

## The Impact of Fasting During the Month of Ramadan on Renal Function of Patients with Chronic Renal Failure: A Retrospective Study of 47 Patients

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### Original Research Article

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**Abstract:** Fasting during the month of Ramadan is one of the five pillars of Islam. During this month, adult Muslims are obligated to refrain from eating and drinking from dawn to dusk. Some of our CKF patients fast the whole month against medical advice, for many reasons (religious or social customs). The aim of our study is to evaluate the impact of fasting on the renal function in this population. We conducted retrospective study of 47 patients (16 females, mean age 61.9 years; 15-85 years) with a eGFR less than 90 ml/min/1.73m<sup>2</sup>, most had a eGFR less than 60 ml/min/1.73m<sup>2</sup>. For patients with chronic kidney disease, the existing data in the literature are scarce and give inconclusive results. Patients should be monitored closely by their physicians while fasting. If a sign or symptom of acute tubular necrosis occurred, the fasting should be discontinued.

**Keywords:** Chronic kidney failure, fasting, Ramadan, acute tubular necrosis.

### INTRODUCTION

Muslims form almost 20% of the world population and inhabit all corners of the globe, thus clinicians need to be familiar with this spiritual obligation as well as its impact on health [1, 2]. During their fast, Muslims are expected to avoid drinking and eating from dawn till sunset every day for 1 lunar month. According to Islamic religion, sick people are frankly exempted from fasting if a 'well-informed' physician decides that fasting may adversely affect their health. This bases the patient's decision to fast or not to fast on the physician's recommendation rather than on a religious scholar's advice [2, 3]. However, as suggested by epidemiological studies on diabetics, most patients insist on fasting against medical advice [4].

Ramadan is the ninth month of the lunar year (The Hegira year) which is 11 days shorter than the solar year causing the month to rotate around all four seasons once every 33 years. This has resulted in Ramadan crawling toward the hot weather of the summer over the last few years. This exposes patients to the risks of dehydration predisposing to further kidney injury [2].

The safety of exposing CKF patients to fasting under such climatic conditions is unknown. Few studies have reported on this, and those that have, included very small numbers of patients and most were performed in the early 2000s when Ramadan occurred in late autumn and winter (shorter duration of fasting and lower temperatures). These studies suggested that changes in kidney function during fasting were insignificant or even improved by the end of the month.

In this study, we report on a cohort of 'real-life' CKF patients who chose to fast during the month of Ramadan in summer of the past year (without

excluding patients with comorbidities if they insisted to fast after explaining the possible hazards).

### MATERIALS AND METHODS

#### Inclusion criteria

We include in our study all patients with CRF who presented to a nephrology clinic during the month preceding the month of Ramadan of the Hegira year 1438 corresponding to May/June 2017, and who insisted to fast the whole month regardless of medical advice.

47 patients with a mean age 61.9 year and a range of 15-85 years, including 16 females, were followed for 6 months with serum creatinine assay (measured by a kinetic Jaffe reaction). 3 measurements were collected at 3 months interval for each patient starting 1 month before Ramadan.

The estimated glomerular filtration rate (eGFR) was calculated using the MDRD formula. Mean (SD) eGFR was 38.23 ml/min/1.73m<sup>2</sup>, with a range of 11 to 75. Accordingly, the staging of CKD included 3

patients with stage II, 29 with stage III, 13 with stage IV, and 2 with stage V.

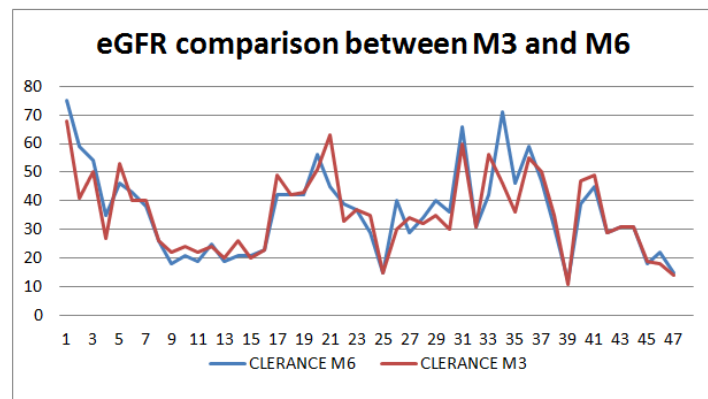
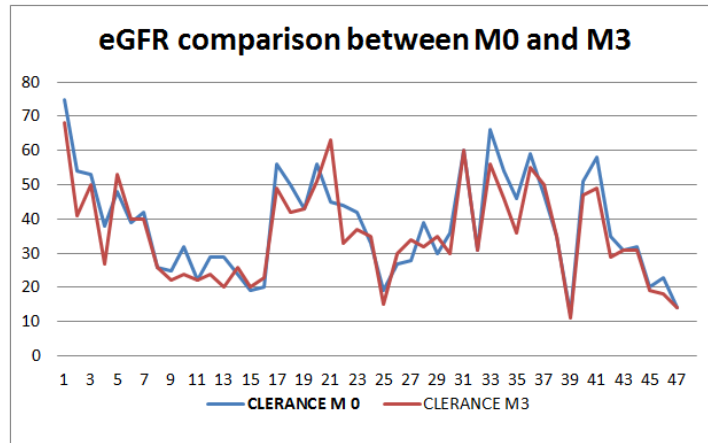
18 patients were diabetic and 5 of them treated with insulin. 30 patients were treated for high blood pressure using ACE inhibitor, angiotensin 2 antagonists, calcium channel blockers or diuretics.

