

# The cardiac patient and Ramadan fasting

## Le patient cardiaque et Ramadan

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### Résumé

Durant le mois de Ramadan, des millions de musulmans du monde entier observent un jeûne absolu du levé jusqu'au coucher de soleil sans boire ni manger. Pendant ce mois saint, l'impact du jeûne chez les patients atteints d'une maladie cardio-vasculaire stable semble minime et n'entraîne pas une augmentation des phénomènes aigus. La plupart des patients cardiaques stables peuvent jeûner en sécurité. Les règles hygiéno-diététiques ainsi que la plupart des doses médicamenteuses sont facilement gérables au cours de ce mois. Le jeûne du Ramadan est un moyen non pharmacologique pour améliorer l'hygiène de vie et mieux gérer les facteurs de risque cardiovasculaires. Mais les patients présentant un syndrome coronarien aigu, une hypertension mal contrôlée, une insuffisance cardiaque décompensée, ou ayant eu une intervention cardiaque récente ou une chirurgie cardiaque doivent éviter le jeûne.

### Mots-clés

Insuffisance cardiaque, insuffisance coronaire, hypertension artérielle, jeûne, Ramadan

### Summary

During the month of Ramadan, millions of Muslims worldwide observe an absolute fast from dawn to sunset without any drink or food. The impact of fasting during Ramadan on patients with stable cardiac disease seems minimal and does not lead to any increase in acute events. Then, most patients with the stable cardiac diseases can fast safely. Most of the drug doses and their regimen are easily manageable during this month. Ramadan fasting is a healthy non-pharmacological means for improving cardiovascular risk factors. But patients with acute coronary syndrome, uncontrolled hypertension, decompensated heart failure, recent cardiac intervention or cardiac surgery or any debilitating diseases should avoid fasting.

### Keywords

Cardiac disease; coronary artery disease; heart failure; fasting; Ramadan; hypertension

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## INTRODUCTION

Fasting over a prescribed period of time is a common religious tradition practiced by several faiths worldwide. For Muslims, fasting during the day in Ramadan (the 9th month of the Islamic lunar calendar) is one of the five pillars of the Islam [1]. This spiritual practice includes refraining from food, drink, sexual activities, and any form of ingestion into the body from dawn till sunset [2]. During Ramadan, Muslims usually eat 2 meals a day: one when they end their daily fast at sunset, known as iftar, and the other is a light meal before the break of the dawn, known as suhoor [3]. In addition to the changes of schedules in their dietary intake habits, sleep patterns of Muslims also change during Ramadan including prolongation of the awakening hours during night that might lead to sleep deprivation during this month [4-7]. During Ramadan, there is also a tendency to consume more fat-rich, carbohydrate-rich, sugar-rich sweet food and liquid. Furthermore, some patients arrange to change their medication schedule to suit the fasting practice. Hence, fasting during Ramadan is essentially a drastic change in the lifestyle for a full lunar month (29 or 30 days). This might contribute to biochemical and physiological variations in the people who fast during Ramadan; especially in those for whom there is a marked change in dietary and sleep habits from their normal daily lifestyle at other times of the year [8].

## HEALTH BENEFITS OF FASTING RAMADAN

Fasting Ramadan improves spiritual and physical health [9-11]. The main purpose of fasting the holy month is to attain righteousness [12], to have self-reflection and appreciation of Allah's blessings, to remember and help the people in need, and to learn self-control [4,9]. Many Muslims also consider this holy month a great opportunity to make healthy changes to their lifestyles because it is, if practiced correctly, an annual training in appetite control and having a balanced diet, which can help in losing weight [11,13,14]. It can be also an ideal time for many individuals to quit some bad habits as smoking, an action that breaks Ramadan fasting [9].

