TYPE 2 DIABETES CONTROL DURING RAMADAN: ON ADVISING PATIENTS

Introduction
It is generally accepted that certain people with diabetes are exempted from fasting, particularly patients on insulin with frequent hypoglycaemia and those with advanced cardio-renal complications. However, many choose to fast despite being advised by their doctors that they are exempt. Results from the huge EPIDIAR study, which included more than 12,000 people with diabetes living in predominantly Muslim countries, showed that 42% of people with type 1 diabetes and 78% of people with type 2 diabetes fasted for well over half of the days in Ramadan, resulting in more episodes of both hypo- and hyperglycaemia than in the preceding months. It is therefore the role of the doctor to both advise the patients about risks related to fasting and to assist those who want to fast to do so safely.

Focus on patients on low-ratio premix insulin

**KEY MESSAGES**

- History of previous year’s fasting and behaviour in Ramadan can help to reduce the risk of hypo- or hyperglycaemia
- Clinicians should ensure focussed education to patients and at least one family member during the pre-Ramadan period
- While the health professional, based on the assessment of a patient’s risk of complications, may advise a particular patient not to fast, this is ultimately the individual person’s decision
- Clinicians should support their decision by advising how to fast as safely as possible
- As many type 2 diabetes patients on insulin are on low ratio premix insulin, this requires careful dose adjustment and monitoring.

Fasting during Ramadan is one of the five pillars of Islam and has major religious spiritual and psychological connotations for individual Muslims. Fasting is obligatory for all Muslim men and boys over the age of 12 and for Muslim women and girls who have passed puberty. It requires not only that no food or drink, including medication (oral, inhaled or rectal), pass the lips during the hours of daylight but also that smoking and sexual activity are prohibited. There are exceptions, so that people who are sick, pregnant, menstruating, breastfeeding and those who are travelling, old or infirm are not required to fast.

Ramadan occurs in the ninth month of the lunar calendar and lasts for 29 or 30 days. It is followed by one day of feasting (Eid-ul-Fitr, often abbreviated to Eid). As it’s based on the lunar cycle, Ramadan comes about 10 days earlier each year so the duration of fasting can be as short as seven hours in winter to as long as 18 hours in summer. This year, it will start around 18 June and fasting in South Africa will be for approximately 12 hours.
The Ramadan routine

To be able to offer medical advice to Muslim patients, it’s important to understand the daily routine both during Ramadan and at the end of the month of fasting. People fasting from dawn to dusk have to consume all food and fluids outside of these hours. In practice, people take their main meal of the day at the end of the day’s fast, usually soon after dusk. This meal is called *iftar* or *iftari*, and generally consists of large amounts of carbohydrate and fat-rich foods. Fried foods, rice, salads, meat and dates are common components.

People may also eat a vegetable called *karela*, also known as bitter gourd, which is important for those with diabetes because it is known to have hypoglycaemic properties.

*If*ar* is commonly a social event with friends and relatives being invited to share food. After *iftari*, men may go to the local mosque for prayers, while women stay at home. Another, lighter meal (*sehri* or *suhur*) is taken before sunrise. Depending on the time of the year in which Ramadan occurs, these two meals may be as little as three hours or as long as 16 hours apart, although the range is more like 8-16 hours apart. It has been suggested that the pre-dawn meal may be omitted to avoid disturbing non-Muslim neighbours, so some people may miss it out completely.

During the daytime, exercise is limited to walking and praying although many secular Muslims will continue to go to work and look after their families as at other times of the year. Ramadan ends in one day of feasting and celebration at *Eid-ul-Fitr* which, again, is a social event but with large meals which may be consumed more than once in the course of the day.

When to give advice

Given the huge variation in fasting behaviour amongst Muslims with diabetes, it’s crucial that health professionals don’t make assumptions about what their patients may do during Ramadan. As the timing of Ramadan is predictable, health professional teams should invite all Muslim patients with diabetes and their families to discuss how their diabetes can be best looked after during Ramadan in the months leading up to the start of the fast. This should be achievable even in practices with large numbers of Muslim patients with careful planning, which should start two months ahead. As Ramadan starts about 18 June this year, this may mean starting to see patients in April/May.

