

Diabetes mellitus and Ramadan in elderly patients

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Abstract

Worldwide, the proportion of people above 60 years old represents 15% of the whole population. Diabetes mellitus is more frequent in this age group, and is associated with increased risk of morbidities and premature mortality. Aged Muslim people with diabetes insist on fasting during Ramadan, for many reasons. Elderly people, especially frail patients, who fast are at increased risk for many complications such as hypoglycaemia, hyperglycaemia and metabolic decompensation including hyperosmolar coma, diabetic ketoacidosis, dehydration and thrombosis. Therefore it is important to assess functional capacity, cognition, mental health and comorbidities in elderly people with diabetes in order to evaluate the risk of fasting, individualize the therapy, and adapt care to their needs.

Keywords: Old people, Diabetes, Ramadan, Fasting.

Introduction

The world population is ageing relentlessly. Currently, the proportion of old people or people above 60 years represents 15% of the whole population and will rise up to 25% by 2050.¹

Diabetes mellitus, mainly type 2, is one of the most frequent disorder in the ageing population. It is a public health problem worldwide. Its incidence varies according to genetic, age-related, and environmental factors. In people aged 60 and over, the insulin secretion may also be reduced. Consequently, the prevalence of diabetes mellitus in elderly age group varies from 18% to 33%.^{2,3} Diabetic complications consisting of macro and micro angiopathies, with or without metabolic ones, generally appear in people with longstanding disease and poor glycaemic control. Some conditions such as stress, high ambient temperature and some situations such as Ramadan may precipitate metabolic disorders.

Followers of Islam account for 1.66 billion which represents nearly one quarter of the world's population. Among these, 50 million persons with diabetes fast during Ramadan each year.^{4,5} Ramadan is a holy month

for Muslims all over the world as everyone believes God revealed the first verses of the Koran during the 9th month of the lunar calendar. Honouring this time and seeking nearness to God, Muslims fast all the month from dawn to sunset. This may mean 14 to 18 hours of fasting per day. During Ramadan, Muslims have to restrain from drinking and eating from sunrise to sunset. Religion exempts old or sick people, pre-pubertal children, pregnant and lactating women, and travelers, from fasting.

In the past Ramadan was a month of prayers and meditations, but in the recent modern life the fasting ritual has become a huge feast where people have a radical change in their life style which might affect biochemical parameters especially among people with diabetes. While some people have only two meals, breaking the fast at sunset and breakfast just before sunrise, others skip breakfast. This may be dangerous especially for old people or those needing medicine. A third group comprises of people who apart from prayers, spend most of the night enjoying food, especially rich sugary pastries, and soft drinks with family and/or friends. Moreover, during Ramadan it has been observed that the food is generally unhealthy containing pastas and calorie filled fried foods. This is true even for people used to a strict diet. As demanded by culture and the fear of hypoglycaemia, women waste a lot of time preparing various attractive dishes. During non-fasting hours men and women consume a lot of dried fruit, almonds, soft drinks and juices. The smell of fresh chapattis and different types of baked breads and buns stimulates the appetite during all the fasting period. So do the aroma of honey, vanilla and caramel filling the Ramadan atmosphere.

How can temptation be suppressed especially in the older people and persons for whom sugar intake is limited? What should the elderly people with diabetes do? Should they fast despite their poor health or are they exempted? Is it easy for them to remain without food and water for the long period of 12 to 16 hours? If they do fast, is it easy for them to exercise self control and overcome temptations? Are they taking their treatment, and maintaining their glycaemic control, or are they exposing themselves to complications by fasting? Is there a solution to avoid metabolic disorders? The aim of this article is to

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answer all these questions.

Reasons for Fasting

Because of the lunar calendar, Ramadan falls in different seasons over a cycle of about 33 years. When it falls in winter it is relatively easy, but in peak summer, it is too challenging and risky, especially during the first week for old or sick people. In Muslim countries most people with diabetes mellitus want to fast, and insist on fasting, whether they are young or old. The EPIDIAR study showed that 43% of patients with type 1 diabetes, and 79% of those with type 2 diabetes fast during Ramadan.⁶

Old diabetics, much more than young ones, insist on fasting during Ramadan, for many reasons. First of all, it is a habit for them as they have been observing fasts from a very young age. They also have a stronger belief in religion compared to the younger people. Performing their religious duty provides self-satisfaction and increases their self-esteem. On the other hand, they like sharing the Ramadan festive atmosphere and want to feel normal and not sick or handicapped. Not fasting is considered shameful: even if they feel tired and weak. Old persons fast because of the fear of being labeled as non-believers or handicapped. Sometimes this fear is so strong that they prefer taking the risk of metabolic complications than being seen eating or drinking. In some areas, where the society is intolerant, many people do not understand that some persons, although they seem outwardly healthy, are really sick. This is the case for elderly people with diabetes, especially those with longstanding disease and comorbidities. For this reason, people suffering from chronic diseases are sometimes obliged to fast to avoid embarrassment and culturally not to offend their neighbours and colleagues. In some countries, even if one eats in private, or takes medication with water, it can become obvious as one does not look as tired as those who are fasting. Even brushing one's teeth may be suspected to be a ploy to hide the smell of coffee.