## STABLE CARDIAC DISEASE AND RAMADAN FASTING

Although more than a billion Muslims worldwide observe fasting the holy month of Ramadan each year, there is still relatively a small number of studies on the effect of fasting Ramadan on cardiovascular diseases (CVD). Chamsi-Pasha and Ahmed [15] in a study about 86 outpatients presenting stable CVD reported that 74 patients (86%) succeeded in fasting the whole month of Ramadan, and only 3 patients (3.5%) could not fast. No

significant changes observed in the New York Heart Association (NYHA) class in the study population during the fasting of Ramadan. They concluded that the majority of patients with stable cardiac disease in this cohort fasted without significant detrimental effects.

Al Suwaidi et al. [16] studied 465 stable cardiac outpatients including heart failure (HF), atrial fibrillation (AF), and valvular heart disease who observed Ramadan fast. They found that 91.2% fasted without detrimental effects, and only 6.7% felt worse during Ramadan fast. Of the studied subjects, 82.8% were compliant with cardiac medications and 68.8% were compliant with dietary instructions. Only 19 patients needed hospitalization during Ramadan for cardiac reasons. They concluded that the effects of fasting on patients with the stable cardiac disease are minimal, and most of these patients can fast.

Khafaji et al. [17] reported also no adverse effects on the clinical status of stable cardiac patients fasting during Ramadan. They reported that the heart condition had not deteriorated in any of the patients. They found that 71.4% of the patients had no change in their symptoms during fasting, whereas 28.6% better.

Salim et al. [18], concluded that the effects of fasting Ramadan on patients with stable cardiac disease were minimal. So that, stable cardiac patients are able to fast, provided they complied with the recommended medication regimens and dietary advice [18].

More recently, Mousavi et al. [19] concluded that patients with stable coronary artery disease and normal left ventricular function could fast safely during Ramadan.

The effect of Ramadan fasting on heart failure (HF) symptoms in patients with HF and reduced ejection fraction was also investigated by Abazid et al [20].

In their study, the NYHA functional classification improved or remained unchanged in 92% of patients who undertook a fast during Ramadan [20]. Furthermore, they observed that patients who were experiencing deteriorating HF symptoms showed statistically significant non-adherence to medications, and/or a lower likelihood of adhering to a strictly controlled diet prescribed for HF patients [20].

In conclusion, an appropriate patient education explaining the importance of medication compliance to drugs administered for the management of HF and the need for a low-sodium and fluid-restricted diet needs to be emphasized prior to undertaking Ramadan fasting during the Holy month.

## DO ACUTE CARDIAC EVENTS INCREASE DURING RAMADAN?

Several studies investigated whether Ramadan fasting has a negative effect on the incidence of admission with

acute coronary syndromes (ACS) [18,21,22]. Ramadan fasting does not seem to increase the burden of acute cardiac illness. The incidence of acute coronary artery syndrome, congestive heart failure, AF, and stroke was similar during the month of Ramadan when compared to the other non-fasting months [18].

Al Suwaidi et al.[22] used a database of all patients admitted to a Cardiology Department in Qatar where over 95% of Qatari adults regularly practice fasting. All patients presenting with ACS were identified during a period of 10 years (1991-2001). There was no significant difference in the incidence of ACS before, during or after Ramadan.

The same investigators also studied whether Ramadan fasting has any effect on the number of hospitalization for cardiac heart failure (CHF) [10]. Hospitalizations with CHF were not significantly different in the months before, during, or after Ramadan. There were no significant changes in the NYHA class ( $P = 0.12$ ) nor in any of the hematological or biochemical parameters during Ramadan fasting [23].

Nevertheless, patients with decompensated heart failure or those requiring large doses of diuretics are strongly advised not to fast, particularly when Ramadan falls during the summer.

These studies conclusions may not be extrapolated to patients with worse functional classes or those who are clinically unstable.

## HYPERTENSION

Many factors may theoretically influence the blood pressure (BP) during Ramadan such as feeding patterns, sleep changes, and changes in the timing of intake of medication. Several studies investigated the consequences of Ramadan fasting on variations of BP in hypertensive patients over the course of 24 h according to an ambulatory BP measurement (ABPM) before the fast and during Ramadan. No statistically significant differences were noted between these two periods regarding systolic BP (SBP), diastolic BP, throughout the 24 h period [24,25]. This was also confirmed in a study of subjects with Grade 2-3 hypertension using combination therapy [26].

