

Effect of COVID-19 lockdown and Ramadan fasting on glucose control in patients with diabetes: a glucose monitoring study

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Introduction

A strict lockdown was enforced as a response to COVID-19 pandemic in many countries including the UAE. The lockdown period overlapped with Ramadan fasting which is accompanied by its own drastic changes in lifestyle including meal timings.

Aims

We report the impact of COVID-19 lockdown (between 22/3/2020 and 24/6/2020) on glucose control pre- and post-lockdown and during Ramadan, in patients with type 1 diabetes (T1D) and type 2 diabetes (T2D) on insulin therapy.

Methods

Twenty-four patients (19 males and 6 females) who were monitoring their glucose levels using FreeStyle Libre flash glucose monitoring (FGM) and were remotely connected to the diabetes clinic in Imperial College London Diabetes Centre (ICLDC), Abu Dhabi, UAE were included. Using the international consensus on use of continuous glucose monitoring guidelines (1); analyses of the data were performed on glucose management indicator (GMI), time in range (TIR), time in hyperglycaemia time in hypoglycaemia, low blood glucose index (LBGI), and high blood glucose index (HBGI) using STATA 15.0. These variables were calculated for each of the following periods: 30 days before COVID-19 lockdown 4/2/2020-14/3/2020; 30 days into lockdown and Pre-Ramadan 20/3/2020-18/4/2020; and 30 days into lockdown and Ramadan 24/4/2020-23/5/2020, using cgmanalysis package in R-studio software (2).

Results

Mean average glucose remained steady before and during lockdown, no significant differences were observed in TIR, time in hypoglycemia, and LBGI between pre-lockdown and lockdown periods. However, there was a statistically significant difference in estimated A1c, GMI and percentage of time in hyperglycemia (> 10.0 mmol/L) between Ramadan and pre-Ramadan during the lockdown period in $p=0.007$, 0.006 , 0.004 respectively. Percentage of TIR (3.9-10.0 mmol/L) was significantly lower in Ramadan 50.3% as compared to pre-Ramadan 56.1% ($p= 0.026$). MAG (182.0 mmol/L v 166.6 mmol/L, $p=0.007$) and HBGI (10.2 (6.8, 14.8) v 11.9 (7.9, 17.8), $p=0.037$). were significantly higher in Ramadan compared to pre-Ramadan period

There was no statistically significant difference in percentage of time in hypoglycemia (< 3.9 mmol/L) and LBGI between Ramadan and pre-Ramadan periods.

Conclusion

The lockdown period had no significant effects in markers of glycemic control in population studies. However, Ramadan fasting period embedded within this time was associated with several changes including increase in GMI, HBGI and glycemic variability similar to what has been reported in other Ramadan studies.

References:

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2. Vigers T, Chan CL, Snell-Bergeon J, Bjornstad P, Zeitler PS, Forlenza G, et al. Cgmanalysis: An R package for descriptive analysis of continuous glucose monitor data. *PLoS ONE*. [Online] Public Library of Science; 2019;14(10): e0216851.

Table 1: Comparison of FGM metrics* during lockdown: Pre-Ramadan (period 1) 20/3/2020-18/4/2020, Ramadan (period 2) 24/4/2020-23/5/2020.

FGM Metrics	Pre-Ramadan	Ramadan	P-value
Estimated A1c	7.4 (1.7)	8.0 (1.5)	0.007
MAG (mmol/L)	166.6 (47.4)	182.0 (41.9)	0.007
GMI (mmol/L)	7.3 (1.1)	7.7 (1.0)	0.006
% TIR	56.1 (19.0)	50.3 (20.4)	0.026
% Time in hyperglycaemia	36.4 (23.2)	45.0 (22.4)	0.004
% Time in hypoglycaemia, median (IQR)	4.1 (2.2, 11.4)	4.3 (0.5, 6.8)	0.063
HBGI, median (IQR)	10.2 (6.8, 14.8)	11.9 (7.9, 17.8)	0.037
LBGI	5.8 (2.8)	5.5 (3.5)	1

* Data represented as mean (SD) unless stated otherwise