Risk Stratification

Do all old people have the same challenges, the same attitude towards Ramadan and the same ability to fast? Of course not! It does not depend on their civil age, but on their vascular or physiological age, their cognitive function and on having or not having diabetes complications and comorbidities.

The WHO defines elderly as people over 60 or 65 years age, but most scientific societies consider a person is old if his/her civil age is superior or equal to 75. Actually, it is more important to consider the physiological or vascular age that varies according to genetic and environmental

factors, and presence or lack of morbidities such as diabetes mellitus, hypertension, obesity, and cognitive dysfunction. Hypothyroidism, hyperthyroidism, renal and hepatic insufficiency, impaired memory/cognition and many other non-glycaemic abnormalities may be present in a person with diabetes, too.

Diabetes mellitus is a major risk factor for frailty which can lead to increased risk for morbidities and premature mortality.⁷ Therefore it is important to assess functional capacity, cognition, mental health and comorbidities in elderly persons with diabetes in order to evaluate the risk of fasting, and to adapt care and individualize the therapy.⁸

The IDF categorizes diabetic patients in three functional categories.¹

- ◆ Category 1 includes people who are functionally independent. In this group diabetes mellitus is the main medical problem. These persons are at a moderate risk for fasting, provided that they do not have other comorbidities and are not taking hypoglycaemia inducing therapy.
- ◆ Category 2 encompasses patients who are functionally dependent on another person. They are subdivided in 2 subcategories: frail patients and patients with cognitive impairment.
 - Frail patients are characterized by a combination of fatigue, weight loss, and severe restriction in mobility and strength which increase the risk of falls and institutionalization.
 - The second subcategory includes patients with dementia who have cognitive impairment and are unable to self-care. This category of patients is at increased risk of both hypoglycaemia and hyperglycaemia.
- ◆ Category 3 includes patients at the end of life care. These individuals have a significant medical illness or malignancy and have a life expectancy of less than one year.

According to this classification it is clear that the risk of fasting in the two last categories is very high, as complications can be life threatening.

Although there is no study that evaluates the risk of fasting in old patients, elderly persons, especially frail ones, who fast are at increased risk of hypoglycaemia, hyperglycaemia, and metabolic decompensation such as hyperosmolar coma, diabetic ketoacidosis, dehydration and thrombosis.

Hypoglycaemia

In diabetic persons a decrease in food intake is a great risk factor for the development of hypoglycaemia independent of age.⁹ The EPIDIAR study showed that fasting during Ramadan increased the risk of severe hypoglycaemia (defined as hospitalization due to hypoglycaemia) from 4.7 fold in patients with type 1 diabetes (from 3 to 14 events per 100 patients per month) to 7.5 fold in patients with type 2 diabetes (from 0.4 to 3 events per 100 patients per month).⁶ In the ACCORD study, elderly subjects were more prone to severe hypoglycaemia, and the risk was 50% higher than in young patients.¹⁰ In addition, hypoglycaemia was associated with 2 fold increased risk of mortality in hospitalized patients aged above 70 years.¹¹ Hypoglycaemia, especially severe episodes, are associated with an increased risk of cardiovascular events, hospitalizations and all causes of mortality.¹² Persons who are at very high risk for severe hypoglycaemia while fasting are: those who presented with severe hypoglycaemia within the three months prior to Ramadan, patients with a history of recurrent hypoglycaemia and persons with hypoglycaemia unawareness, especially the elderly or those with neurological complications and/or cognitive disorders.¹³