The health professional may well advise that the patient should not fast but it is ultimately the individual person’s decision. They must be supported in that decision and advised how to fast as safely as possible. Several factors increase the risk of complications during Ramadan (Table 1), which should be addressed.

### Table 1. Factors associated with a high risk of complications during Ramadan

- Recent severe hypoglycaemia
- Recurrent hypoglycaemia
- Erratic glycaemic control
- Recent diabetic ketoacidosis
- Loss of hypoglycaemia awareness
- Acute illness
- Chronic kidney disease grade 4 or 5
- Patients on dialysis
- Significant vascular disease (stroke, ischaemic heart disease, claudication)
- Living alone
- Testing infrequently or not at all.

Reducing the risk of complications during Ramadan

The three components of good advice are monitoring, diet and medication.

Monitoring

Careful monitoring of a Muslim patient with diabetes who wishes to fast should start before Ramadan. Monitoring should aim to achieve tight control of blood pressure and lipids, as well as blood sugar, in the months before Ramadan, in addition to observation and recording of variations in control, including frequency and severity of hypos and whether there is any degree of lack of awareness of hypos. In addition, relatives must be educated to be aware of the signs and symptoms of hypo- and hyperglycaemia and what to do if they occur.
Finally, the patient’s home blood glucose testing equipment should be checked and calibrated, and they should be provided with sufficient testing strips for blood sugar and ketones to allow for more frequent testing. This applies particularly to patients on insulin or sulphonylureas.

**Diet**

As always, patients should be encouraged to eat a healthy, balanced diet. If possible this means having several smaller meals during the non-fasting period rather than having a large meal at the break of the fast. Diabetics should avoid excess fatty and fried foods such as pakoras, samosas and Bombay mix, as these delay absorption of carbohydrates in the meal. Sugary foods such as burfi should be eaten in small amounts. Dates, which are regularly consumed at sunset during Ramadan, are a good source of fibre and carbohydrate.

Patients should be advised never to miss the pre-dawn meal during Ramadan. This should contain as much complex carbohydrate as possible, including foods such as basmati rice, wholemeal bread or chapattis, potatoes and pasta, as well as vegetables. It should end with fruit and sugar-free drinks. This general dietary advice also applies to *Eid-ul-Fitr*, the period of feasting at the end of Ramadan, where sugary foods are commonly eaten but which patients with diabetes should avoid wherever possible. Dietary advice should also be given to diabetes patients who do not intend to fast as they often partake in the meals with their families.

**Diabetes medication – focus on low-ratio premix insulin users**

Medication advice can usually be worked out on the principle that most of the daily carbohydrate consumption occurs in the evening and the most important aim is to control blood sugar during the daytime.

Low ratio premix insulin (premix insulin with rapid component equal or less than 30% e.g. BiAsp 30) is the most widely prescribed insulin in South Africa. As there are no large studies to guide the titration and dosage adjustment of this premix insulin during Ramadan, a working group comprised of experts from North Africa, Europe, Middle East, South Africa and India recently pooled opinions from clinical practice to optimize low ratio premix insulin therapy during Ramadan fasting. The recommendations were published in 2014 and offer valuable advice to clinicians and their patients.3

The Working Group supports the concept of providing practical advice early in the months before Ramadan and also suggests a trial fast for three consecutive days before Ramadan to mimic the longer fast of Ramadan.

**Dose adjustment of low-ratio premix insulin during Ramadan**

The following points from the Working Group are considered as general practical advice on dose adjustment:

A. If the patient is on once daily premix insulin in combination with oral glucose lowering drugs (OGLDs) in the pre-Ramadan period, then the same dosage should be given at the sunset meal (*Iftar*) and can be titrated further as per the algorithm listed below (Table 2). The dose of OGLDs should be optimized as per the standard recommendations of ADA.4

B. If the patient on once daily premix insulin is uncontrolled, then dosage should be uptitrated as per the algorithm (Table 2). If after titration, the pre-meal/fasting blood glucose is not controlled, advise the patient to break the fast and start premix insulin twice daily.

