Clinical Practice Guidelines
Management of Type 2 Diabetes Mellitus
(5th Edition) 2015

Topic 16:
Diabetes in Ramadan

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Month of Ramadan

- A lunar-based Muslim month
- Timing linked to the sighting of the new moon
- Duration between 29 and 30 days
- Duration of daily fast may range from few hours to > 20 hrs.
Philosophy of Fasting During the month of Ramadan

• One of the five pillars of Islam

• Significant religious and psychological connotation

• Teaches Muslim self-discipline and self control

• The value of charity

• Recognition of the plight of under privileged

• Fasting during Ramadan is an obligatory duty for all healthy adult Muslims
Things Happened During Ramadan

• During Ramadan, Muslims must fast from dawn to sunset.

• Food and fluids may be consumed freely during the night, but forbidden during day time, including oral medication.

• This will involve a sudden and major change in the daily meals.
Things Happened During Ramadan

• This include meal timing, total calories, food type and consistency.

• Prior to the month of Ramadan, people usually take 3 major meals (breakfast, lunch, dinner/supper)

• *This will change to 1-6 two meals Regular *Iftar and *Sahur. Iftar will be around 6:00 pm and Sahur will be around 3:00 am.
Things Happened During Ramadan

• Increased in post prandial physical activity during the night times associated with Tarawih.

• Psychological changes due to the general spiritual atmosphere during Ramadan, which create a feeling of inner well-being.
Surah Al-Baqarah: 183-184

- …..Observing As-Saum (the fasting) is prescribed for you as it was prescribed for those before you, …..
- ….., but if any of you is ill or on a journey, ….. And as for those who can fast with difficulty, (e.g. elderly, etc),……..
- This exemption represent more than simple permission not to fast; the prophet Mohamad said “God like his permission to be fulfilled, as he likes his will to be executed”
Major Risks associated With Fasting in Patients With Diabetes

- Hypoglycemia
- Hyperglycemia
- DKA
- Dehydration and thrombosis
### Self-reported Hypoglycaemia Before and During Ramadan

#### Frequency of episodes per month

<table>
<thead>
<tr>
<th></th>
<th>Overall population</th>
<th>type 1 DM</th>
<th>type 2 DM</th>
<th>type 1 DM</th>
<th>type 2 DM</th>
</tr>
</thead>
</table>
|                      | Before Ramadan     | During Ramadan | Before Ramadan | During Ramadan |.prof
|                      |                    |            |            |            |            |
| Non severe           | Mean (SD)          | 2.6 (4.9)  | 1.7 (3.0)  | 0.6 (1.7)  | 0.6 (1.9)  |
| hypoglycaemia        | p                  | SS (p < 0.001) | NS (p = 0.29) | |
| Severe hypoglycaemia*| Mean (SD)          | 0.03 (0.1) | 0.14 (0.6) | 0.004 (0.02) | 0.03 (0.28) |
|                      | p                  | SS (p = 0.0174) | SS (p < 0.0001) | |

* : requiring hospitalisation

4.7X 7.5X
Severe hyperglycaemia before and during Ramadan

Frequency of episodes requiring hospitalisation per month

<table>
<thead>
<tr>
<th></th>
<th>DM-type 1</th>
<th>DM-type 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before Ramadan</td>
<td>During Ramadan</td>
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<tr>
<td>Overall population</td>
<td>0.05</td>
<td>0.16</td>
</tr>
<tr>
<td>p</td>
<td>NS (p = 0.16)</td>
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<tr>
<td>Population who fasts</td>
<td>Mean 0.05</td>
<td>0.20</td>
</tr>
<tr>
<td>p</td>
<td>SS (p = 0.001)</td>
<td>SS (p &lt; 0.0001)</td>
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<tr>
<td></td>
<td>3X</td>
<td>5X</td>
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</table>
Fasting during Ramadan (1)
(% of patients who fast > 15 day)

DM type 1

<table>
<thead>
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<th>Country</th>
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<td>Pakistan</td>
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<td>Saudi Arabia</td>
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<td>Turkey</td>
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DM type 2

<table>
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<td>Tunisia</td>
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<tr>
<td>Turkey</td>
<td>73</td>
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</tbody>
</table>

Overall population

DM type 1 = 54%
DM type 2 = 78%

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Fasting during Ramadan (2)
(Number of fasting days, patients who fast)

<table>
<thead>
<tr>
<th>Country</th>
<th>DM type 1</th>
<th>DM type 2</th>
</tr>
</thead>
<tbody>
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<td>Algeria</td>
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<td>Bangladesh</td>
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<tr>
<td>Egypt</td>
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<td>India</td>
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<td>Jordan</td>
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<td>Lebanon</td>
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<td>Malaysia</td>
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<td>28</td>
</tr>
<tr>
<td>Turkey</td>
<td>18</td>
<td>24</td>
</tr>
</tbody>
</table>

DM type 1 = 23 days  DM type 2 = 27 days
MANAGEMENT
Categories of risks in patients with type 2 diabetes who fast during Ramadan

Very high risk

- Severe hypoglycemia in last 3/12
- History recurrent hypoglycemia
- Hypoglycemia unawareness
- Poor glycemic control
- Acute illness
- Hyperosmolar in last 3/12
- Intense physical labor
- Pregnancy
- Chronic dialysis
Categories of risks in patients with type 2 diabetes who fast during Ramadan

