

Insulin in Ramadan

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Abstract

Many people with diabetes, both type 1 and type 2, require insulin for maintenance of glycaemic control and health. Most of these people can observe the Ramadan fast, provided appropriate dosage adjustments are made, and basic rules of safety followed. This article describes modifications and precautions that are needed while prescribing insulin during Ramadan.

Keywords: Diabetes, Basal insulin, Premixed insulin, Basal-bolus therapy, Degludec, Degludec aspart, Glargine, Glulisine, Lispro.

Introduction

Various recommendations have been published regarding the use of insulin during Ramadan. These publications describe evidence-based and experience-based suggestions to ensure safe and effective usage of insulin. All this guidance is based upon an understanding of the basic pharmacology of various insulins, and ensuring concordance of prescribed therapy with the dietary regimes followed in Ramadan.^{1,2}

The South Asian consensus guidelines on use of insulin during Ramadan offer a pragmatic approach to this subject. Written by experts from three countries, they suggest simple changes in dosage of insulin during this month. These guidelines support the use of rapid acting, premixed and basal analogues in view of the lesser risk of hypoglycaemia associated with them. Examples of dose adjustment are also given.³

This review collates essential information from these articles, while emphasizing the need for active patient involvement in decision-making and management.

Type 1 Diabetes, With Stable Control

The ideal insulin regimen for type 1 diabetes is a basal-bolus regime with a regulated diet plan. Such a regimen provides safe and effective glycaemic control, while assuming a regular 3+3 meal pattern (3 major meals and 3 snacks) and a fixed physical activity profile.

During Ramadan, however, the basal bolus regimen is not

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possible. Persons with type 1 diabetes, who enjoy stable control, without significant complications or comorbidity, and wish to fast, will require modification in insulin regimens (Table-1) Such persons may benefit from a modified basal plus regime. Persons with type 2 diabetes, on basal bolus or split mix therapy, will need similar modification in therapy.³

Modern insulin analogues are reported to be effective at achieving glycaemic control, with lower hypoglycaemia risks.⁴⁻⁶ Insulin detemir or glargine has demonstrated a significant decline in mean plasma glucose with minimal episodes of mild hypoglycaemia. Similar results are seen with insulin glulisine, lispro, or aspart used instead of regular insulin in combination with intermediate-acting insulin injected twice a day. Compared with those who did not fast during Ramadan, patients with type 1 diabetes on insulin pump therapy who fasted showed a slight improvement in A1C without increasing the risk of hypoglycaemia.^{7,8}

The ultra-long acting insulin degludec aspart (I Deg Asp) has recently been approved in a few countries.⁹ I Deg Asp has been studied as part of a three-dose regime in adult type 1 diabetes.¹⁰ This entails use of I Deg Asp with one major meal, and insulin aspart with the other two meals, daily. This may be modified in Ramadan to a twice daily I Deg Asp regime, as has been reported in type 2 diabetes.¹⁰ Such a shift should be done a few weeks prior to the start of Ramadan, so that dose titration can be done

Table-1: Modification of intensive insulin therapy during Ramadan.

Modification of basal-bolus therapy		
Bolus dose	Morning dose	Transfer full dose at iftar.
	Evening dose	Transfer ½dose at suhur.
	Lunch dose	Omit the dose
Basal portion	If patient is on NPH	50% dose at suhur
	If patient is on basal analog	Same dose at bedtime.
Modification of split insulin therapy		
Split with three time short acting and NPH at dinner	Morning short acting	transfer full dose at iftar
	Lunch short acting	Omit dose
	Dinner short	transfer ½ dose at suhur
	Intermediate acting:	Keep same dose at suhur.
Split short acting and NPH twice daily	Morning short acting	transfer full dose at iftar
	Morning intermediate	transfer full dose at iftar
	Dinner short acting	transfer ½ dose at suhur
	Dinner intermediate	Transfer ½ dose at suhur.

safely. A shift from biphasic aspart (BI Asp) to I Deg Asp will require a 10-20% reduction of dosage.

Type 1 Diabetes With Unstable Control

Persons with type 1 diabetes, who experience unstable control, brittle diabetes, frequent hypoglycaemia, hypoglycaemia unawareness, or have significant chronic complications or acute/ chronic comorbidity, should be dissuaded from observing the Ramadan fast. The appropriate religious exemptions should be explained to them with empathy.

Type 2 Diabetes, With Stable Control

Various insulin regimens are available for use in type 2 diabetes. The choice of insulin regimens and preparation depends upon a multitude of objective and subjective parameters, including the person's gluco-phenotype, dietary and physical activity patterns risk of hypoglycaemia and personal preferences. As all these factors change during Ramadan, modification of insulin regimens may be needed (Table-2).

Use of a rapid acting insulin analogue instead of regular human insulin before meals in patients with type 2 diabetes who fast during Ramadan is associated with less hypoglycaemia and less post prandial glucose excursions.

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 roughly half of the evening dose pre-Ramadan. Further dose adjustment is decided as per glucose monitoring trends.