Statistical analysis was performed in collaboration with the epidemiology lab at the Fez

Medical School using the SPSS software version 20. A probability of less than 0.05 was accepted as significant.

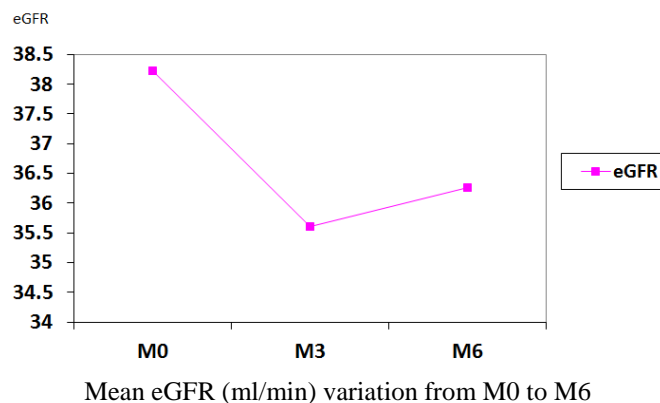
**RESULTS**

All the 47 patients included in the study managed to fast the whole month of Ramadan. The fasting time was around 14 hours and the atmosphere temperature was between 19-45°C with a mean of 36°C. None of the patients displayed any new clinical symptom or sign. Renal function measurements, pre, 3 months and 6 months post Ramadan are illustrated in the following graphs:



Statistical analysis showed a significant difference between M0 and M3 (p=0.003) and no

statistically significant difference between M3 and M6 (p=0.53) or between M0 and M6 (p=0.051).



## DISCUSSION

Chronic kidney disease is associated with gradual loss of kidney function over time. Many physicians are concerned about the worsening effects of fluid deprivation and electrolyte disturbance during Ramadan on the remaining renal function in patients with chronic kidney disease. A review of the literature revealed a paucity of data on the impact of Ramadan fasting in chronic kidney disease. In a study, El-Wakil *et al.* [5] investigated the changes in the renal function of 15 chronic kidney disease patients (baseline GFR <60 ml/min) who fasted during the month of Ramadan (November 2001), and compared their findings with a group of 6 matched controls who did not fast. After Ramadan month, the change in GFR from the baseline value was not significantly different between the fasting and non-fasting groups. However, the change in urinary NAG (N-acetyl-d-glucosaminidase) from the baseline was significantly higher in the fasting group in comparison with the non-fasting controls. These findings revealed that while GFR may not significantly change in patients with chronic kidney disease, Ramadan fasting may damage renal tubular cells in these patients. Correspondingly, the authors argued that the fluid deprivation in Ramadan may induce acute tubular cell injury in chronic kidney disease patients, while the value of GFR may remain unchanged due to renal compensatory mechanisms at the same time.

In our study there was a statistically significant change in eGFR before Ramadan and 3 months after it. This decrease in eGFR may be due to many reasons: the longer fasting duration during summer, the hot weather and dehydration, the use of antihypertensive medication (ACE inhibitors, angiotensin 2 antagonist and diuretics) or the poor control of diabetes during this month.

## CONCLUSION

For patients with chronic kidney disease, the existing data in the literature are scarce and give inconclusive results. Overall, it is argued that water restriction during Ramadan can induce acute tubular cell injury in these patients. Patients should be monitored closely by their physicians while fasting. If a sign or symptom of acute tubular necrosis occurs, fasting should be discontinued.

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