Some recommendations were made on the management of hypertension during Ramadan. In the conclusion: (1) Physician's advice and management should be individualized. (2) Patients should seek medical advice before Ramadan so that their clinical status is assessed and medications can be adjusted. (3) Education should emphasize the adherence to both nonpharmacological and pharmacological measures. (4) Diuretics are better avoided, particularly in hot weather or to be taken in the early evening. (5) A once-daily medication with long-acting preparations is recommended. (6) Patients

should be advised to take a low-salt, low-fat diet. (7) Patients with uncontrolled hypertension, are advised not to fast until their BP is controlled and (8) Patients with hypertensive emergencies should be treated appropriately regardless of fasting [27,28].

## ORAL VITAMIN K ANTAGONIST (VKA) AND RAMADAN FASTING

Oral vitamin K antagonist (VKA) has been the mainstay of anticoagulation therapy. It has established efficacy and safety in primary and secondary prevention of thromboembolic events. However, due to its small therapeutic window and its potential interactions with food and medications, regular monitoring and dose adjustments are required.

One study reported that fasting significantly increases the mean INR of medically stable patients taking warfarin and the likelihood of having an INR above therapeutic targets [29].

The significant increase in mean INR during Ramadan when compared with non-Ramadan periods is attributable to the effect of fasting and the consequential changes to dietary patterns and timing of food intake. Ramadan is associated with sleep deprivation as a result of long periods of praying and dehydration due to daytime withdrawal of fluids [29]. In terms of metabolic changes, it has been shown that fasting during Ramadan resulted in a temporary reduction in body weight, blood glucose and high-density lipoprotein and an increase in low-density lipoprotein levels [13]. These physical and mental stress factors during the Ramadan period are possible reasons for the increase in INR, which has been demonstrated in animal studies [30, 31]. As a result of the fewer number of meals taken each day and changes to dietary content, the amount of dietary vitamin K obtained from food may also be reduced. Multiple factors are therefore present during Ramadan that may directly or indirectly reduce the synthesis of clotting factors, resulting in the increase in INR.

In conclusion, for patients maintained at the higher end of INR target ranges or at increased risk of bleeding, clinicians must be aware of this effect and consider more intensive and close INR monitoring and VKA dose adjustment.

## GENERAL ADVISES FOR ALL FASTING CARDIAC PATIENTS (Table 1)

A preRamadan medical assessment and education to all cardiac patients, who are willing to fast, would be helpful to achieve safe fasting and to adjust their medications if needed [32]. Avoiding dehydration during fasting should be emphasized, especially when Ramadan

**Table 1 :** General advises and precautions in cardiac fasting patients

General advises and precautions	
<b>Stable cardiac diseases</b>	- Lower food intake; avoid fatty, salty and high glycemic index foods; abstaining from smoking. - Avoid dehydration: drinking ample amount of fluids between iftar and suhoor.
<b>Hypertension</b>	- Consult the cardiologist, particularly to determine the proper timing and dosage of medications, in order to avoid complications - Adherence to different medications. - Prefer long-lasting medications in order to compensate for the daily 15-hour fasting time.
<b>Patients under VKA</b>	- Adherence to both non-pharmacological and pharmacological measures. - Avoid fatty and salty foods. - A once-daily medication with long-acting preparations is recommended. - Diuretics are better avoided. - Patients with uncontrolled hypertension, are advised not to fast until their BP is controlled. - Adherence to VKA treatment. - Consider more intensive and close INR monitoring and VKA dose adjustment.
<b>Unstable patients</b>	- Patients with decompensated heart failure or those requiring large doses of diuretics are strongly advised not to fast. - Patients with acute coronary syndrome, recent myocardial revascularisation are strongly advised not to fast. - Patients with uncontrolled hypertension or hypertensive emergencies should be treated appropriately regardless of fasting.