No consensus statement has been released so far regarding the use of insulin degludec and I Deg Asp in Ramadan. However, the unique time-action profile of these drugs supports their use during fasting. If used as basal therapy, the dose of insulin degludec should be

Box-1: Examples of insulin dose modification during Ramadan.

Insulin regime	Pre-Ramadan dose(unit)	Starting dose during Ramadan(units)
Basal; o.d	10	8
Basal; b.d	10 AM -10 PM)	5 AM -10 PM)
Premixed; o.d AM	10(AM)	- 6units (AM)
Premixed; o.d PM	10(PM)	10(PM)
Premixed; b.d 70/30	20-10	20-May
Split mix		
Basal – bolus	R6-R6-R6-B10 R=rapid B=basal	R3-R0-R9-10 AM=pre-dawn PM=post-sunset

reduced by 10-20% during Ramadan. If taken as part of basal bolus therapy, the same rules will follow, as described in the section on type 1 diabetes. If utilized as a twice daily regime during Ramadan, the I Deg Asp co-formulation can be used in a manner similar to that suggested for premixed insulins.

Counselling

The need for Ramadan- focused diabetes education has been discussed in detail by Hassanein.¹¹ Three points, however, need to be reinforced here.

The need for insulin

In normal healthy individuals eating stimulates the secretion of insulin from the islet cells of the pancreas. This in turn results in glycogenesis and storage of glucose as glycogen in liver and muscle. On the contrary, during fasting, secretion of insulin is reduced while counter-regulatory hormones glucagon and catecholamines are increased. This leads to glycogenolysis and gluconeogenesis. The low levels of insulin in circulation also lead to increased fatty acid release and oxidation that generates ketones which are used for nutrition by the body.¹²

Table-2: Management of patients with type 2 diabetes mellitus.

Diabetes Treatment	Recommended Regimen During Ramadan
Once daily long-acting basal insulin (glargine, detemir)	Reduce dose by 10% to 30% Take at sunset meal (iftar)
Once daily premixed insulin	Keep the same dose, at sunset meal(Iftar)
Twice daily pre mixed insulin	Keep sunset meal (iftar) dose the same The morning dose is shifted to before Iftar cum dinner Reduce the second dose by 20% to 30% and take with pre-dawn meal (suhur) The evening dose is reduced by 50% before Suhur
Thrice daily premixed insulin	Omit afternoon dose. Titrate pre-Iftar and pre-Suhur doses
Rapid-acting insulin (aspart, lispro, glulisine)	Start with the same meal dose, but may need to increase sunset meal (iftar) dose by 10% to 20% to avoid hyperglycaemia Same meal dose for pre-dawn meal (suhur) If morning hypoglycaemia occurs, reduce pre-dawn meal (suhur) dose by 10% to 20% or omit it completely if needed
Insulin pump	Basal rate reduced by 20% Meal doses as per above (rapid-acting insulin)

Patients with insulin deficiency especially Type 1 diabetes, may have excessive glycogenolysis, gluconeogenesis and ketogenesis. All of this may lead to hyperglycaemia and ketoacidosis that may be life-threatening. Therefore, insulin is as necessary during Ramadan fasting, as it is during other times of the year, for persons who require this drug. Fasting or starvation does not imply lack of insulin requirement.

Safety first

Fasting is obligatory upon each sane, responsible and healthy Muslim. Certain individuals, however, are exempt from fasting: children under the age of puberty, those with learning difficulties (those unable to understand the nature and purpose of the fast), the old and frail, the acutely unwell, those with chronic illnesses in whom fasting may be detrimental to health, and those travelling a distance greater than 50 miles in single journey.^{3,12}

At times, unexpected life-threatening, limb-threatening or organ-threatening complications may occur during Ramadan. Such a complication may require intensive insulin therapy, which may not be concordant with the dietary restrictions imposed by Ramadan. In such a case, the fast may be broken, without religious demerit. Mere self-monitoring of blood glucose, venous blood sampling, or any diagnostic procedure which does not involve oral intake, does not constitute break in fasting, and is not prohibited by religion.

Hypoglycaemia awareness

Person on insulin or other glucose-lowering therapy must be aware of the symptoms and signs of hypoglycaemia, and how to prevent and manage them. This information is especially relevant during Ramadan, and must be shared with family members and colleagues as well. Difficulty in concentrating, meditating or praying may be a subtle symptom of neuroglycopenia,¹³ and should not be ignored. Blood glucose should be monitored immediately on occurrence of any unusual symptom. People with diabetes and hypoglycaemia unawareness should not fast as they are at higher risk of severe hypoglycaemia.

Seven Suggestions for Safe Insulin Use in Ramadan

- ◆ Plan choice of insulin regimens and preparations prior to Ramadan. Visit your doctor a month before the advent

of Ramadan.

- ◆ Take a small snack three hours after iftar, followed by Suhur just before sunrise
- ◆ Avoid unaccustomed physical activity/exercise routines.
- ◆ Monitor blood glucose regularly
- ◆ Reduce insulin doses in case of doubt
- ◆ Take symptoms suggestive of hypoglycaemia seriously
- ◆ Follow physician's advice in the spirit of shared decision making

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