C. If, during the pre-Ramadan period, the patient is on twice daily premix insulin then prescribe the usual morning dose at the sunset meal (*Iftar*) and half the usual evening dose at pre-dawn (*suhur*), e.g. if 30/70 premix insulin is prescribed 30 units in the morning and 20 units in the evening before Ramadan, then the recommended dose during Ramadan will be 30 units pre-*Iftar* and 10 units at pre-*Suhur*.

D. If the patient on twice daily premix insulin is uncontrolled and has before dinner blood glucose (16.6 mmol/L) in the pre-Ramadan period, then prescribe the usual morning dose at the sunset meal (*Iftar*) and the usual evening dose at pre-dawn (*suhur*), e.g. if
30/70 premix insulin is prescribed 30 units in the morning and 20 units in the evening before Ramadan, then the recommended dose during Ramadan will be 30 units pre-Iftar and 20 units at pre-Suhur.

E. If the patient is on thrice daily insulin, omit the afternoon dose and titrate the pre-Iftar and pre-Suhur dose as described above for twice daily premix regimen.

F. Dosage adjustments should be done based on home BGM data.

G. The preference of premix insulin analogue instead of human insulin can be considered when
   • Immediate injection before a meal is preferred or
   • Frequent hypoglycemia is a concern or
   • There are marked postprandial blood glucose excursions.

H. While switching from human premix to analogue premix insulin, the dose of analogue insulin at pre-Iftar should be 20 to 30% lower than the morning human insulin dose pre-Ramadan. Pre-Suhur dose should be 40% lower than the evening dose pre-Ramadan. Further dose adjustment to be decided as per the BGM data.

**Treatment algorithm for self-titration on low-ratio premix insulin**

The initial doses used when fasting commences may need adjustment and patients should be educated on self-titration of their insulin doses.

• It is advisable to titrate insulin dose every 3 days
• The lowest of the three readings on three consecutive days should be considered to up titrate the insulin dose. The timing of BGM is described in the algorithm (Table 2).
• Hypoglycaemia is defined as blood sugar below 3.9 mmol/L or symptoms of hypoglycaemia
• If hypoglycaemia is noted on two (any time of the day) out of three consecutive days, fasting must be stopped and insulin dose should be reduced as described in the algorithm (Table 2). Fasting should be stopped even if the hypoglycaemia occurs close to the time of Iftar
• If blood glucose is ≥16.6 mmol/L, ketones in blood or urine should be checked and the patient should break the fast
• Patients should avoid fasting on sick days.

**Table 2. Algorithm for self-titration of premix insulin during Ramadan**

<table>
<thead>
<tr>
<th>Fasting/pre-iftar/pre-suhur BG</th>
<th>Premix insulin units*</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3.9 mmol/L or symptoms</td>
<td>Break the fast and down titrate</td>
</tr>
<tr>
<td>&lt;5.0 mmol/L</td>
<td>−2 IU</td>
</tr>
<tr>
<td>5.0-7.0 mmol/L</td>
<td>No change</td>
</tr>
<tr>
<td>&gt;7.0 mmol/L</td>
<td>+2 IU</td>
</tr>
<tr>
<td>&gt;16.6 mmol/L</td>
<td>Break the fast and increase dose by 4 units and check for ketones</td>
</tr>
</tbody>
</table>

*Pre-Iftar dose to be adjusted based on pre-Suhur BG and pre-Suhur dose to be adjusted based on pre-Iftar BG levels.

**Conclusion**

Ramadan is an important part of a Muslim’s life and fasting results in a significant change to the individual’s diet and routine. This poses a potential risk to those with diabetes in terms of hypoglycaemia, hyperglycaemia and dehydration.

Despite the advice of medical practitioners regarding these risks many Muslim diabetes patients continue to fast and thus our focus must be to ensure safe fasting for them. This can be accomplished by beginning with an education programme 2 to 3 months prior to Ramadan and should include advice on diet, monitoring and medication. Since many patients are on low ratio premix
insulin we suggest that they be taught to adjust their doses at the start of Ramadan according to the recently published guideline. Furthermore since individual diet and lifestyles vary significantly they must be taught to self-titrate their insulin doses to ensure optimum glycaemic control.

References


Linked article
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4192983/