Hyperglycaemia

The EPIDIAR study showed that the risk of severe hyperglycaemia requiring hospitalization increased 5 fold in patients with type 2 diabetes mellitus (from 1 to 5 events per 100 patients per month). The risk of severe hyperglycaemia with or without ketoacidosis increased threefold in patients with type 1 diabetes (from 5 to 17 events per 100 patients per month).⁶ Hyperglycaemia is due to an excessive reduction in the dosage of medications by patients, in order to avoid hypoglycaemia, but also because of excessive food intake during non fasting hours. As expected, patients who reported excessive food intake during the first meal with a lot of glucose intake had higher rates of severe hyperglycaemias.⁶ Consequently, one should pay great attention to elderly patients who prefer soft and sweet foods, and in whom symptoms of hyperglycaemia such as fatigue, polyuria, urinary incontinence and cognitive impairment may be wrongly attributed to ageing. Cognitive impairment symptoms may also be dramatically improved with glycaemic control which proves the relationship with hyperglycaemia.¹⁴ Patients at high risk of severe hyperglycaemia are those with sustained poor glycaemic control, ketoacidosis within three months prior to Ramadan and patients who had hyperosmolar hyperglycaemic coma within the previous three months.¹³

Dehydration and Hyperosmolar Coma

Malnutrition and dehydration are frequent in elderly people and warning symptoms are often overlooked. Limitations of fluid intake during fasting especially during summer and if the fast is too prolonged can lead to extreme dehydration with hyperosmolar coma. Moreover glycosuria secondary to hyperglycaemia can worsen dehydration and cause hypovolaemia which can be life threatening.

Patients on diuretic treatment are also at increased risk of dehydration. This can cause orthostatic hypotension, syncope and falls with a high risk of bone fractures in old people.¹⁵ Dehydration can also lead to an increased procoagulant state with a risk of thrombosis. In this context an increased risk of thrombosis of the central vein of the retina during Ramadan has been reported in some populations.¹⁶

Cardiovascular Risk

Several studies have assessed the effect of fasting on cardiovascular system. In a systematic review of the literature, Salim et al. evaluated the effect of Ramadan fasting on cardiovascular diseases. These authors showed that fasting has minimal effect in patients with stable disease. However, patients with unstable diseases, and patients with impaired cardiac function were at high risk of decompensation, and should be discouraged from fasting.¹⁷ It is important to consider the duration of fasting too, as not eating during a long period may have negative effects on cardiac complications.

Al Suwaidi et al, in a population based study, noted that the incidence of acute coronary syndromes during a ten years period of Ramadan was not influenced by fasting.¹⁸ However, patients with a recent heart attack are at high risk and should be discouraged from fasting. According to some authors, fasting during Ramadan does not seem to have an impact on stroke incidence.^{19,20} However, blood pressure may be uncontrolled as visits to the emergency department increase during Ramadan.²¹ So, blood pressure control should be taken into account during fasting, especially in elderly persons, to prevent stroke and heart decompensation.

Treatment of diabetes in elderly persons during Ramadan

It is important to review diabetes treatment during Ramadan in order to avoid both hypoglycaemia and hyperglycaemia. In the EPIDIAR study, it was observed that during Ramadan fasting, treatment based on antidiabetic drugs were not modified in 79% among

people with type 1 diabetes mellitus, and in 75% among those with type 2 diabetes.⁶ It was also demonstrated that insulin doses remain the same in 64%.⁶ The most important aspect of care is education. This remains the cornerstone of any management. Individualization of treatment according to the patient's health condition is equally important. The risk of Ramadan fasting is low for old, but fit patients who know how to manage their treatment. For example, for people on lifestyle therapy, or on medications with low hypoglycaemic risk such as metformin, alpha glucosidase inhibitors, glitazones or incretin-based therapy, the risk of fasting is low, even for old people. But, frail patients, patients with comorbidities or those on medications with high hypoglycaemic risk such as insulin or insulin secretagogues are at high risk during Ramadan fasting. Consequently this group should be discouraged to fast. If these patients insist on fasting, they should be advised to monitor blood glucose levels frequently and to attend Ramadan-focused diabetes education programmes.

Conclusion

An overwhelming proportion of elderly Muslims with diabetes insist on fasting during Ramadan, for many reasons, even if they know they are putting themselves at risk for acute metabolic and cardiovascular events. Actually, the old persons' very strong religious belief added to the wish to share the Ramadan festive atmosphere with their family, and the desire to appear normal, pushes them to take the risk of long fasting hours even during very hot summer. Therefore, the healthcare providers should address the risk of fasting in old people by assessing their overall health status and associated comorbidities, especially cardio-metabolic diseases and geriatric syndromes. Frail patients should be discouraged to fast, but the risk of fasting seems to be low in fit patients without associated comorbidities. The risk of Ramadan fasting in old people can be reduced by an appropriate education on self-monitoring and/or management. On the other hand, the advent of new antidiabetic medications, with low risk of hypoglycaemia may, in the near future, offer opportunities for healthcare providers to manage elderly persons with diabetes, and help them to observe Ramadan safely.

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