occurs in hot seasons, by drinking ample amount of fluids between iftar and suhoor. It is also highly recommended to maintain a well-balanced, healthy diet that is rich in fibers and low in salt, fat and glycemic index. Drugs given three times daily can be usually changed to single sustained release formulations [4, 32]. Dehydration and electrolyte imbalance that is often encountered with diuretics should be avoided particularly if it can lead to serious cardiac dysrhythmias. Diuretics are not the first choice as an antihypertensive for a fasting patient. Diuretics dosing, whether for the purpose of HF or as antihypertensive, may need to be adjusted down during fasting, especially loop diuretics with prolonged fasting during hot seasons. Most cardiac medications with once-daily dosing are highly recommended.

## CONCLUSION

Patients with stable cardiac disease can observe the fasting of Ramadan without anticipating any major adverse cardiac events while those with unstable disease or recent myocardial revascularization should largely refrain. Most cardiac medications can be prescribed once or twice daily. A fairly small group of patients with cardiac conditions should be advised to refrain from fasting during Ramadan. These include patients with acute cardiac illnesses, such as ACS, uncontrolled hypertension, congestive HF and recent cardiac intervention/surgery. Ramadan is an ideal platform to target year long life-style modification and to ensure health care benefits.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

1. The Qur'an. Ch. 2, Ver. 183. Translated by Abdullah Yusuf Ali. New York: TahrikeTarsile Qur'an Inc.; 2003.
2. Sakr AH. Fasting in Islam. *J Am Diet Assoc* 1975;67:17-21.
3. Khalife T, Pettit JM, Weiss BD. Caring for Muslim patients who fast during Ramadan. *Am Fam Physician* 2015;91:641-2.
4. Chamsi-Pasha M, Chamsi-Pasha H. The cardiac patient in Ramadan. *Avicenna J Med* 2016;6:33-8.
5. Bahammam AS, Almushailhi K, Pandi-Perumal SR, Sharif MM. Intermittent fasting during Ramadan: Does it affect sleep? *J Sleep Res* 2014;23:35-43.
6. TurinTC, AhmedS, ShommuNS, AfzalAR, Al MamunM, QasqasM, et al. Ramadan fasting is not usually associated with the risk of cardiovascular events: A systematic review and meta-analysis. *J Family Community Med* 2016;23:73-81.
7. Qasrawi SO, Pandi-Perumal SR, BaHammam AS. The effect of intermittent fasting during Ramadan on sleep, sleepiness, cognitive function, and circadian rhythm. *Sleep Breath* 2017; Sep;21(3):577-586
8. Yegi INM, Yegi INA, Agibase A, Bakan E. Starvation and diet. *J Ankara Univ Med Sch* 1981;13:57-62.
9. Mughal F. Ramadan: What it means for general practice. *Br J Gen Pract* 2014;64:356.

