cannot be easily secured or surgery cannot be done for limitations of hospital resources due to the pandemic, medical therapy should be preferred. Concomitantly, the optimisation of medical treatment for pre-existing comorbidities as well as the choice of cortisol-lowering drugs with potentially positive effects on obesity, hypertension, or diabates are crucial to improve the eventual clinical course of COVID-19.

Once patients with Cushing's syndrome are in remission, the risk of infection is substantially decreased, but the comorbidities related to excess glucocorticoids might persist, including obesity, hypertension, and diabetes, together with thromboembolic diathesis.[2] Because these are features associated with an increased death risk in patients with COVID-19,[1] patients with Cushing's syndrome in remission should be considered a high-risk population and consequently adopt adequate self-protection strategies to minimise contagion risk.

In conclusion, COVID-19 might have specific clinical presentation, clinical course, and clinical complications in patients who also have Cushing's syndrome during the active hypercortisolaemic phase, and therefore careful monitoring and specific consideration should be given to this special, susceptible population. Moreover, the use of medical therapy as a bridge treatment while waiting for the pandemic to abate should be considered.

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*Rosario Pivonello, Rosario Ferrigno, Andrea M Isidori, Beverly M K Biller, Ashley B Grossman, Annamaria Colao
rosario.pivonello@unina.it

Dipartimento di Medicina Clinica e Chirurgia, Sezione di Endocrinologia, Università Federico II di Napoli, Naples 80131, Italy (RP, RF, AC); UNESCO Chair for Health Education and Sustainable Development, Federico II University, Naples, Italy (RP, AC); Department of Experimental Medicine, Sapienza University of Rome – Policlinico Umberto I – COVID Hospital, Rome, Italy (AMI); Neuroendocrine and Pituitary Tumor Clinical Center, Massachusetts General Hospital, Boston, MA, USA (BMKB); Centre for Endocrinology, Barts and the London School of Medicine, Queen Mary University of London, London, UK (ABG); and Oxford Centre for Diabetes, Endocrinology and Metabolism, University of Oxford, Oxford, UK (ABG)

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Type 1 diabetes and fasting in Ramadan: time to rethink classification of risk?


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In the past few decades, several advances have allowed people with type 1 diabetes to live near normal lives and participate in activities previously considered high risk. These advances include the provision of structured education, analogue insulins, technologies including constant subcutaneous insulin infusion (CSII), continuous glucose monitoring, and automated insulin delivery or artificial pancreas systems.[1] Despite these advances, there is a scarcity of detailed consensus guidance on type 1 diabetes and fasting in Ramadan. In this comment, we present an up-to-date risk stratification tool to support people with type 1 diabetes considering fasting during Ramadan and health-care professionals.

Fasting during the month of Ramadan is a challenging situation given complete abstinence from food and water from dawn to dusk over consecutive days during an entire lunar month. Fasts in countries in the northern hemisphere can be 16–19 hours long and will remain over 16 hours for the next few years, providing a very small window to eat and drink during fasts.

For some people with type 1 diabetes, fasting during Ramadan is an essential part of their spiritual life. Therefore, providing avenues to empower people with type 1 diabetes to undertake fasting is important for people with type 1 diabetes considering fasting during Ramadan and health-care professionals.

Observational data collected over 15 years ago in the Middle East and Asia suggested that significantly higher risks of severe hypoglycaemia and non-significant increases in severe hyperglycaemia or diabetic ketoacidosis were associated with fasting during Ramadan.[2] These observations were based on older management strategies such as twice-daily insulin regimens with little support from health-care professionals or provision of diabetes education. On the basis of these observations, guidance supported by the International Diabetes Federation in 2017 suggested that even those with well controlled diabetes are at high risk for acute complications of diabetes and recommended that they should not fast.[3] Similarly, an American Diabetes Association working group have repeatedly supported the classification of this group of people as very high risk and that fasting is not recommended.[4] Even with these recommendations, over 40% of people with type 1 diabetes continue to fast during Ramadan.[2] Although there are paediatric guidelines for fasting with type 1 diabetes,[5] there is very little published guidance on ways to support fasting in adults and no detailed risk stratification for people with type 1 diabetes.

Contrary to the older evidence,[2] continuous glucose monitoring data suggests that people whose type 1 diabetes is well-managed before Ramadan might not have deterioration in glycaemia while fasting.[6] Evidence also indicates that the risk of diabetic ketoacidosis during Ramadan, often highlighted in guidance on this topic, is very low during fasting.[7] The dual risks of hypoglycaemia from prolonged fasting and post-meal hyperglycaemia after Iftar (evening meal when breaking the fast) pose substantial challenges to patients and the health-care professionals who support them. Hypoglycaemia poses a psychological burden of having to break the fast in addition to the negative experience of hypoglycaemia itself. The availability of structured education guiding functional insulin therapy has helped improve metabolic and psychological outcomes, including quality of life and hypoglycaemia outside of the context of fasting.[8] The provision of CSII via pump can aid strategies to optimally adjust treatment during prolonged fasts.[5] Improvements in technology, such as continuous glucose monitoring and sensor-augmented pump therapy can greatly reduce the risk of severe hypoglycaemia and improve metabolic control in type 1 diabetes.[1] Observational data shows that the use of technology and education before Ramadan is associated with an increased proportion of people with type 1 diabetes being able to complete their fasts without hypoglycaemia and with improvements in glucose control.[5,9]

Like others,[10] our own clinical experience with open-source and commercial hybrid closed loop insulin delivery systems in Ramadan has been very encouraging (unpublished data). Although accessibility of these

***Panel:* Risk stratification for adults with type 1 diabetes considering fasting during Ramadan**

Stratification terms are aligned with international guidance.[3] In all situations individuals making a personal decision to fast should be supported with education, frequent follow-up, and additional support measures regardless of their risk status.

