The Impact of Ramadan fasting on Glycemic Control and Kidney Function in Patients with Diabetes and Chronic Kidney Disease stage 3

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Background

Patients with diabetes and renal impairment are considered high risk for fasting due to the relative increased risk of hypoglycemia and the possible worsening of renal functions due to prolonged dehydration hours (1). However, many usually prefer to fast despite advice against it (2,3). There are few studies that assessed the impact of fasting on the kidney function at different stages of renal jeopardy with very variable results (4).

Aim

To understand the risk of hypoglycaemia during Ramadan fasting through CGM along with monitoring of renal and other metabolic changes after Ramadan in patients with diabetes and chronic kidney disease stage 3. We conducted this prospective study in a tertiary care hospital in Dubai during Ramadan 2016 that from June 6th till July 5th.

Method

Adult patient aged between 18 to 70 years with type 2 diabetes (T2DM) and stable CKD stage-3 (estimated glomerular filtration rate 30-60 ml/min), who insisted on fasting, were randomly selected from endocrine and nephrology clinic 1 to 2 months before Ramadan, counseled, and asked to sign an informed consent. Patients with any recent hospitalisation or with known cardiovascular disease were excluded. All the patients received a 60 minutes' session of Ramadan-focused diabetes education. After the education, a Libre free style sensor was inserted for continuous glucose monitoring. Their biophysical and biochemical profile was recorded 2-4 weeks before and after Ramadan. We recorded the frequency and pattern of hypoglycemia during Ramadan fasting and non -fasting period through CGM and the mean change in weight, Body mass index, systolic and diastolic blood pressure, HBA1c, lipids profile, renal functions was also recorded.

Results and Discussion

Total of 25 patients was recruited. 19 patients completed the study, 11 were males, and 8 were females with the mean age of 62 (± 14 years). 84% of patient (n=16) fast more than 20 days. 8 patients reported symptomatic hypoglycemia and only 4 patients broke their fast .

Parameter	Pre-Ramadan (mean)	Post-Ramadan (mean)
Weight (kg)	92	93
BMI (kg/M2)	34.2	34.46
Systolic BP	140	135
Diastolic BP	72	71
HBA1c	7.9%	7.6%
Serum Creatinine (mg/dl)	1.48	1.55
e-GFR	45.52	44.11
Serum Urea	47	54
Uric Acid (mg/dl)	7.3	7
Serum LDL	82.3	70
Serum cholesterol	164	170
Serum Triglyceride	182	209

Most patients had three sensors (FSL-CGM) during the study, covering an average three weeks during Ramadan and three weeks outside Ramadan. The captured data from the sensors showed peak glucose of 333mg/dl during Ramadan and 295mg/dl outside Ramadan while the lowest mean glucose was 70mg/dl (Ranged 40-110) and 94mg/dl (Ranged 43-258) respectively. Total 42 events of hypoglycemic episodes were recorded during the non-Ramadan period with a mean duration of 44 minutes (range 15-120), and that increased to 80 events with an average length of 100 minutes (range 30—500) during Ramadan.

No severe hypoglycemia or A&E visit was recorded although there was repetitive hypoglycemia. During Ramadan fasting 50% of patients have shown glucose reaching < 60mg/dl compared to 45% outside Ramadan. No deleterious effect of fasting was seen in renal functions or HBA1c. No significant change was observed in weight, BMI, systolic and diastolic blood pressure after Ramadan fasting.

Timing of Hypoglycemia

Conclusion

This study is unique to assess the risk of fasting in patients with moderate renal impairment by recording the continuous glucose profile through CGM device. Patients with DM and moderate renal impairment experienced prolonged and more frequent hypoglycemia during Ramadan compared to non- Ramadan period. Incidence of Hypoglycemia increased twice during fasting (80 & 42 events). However, no severe hypoglycemia or hospitalisation or deterioration in renal functions was observed.

To anchor these findings, and to further confirm the risk stratification of diabetes patients during Ramadan; larger multicenter studies are necessary.

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