduced or the medication stopped before the start of the fast, depending on the degree of glycemic control, kidney function, and presence of diabetic complications. There is increasing knowledge on the efficacy and safety of DPP4 inhibitors as monotherapy or in combination with metformin therapy. The use of DPP4 – inibitors appears to be safe and with low rates of hypoglycemia. The use of GLP-1 RA may also be of benefit in obese patients in improving glycaemic control and in reducting appetie during Ramadan. There is no data on the safety and efficacy of SGLT-2 inhibitors during the fasting period of Ramadan. Patients with type 1 and type 2 diabetes treated with insulin should be educated on the appropriate use of insulin administration and the need for glucose monitoring during the fasting period. Most patients require a modification of the basal insulin dosage and on the use of premeal insulin to cover meals after breaking of the fast. In some patients, a larger insulin dose may be needed after a large evening meal. The use of basal insulin analogs and continuous insulin infusion may be of benefit as they cover basal requirements without significant peaks and may result in less hypoglycemia compared with human NPH and premixed insulin".*

In addition, Ibrahim et al. include an instructive management algorithm for people with type 2 diabetes before, during and after fasting of Ramadan, give some informations regarding dates consumption and lifestyle changes after Ramadan and they extend on some misconceptions about drawing blood and insulin injections during the fast, while providing proper recommendation for avoidance of hypoglycemia (11).

Diabetic patients who should not fast are those known to be noncompliant, poorly controlled, and all brittle type 1 diabetics; pregnant diabetics, those with a history of

diabetic ketoacidosis or hyperosmolar coma, and patients with serious complications such as coronary artery disease, cirrhosis and chronic renal failure; elderly patients with any degree of alertness problems, and diabetics with frequent episodes of hyper- or hypoglycemia before and/ or during Ramadan fasting (10, 11).

Diabetics who are motivated to observe fasting in Ramadan must visit a physician and a dietician before Ramadan. Dietary and glycemic control should be achieved and advice relating diet adherence, appropriate exercise, self-monitoring of blood glucose and compliance with medical therapy should be emphasized (12).

It is northworthy that many diabetic muslim believers wish to fast during Ramadan, inspite of being medically unfit to do fast. In addition, many diabetics are not controlled or do not have appropriate lifestyle to enter fasting. Therefore, a conprehensive medical assessment and risk stratification must be done by physicians 1-2 months before Ramadan. This should include patient education regarding nutrition, physical activity, warning symptoms and self mentoring blood glucose, as well as revision of therapy. Regular follow up just before start of fast and during Ramadan is needed for provision of best management and this should include reappraisal of diet, physical activity and drug treatment continuously before during and after Ramadan (13).

While publishing recent recommendations of diabetic management during Ramadan has been helpful and some studies have shown that physicians have increasingly adopted multiple approaches to the management of fasting during Ramadan (14), many unresolved issues remain. Firstly, there is urgent need for multinational prospective studies including well-designed cohort and randomized clinical trials, in order to confirm many expert-based recommendations. Secondly, many diabetics visit physicians immediately before Ramadan without proper HbA1c control and adequate education. Majority of these patients may not agree with advice of physician to avoid fasting and they go observe Ramadan fasting. Thirdly, some expert recommendations many not be applicable in real practice. Newer drugs have less potency for decreasing blood sugar and could not replace other more potent medications; many patients are controlled on a combination of full dose sulfonylureas, in particular glibenclamide and metformin that could not be controlled with other drugs, in particular if they see physician just before the start of fast. The same is true for those insulin-dependent patients on combination therapy of NPH and regular insulin.

These and other observations indicate that physicians must observe, assess, and evaluate each diabetic patient separately. While respecting patient's wishes and taking into consideration physician advice with a holistic view in all aspects of diabetic care, physicians should focus on management of individual patients and try to do the best help them to observe fasting of Ramadan with proper control and minimal complications.

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