10. Bragazzi NL, Briki W, Khabbache H, Rammouz I, Mnadla S, Demaj T, et al. Ramadan fasting and infectious diseases: A systematic review. *J Infect Dev Ctries* 2015;9:1186-94.
11. Rouhani MH, Azadbakht L. Is Ramadan fasting related to health outcomes? A review on the related evidence. *J Res Med Sci* 2014;19:987-92.
12. Abdullah YA, translator. *The Qur'an*. Ch. 2, Ver. 183. New York: TahrikeTarsile Qur'an Inc.; 2003.
13. Kul S, Savas E, Öztürk ZA, Karadag G. Does Ramadan fasting alter body weight and blood lipids and fasting blood glucose in a healthy population? A meta-analysis. *J Relig Health* 2014;53:929-42.
14. Meo SA, Hassan A. Physiological changes during fasting in Ramadan. *J Pak Med Assoc* 2015;65 5 Suppl 1:S6-14.
15. Chamsi-Pasha H, Ahmed WH. The effect of fasting in Ramadan on patients with heart disease. *Saudi Med J* 2004;25:47-51.
16. Al Suwaidi J, Zubaid M, Al-Mahmeed WA, Al-Rashdan I, Amin H, Bener A, et al. Impact of fasting in Ramadan in patients with cardiac disease. *Saudi Med J* 2005;26:1579-83.
17. Khafaji HA, Bener A, Osman M, Al Merri A, Al Suwaidi J. The impact of diurnal fasting during Ramadan on the lipid profile, hs-CRP, and serum leptin in stable cardiac patients. *Vasc Health Risk Manag* 2012;8:7-14.
18. Salim I, Al Suwaidi J, Ghadban W, Alkilani H, Salam AM. Impact of religious Ramadan fasting on cardiovascular disease: A systematic review of the literature. *Curr Med Res Opin* 2013;29:343-54.
19. Mousavi M, Mirkarimi S, Rahmani G, Hosseinzadeh E, Salahi N. Ramadan fast in patients with coronary artery disease. *Iran Red Crescent Med J* 2014;16:e7887.
20. Abazid R, Khalaf H, Sakr H, Altorbak N, Alenzi H, Awad Z, et al. Effects of Ramadan fasting on the symptoms of chronic heart failure. *Saudi Med J*. 2018 Apr; 39(4): 395-400.
21. Temizhan A, Dönderici O, Ouz D, Demirbas B. Is there any effect of Ramadan fasting on acute coronary heart disease events? *Int J Cardiol* 1999;70:149-53.
22. Al Suwaidi J, Bener A, Suliman A, Hajar R, Salam AM, Numan MT, et al. A population based study of Ramadan fasting and acute coronary syndromes. *Heart* 2004;90:695-6.
23. Al Suwaidi J, Bener A, Hajar HA, Numan MT. Does hospitalization for congestive heart failure occur more frequently in Ramadan: A population-based study (1991-2001). *Int J Cardiol* 2004;96:217-21.
24. Habbal R, Azzouzi L, Adnan K, Tahiri A, Chraibi N. Variations of blood pressure during the month of Ramadan. *Arch Mal Coeur Vaiss* 1998;91:995-8.
25. Perk G, Ghanem J, Aamar S, Ben-Ishay D, Bursztyn M. The effect of the fast of Ramadan on ambulatory blood pressure in treated hypertensives. *J Hum Hypertens* 2001;15:723-5.
26. Ural E, Kozdag G, Kilic T, Ural D, Sahin T, Celebi O, et al. The effect of Ramadan fasting on ambulatory blood pressure in hypertensive patients using combination drug therapy. *J Hum Hypertens* 2008;22:208-10.
27. Saudi Hypertension Management Group. Saudi hypertension management guidelines, 2007: Executive summary/Saudi Arabia. Riyadh: Saudi Hypertension Management Group; 2007. p. 26-7.
28. Hypertension during Ramadan and Hajj. In: Guidelines for Management of Hypertension in Primary care Settings and Outpatient Clinics in the Kingdom of Bahrain. Bahrain: Ministry of Health, Health Promotion Council; 2008. p. 35-6.
29. Lai YF, Cheen MH, Lim SH, Yeo FH, Nah SC, Kong MC et al. The effects of fasting in Muslim patients taking warfarin. *J ThrombHaemost*. 2014;12(3):349-54
30. Hawk TL, Havrda DE. Effect of stress on international normalized ratio during warfarin therapy. *Ann Pharmacother* 2002; 36:617-20.
31. Lalibert\_e R, Chakrabarti S, Brodeur J. The influence of fasting and stress on the response of rats to warfarin. *J PharmacolExpTher* 1976; 196: 194-203.
32. Abolaban H, Al-Moujahed A. Muslim patients in Ramadan: A review for primary care physicians. *Avicenna J Med*. 2017 Jul-Sep;7(3):81-7.