Low and moderate risk

Individuals may consider fasting with the support of health-care professionals if they meet criteria and after consideration of medical opinion on overall ability of the individual to tolerate fasting.

Individuals must meet all the following criteria (essential):

- HbA_{1c} ≤8% (64 mmol/mol)
- Multiple daily injections with or CSII with analogue insulins
- Understanding and implementation of the principles of dose modifications with intensive insulin therapy
- Ability to self-monitor up to eight times per day or use of flash glucose monitoring during fasting period
- Hypoglycaemia aware at glucose >3 mmol/L
- Received or due to receive pre-Ramadan guidance
- Undertaken previous fasts or trial fasts with no safety concerns during or outside Ramadan period
- Understands requirement to break a fast if glucose <3·9 mmol/L or >16·7 mmol/L
- Ongoing attendance and follow-up with a specialist diabetes team

Additional criteria (desirable with reduced risks):

- Use of CSII
- Time below range <5%
- Use of real-time continuous glucose monitoring with alarms or alerts during fasting
- Use of hybrid closed-loop automated insulin delivery systems

High risk

Advise individual that they should not fast if they meet any of the following criteria:

- HbA_{1c} between 8% and 9% (64–75 mmol/mol)
- Recent diagnosis over 3 months and within the last 12 months
- Chronic kidney disease stage 3
- Stable macrovascular complications

(Continues on next page)

(Panel continued from previous page)

Very high risk

Advise individual that they must not fast if they meet any of the following criteria:

- HbA_{1c} ≥9% (75 mmol/mol)
- History of recurrent hypoglycaemia or hypoglycaemia unawareness
- Unexplained diabetic ketoacidosis within the past 12 months
- Unexplained severe hypoglycaemia within the past 12 months
- Recent diagnosis within the past 3 months
- Pregnancy
- Acutely unwell
- Chronic kidney disease stage 4 and 5
- Advanced macrovascular complications
- Gastroparesis
- Cognitive, visual, or physical impairments including active diabetes related foot disease
- Psychological concerns such as psychosis, severe anxiety, or depression
- Recurrent difficulties in attending planned follow-up visits with diabetes services
- Consecutive fasts over 20 hours
- Requirement for intense physical labour*
- Requirement for prolonged periods of driving*
- On SGLT2 inhibitor adjunctive therapy†

CSII=constant subcutaneous insulin infusion. *Fasts may be considered on days within or outside Ramadan when these requirements are not present. †Fasts may be considered after cessation of adjunctive medication and subsequent appropriate insulin adjustments.

technologies is limited to a relatively small group of people with type 1 diabetes, these technologies have a potential to make fasting safer and easier, with minimal risks and exceptional glycaemic outcomes. These systems also provide unique insights into insulin dose adjustments which might offer learning for general insulin dose adjustment during fasting. Further research is currently awaited on the use of these systems in type 1 diabetes and fasting in Ramadan, as well as other approaches such as subcutaneous glucagon treatment with continuous glucose monitoring.

As we strive evermore to support people with type 1 diabetes to live as normal a life as possible, we can use education and technology to support patients in endurance training, intensive exercise, and high-level sport. It is unfortunate that international guidance has not been updated to support the large population of people with type 1 diabetes who could potentially be able to fast safely in accordance with their faith.

We present our approach to risk stratification for people with type 1 diabetes contemplating fasting during Ramadan (panel). While, we appreciate the approach outlined might not be accessible to all people with type 1 diabetes, we consider that this approach provides a more flexible view that will enable health-care professionals to empower some people with type 1 diabetes to fast and avoid the blanket high or very-high risk classification used repeatedly in existing guidance on Ramadan. Ultimately, the decision to fast is personal. The criteria we present do not imply someone should fast but highlight that they can be fully supported to do so with individualised planning and monitoring. We hope that publication of these criteria produces a stimulus for change in future guidance, with engagement of people with type 1 diabetes and those involved in their specialist care, to develop more detailed management strategies.

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*Sufyan Hussain, Pratik Choudhary, David Hopkins
sufyan.hussain@kcl.ac.uk

Department of Diabetes & Endocrinology, Guy's and St Thomas' Hospital NHS Trust, London, UK (SH); Department of Diabetes, School of Life Course Sciences, King's College London, London SE1 7EH, UK (SH, PC, DH); and Institute of Diabetes, Endocrinology and Obesity, King's Health Partners, London, UK (SH, PC, DH)

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