Impact of Optimum Diabetes Care on the Safety of Fasting in Ramadan in Adult Patients with Type 1 Diabetes Mellitus

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Background

Islamic law exempts patients with poor health from fasting during Ramadan. Some of our patients with type 1 diabetes are eager for Ramadan fasting against medical advice and religious exemption. Current recommendations stratify this subgroup of patients as high risk (1) for fasting though the published data is sparsely available in this regard.

Aim

The primary objective is to assess the safety of Ramadan fasting in patients with type 1 diabetes by monitoring the rate and severity of hypoglycemia and hyperglycemia during the fasting period and compare it with the non-fasting state. The secondary endpoint is to follow the effect of fasting on their weight, blood pressure, and HbA1c by observing these parameters pre and post Ramadan.

Method

Patients with a known diagnosis of type 1 diabetes mellitus attending the Adult Endocrinology Clinic at Dubai Hospital were selected at convenience 1-2 months before Ramadan, counselled, and asked to sign an informed consent. Patients with concurrent renal disease or any recent hospitalisation in the last 3 months were excluded. All the patients received a 90 minutes session for Ramadan-focused education. The Freestyle Libre flash sensor insertion was done for continuous glucose monitoring. Their biophysical and biochemical profile was collected 2 to 4 weeks before and after Ramadan. We recorded diabetes related emergency visits or hospitalisation, change in BMI, systolic and diastolic BP, lipids profile, renal function, HbA1c, and frequency of hypoglycemia during Ramadan fasting and non-fasting period.

All the quantitative values are described as mean, and analysis of CGM data is shown in frequencies.

Results and Discussion

A total of 30 patients with type 1 diabetes were recruited, 4 patients dropped out, 1 of which was due to a hospitalization with diabetic ketoacidosis. 4 other patients did not complete the full protocol as they only had one sensor.

Total Patients = 26		Average Duration of Diabetes = 8.6 yrs
= 53.3% = 46.7%		76.6% Emirati 23.3% Arab Nationals
Minimum Age = 15		258 Days Non Fasting
Maximum Age = 44		+ 289 Days in Ramadan
Mean Age = 23.3 yrs $\pm$ 7.85		= 547 Days of Sensor Data

A total of 258 days of non-fasting data was recorded (47%) and 289 days of fasting data in Ramadan (53%). 46.7% of patients had frequent hypoglycemic events of >10 episodes in 2 weeks during the non-fasting period compared to 29.2% who had a similar frequency of hypoglycemia (HE) during Ramadan. More patients had no HE recorded at all on CGM in the Ramadan group (12.5%) compared to the non fasting period (8.3%). The average duration of HE was slightly longer during Ramadan with a mean of 98.50 minutes $\pm$ 62.55 compared to 96.33 minutes $\pm$ 49.32 in the non-fasting period. During Ramadan, most HE occurred between 00:00-06:00 (average 2.08 per/day). 62% of patients improved in Ramadan by having less HE, 9.5% remained the same, and 33.3% had more frequent HE during Ramadan.

Frequency of Hypoglycemia Per Patient

Hypoglycemia Timing: Non Fasting vs Fasting

Comparison of Average Frequency of Hypoglycemic Episodes Per Day In and Out of Ramadan

Change in HbA1c Before and After Ramadan

Conclusion

Optimum care with Ramadan-specific education for type 1 diabetes resulted in favorable glycemic control after Ramadan fasting with less hypoglycemic episodes during Ramadan compared to non-fasting days. Only one other study has shown such a benefit with education and it was mainly in type 2 diabetes(2). Biometric and biochemical data remained the same, with a minor trend of improvement and there was a negligible hospitalization rate. Replication of the study in a larger cohort is essential before clinical application.

References

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