High risk

- Moderate hyperglycemia
- Renal insufficiency
- Advanced macrovascular complication
- Living alone treated with SU/insulin
- Comorbid condition
- Old age with ill health
- Drug that may effect mentation
Categories of risks in patients with type 2 diabetes who fast during Ramadan

Moderate risk

• Well control patient treated with meglitinide

Low risk

• Diet alone, metformin/ TZD/DPP4-i/AGI
Patients with one or more of the following are advised not to fast:

- Conditions related to diabetes:
  - Nephropathy with serum creatinine more than 1.5 mg/dL
  - Severe retinopathy
  - Autonomic neuropathy: gastroparesis, postural hypotension
  - Hypoglycemia unawareness
  - Major macrovascular complications: coronary and cerebrovascular
  - Recent hyperosmolar state or DKA
  - Poorly controlled diabetes (Mean Random BG > 300)
  - Multiple insulin injections per day

- Physiological conditions:
  - Pregnancy
  - Lactation
Patients with one or more of the following are advised not to fast:

- Co-existing major medical conditions such as:
  
  - Acute peptic ulcer
  - Pulmonary Tuberculosis and uncontrolled infections
  - Severe bronchial asthma
  - People prone to urinary stones formation with frequent Urinary Tract Infections
  - Cancer
  - Overt cardiovascular diseases (recent MI, unstable angina)
  - Severe psychiatric conditions
  - Hepatic dysfunction (liver enzymes > 2 x ULN)
Management

General consideration

• Individualisation
• Frequent monitoring
• Nutrition
• Breaking the fast
Management

General Consideration

Nutrition

- Should not differ significantly from healthy balance diet
- Maintain constant body mass
- More complex CHO at predawn meal
- Increased fluid during non fasting period
- Predawn meal taken as late as possible before the start of daily fasting
Management

General Consideration

Exercise

• May maintain normal physical activity
• Avoid excessive physical activity in particular few hour before sunset meal
• Terawih prayer as part of daily exercise
Management

Pre-Ramadan Assessment and Education

- Status of glycaemia, BP and lipid
- Specific advice (patient and family)
  - Diet
  - Medication
  - Self care (SMBG, hypoglycaemia kit, exercise)
Breaking Fast

Should always and immediately broken;
• Symptomatic
• Asymptomatic
  • BS < 3.3 mmol/l
  • BS < 3.9 mmol/l in first few hours of starting fasting
  • BS > 16.7 mmol/l
Patients agree with breaking fast during Ramadan

- 73% of type 1 DM patients
- 55% of type 2 DM patients

Same trend in most countries

Turkey

Turkey
Management of T2DM

Diet controlled patients

- Risk of fasting is quite low
- Risk for occurrence of post prandial hyperglycemia
- Distribute the calorie to >2 smaller meal during non-fasting hours
Management of T2DM

T2DM with Metformin

- May safely fast
- 2/3 total daily dose immediately before sunset meal
- 1/3 before pre-dawn meal
Management of T2DM

T2DM with TZD/DPP-4i/GLP-1 RA/SGLT2i/AGI

- No dose change required
- Low risk of hypoglycemia
Management of T2DM

T2DM with SU

- Newer SU is effective with less hypoglycaemia
- Avoid glibenclamide
- Chlorpropamamide is absolutely contraindicated
# Insulin Adjustments During Ramadan

<table>
<thead>
<tr>
<th>Insulin Regimen</th>
<th>Adjustment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basal insulin only</td>
<td>Basal Insulin to be taken at bedtime or after <em>Iftar</em> meals. May need dose reduction if there is a risk of daytime hypoglycaemia.</td>
</tr>
<tr>
<td>Premixed insulin once daily</td>
<td>Inject usual dose at <em>Iftar.</em></td>
</tr>
<tr>
<td>Premixed insulin twice daily</td>
<td>Reverse doses – Morning dose given at <em>Iftar</em> and evening dose at <em>Sahur.</em> Insulin dose at <em>Sahur</em> reduced by 20-50% to prevent daytime hypoglycaemia. or Change to short/rapid acting.</td>
</tr>
<tr>
<td>Basal bolus insulin</td>
<td>Taken at bedtime or any time after <em>Iftar</em> meals. May require a dose reduction if there is daytime hypoglycaemia. <em>Sahur</em> – Usual pre-Ramadan breakfast or lunch dose. May require a dose reduction to avoid daytime hypoglycaemia. Lunch – Omit. <em>Iftar</em> – Usual pre-Ramadan dinner dose. May require dose increment.</td>
</tr>
<tr>
<td>Insulin Pump</td>
<td><em>Basal insulin rate:</em> May require reduction of up to 25%. <em>Prandial bolus:</em> According to individualised insulin-to-carbohydrate ratio (ICR).</td>
</tr>
</tbody>
</table>
Recommendations: Diabetes in Ramadan

1. A pre-Ramadan medical assessment of general well-being, glycaemic control, comorbidities and complications should be performed to categorise the patient’s risks from fasting as well as to optimise their management. [Grade C]

2. Patients and care-givers should receive education concerning self-care on risks of hypoglycaemia, hyperglycaemia and dehydration. [Grade C]

3. Anti-diabetic therapies should be individualised during fasting. [Grade C]