



Ramadan Fasting and Intracerebral Hematoma: Incidence and Outcomes

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Authors' contributions

This work was carried out in collaboration among all authors. Author KE contributed in CT interpretation, scoring assessment and statistical analysis of results. Author HE contributed in diagnosing cases and interpretation of data, designing the work and revised it. Authors WM and NE contributed in collecting data and writing the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background and Objectives: Fasting over a prescribed period of time is a common religious tradition practiced by several prominent faiths in the world. It is also currently regaining interest as a medical practice, both as preventive and as therapy and/or simple choice of lifestyle. For the first time, we evaluate how Ramadan (an Islamic month) fasting can influence the incidence of intracerebral hematoma and its outcome.

Methods: 69 patients with primary intracerebral hemorrhage enrolled in this study, 32 patients were enrolled during Ramadan (18 patients were fasting, 14 patients were not fasting) and 37 patients were enrolled one month later (Shawal) which is not a mandatory fasting month among Muslims. All patients were admitted to Neurology department, Mansoura university hospital. The clinical characteristics and mortality during hospital admission were noticed. They were all assessed using routine lab, CT brain, "National Institutes of Health Stroke Scale" (NIHSS) and "Modified Rankin Scale" (mRS).

Results: About 22 percentage of fasting patients with intracerebral hematoma died, 28.6% non-fasting patients died and 20.5% of patients died in the month after Ramadan without significant difference among the three groups ($p > 0.05$). Also regarding NIHSS, hematoma expansion and mRS, there was no statistically significant difference among the three groups ($p > 0.05$).

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Conclusion: Ramadan fasting showed neither protective effect nor worsening as regard incidence or bad impact on patients with spontaneous intracerebral hemorrhage.

Keywords: Fasting; ICH; NIHSS; mRS.

1. INTRODUCTION

Ramadan Fasting is obligatory worship to the Muslims [1]. This spiritual practice includes refraining from food, drink, sexual activities, and any form of ingestion into the body from dawn until dusk [2]. A common tradition for people fasting during Ramadan is to eat a pre-fast meal called "Suhoor" before initiating the fast, which then ends with a post-sunset meal called "Iftar" [3].

All in Ramadan there are changes in schedule of diet intake also sleep changes that may lead to physiological and biochemical changes [4].

Stroke is considered as the second of the most common causes of deaths. There are a lot of risk factors associated with stroke as obesity, sedentary life, hypertension and diabetes. Intermittent fasting is adopted by some people. It may alleviate stroke severity via different mechanisms such as reduction of glutamate excitatory toxicity, oxidative stress and cell death pathways in animal stroke models [5].

As the most common etiology for spontaneous intracerebral hemorrhage is hypertension, so it was important to review the literature for the possible connection between blood pressure and fasting. Systematic review suggested that Ramadan fasting can improve systolic and diastolic blood pressure measurements. Patients with hypertension are advised to consult their physicians about the treatment regimen during fasting and the safety of fasting during Ramadan [6].

2. PATIENTS AND METHODS

Adult patients with primary intracerebral hemorrhage were admitted to Mansoura neurology stroke unit during Ramadan and a month after over the years 2018 and 2019. These patients were followed up to study the correlation between hemorrhagic stroke and fasting.

The studied patients were classified into 2 groups fasting (during Ramadan month for 2 years) and non -fasting (a month after Ramadan

each year). Then the patient's data were collected that include; risk factors, neurological examinations, NIHSS score and Baseline laboratory investigations on admission; the site of hematoma was determined by computerized tomography (CT) brain scan and ABC/2 technique was used to measure expansion 24 hours following initial CT Brain.

Onset of the stroke was determined by the last time the patient seen well according to his relative, wife, sons or by standers or the patient himself if he is able to give significant information about his illness.

Data were analyzed with Statistical Package for the Social Sciences (SPSS) version 21. One-sample Kolmogorov-Smirnov test was used first to test the normality of data. Number and percent were used to describe qualitative data. Chi-square test was used to test association between categorical variables. Continuous variables were presented as mean \pm SD (standard deviation) for parametric data and Median for non-parametric data. The two groups were compared with Student t test (parametric data) and Mann-Whitney test (non- parametric data).

3. RESULTS

142 patients were enrolled in our study over a period of 2 months, Ramadan one month after through 2 consecutive years 2018 and 2019. During Ramadan, 63 patients with spontaneous intra cerebral hematoma were admitted (2.1 patient/day) and 78 patients were admitted a month after Ramadan in the 2 years at an average rate of (2.6 patients/day).

The patient's demographic data were explained in (Table 1). As regard demographic data, there was no significantly different between the 2 groups ($p >0.05$). Mean age at the onset of stroke was 51.24(\pm 18.2) y for fasting group and 50.17(\pm 18.9) y for the non-fasting group. Also, the difference in the mean baseline NIHSS score between the two groups was not significant.

Medical illness like HTN, DM, ischemic heart disease, previous strokes and frequency of other strokes were not significantly showed statistical

difference between both groups ($p > 0.05$) (Table 2). The difference between hematoma expansion on CT, NIHSS at discharge and mRS between both groups was not significant.

Laboratory results showed no statistically significant difference among both groups including the complete blood count, baseline level of blood glucose, serum creatinine, serum albumin, ALT, prothrombin time, activated partial thromboplastin time (aPTT) and international normalized ratio (INR) between the two groups ($p > 0.05$) (Table 3).

The duration of fasting was calculated by deducing the time of the last meal from that of the stroke onset in all fasting patients, the least

was 12 hours for any fasting patient, sometimes patients did not eat the before dawn meal and made the fasting duration more longer; there was no significant correlation between the period of fasting and hemorrhagic stroke severity or disability on follow up via mRS score ($p > 0.05$) (Table 4).

4. DISCUSSION

Fasting is considered as a common shared religious habit among Muslims. It was very important to analyze the effect of fasting among patients with intracerebral hematoma to identify the potential protective or worsening effect on the clinical outcome.

Table 1. Demographic data of the studied groups

	Ramadan	Shawal	p-value
Number	64	78	0.164
Gender			
Male	34	48	0.242
Female	30	30	0.286
Age	52.24(±18.2)	50.17(±18.9)	0.526

Table 2. Medical comorbidities among the studied groups

	Ramadan	Shawal	p-value
HTN	64	58	0.673
AF	15	19	0.745
DM	43	46	0.187
Hepatic	19	18	0.392
CRF	4	7	0.654
Thrombocytopenia	12	14	0.761

Table 3. Laboratory results

	Unit	DR, mean ± SD	AR, mean±SD	P-value
RBCs	mil/cmm	4.5 ± 0.81	4.6 ± 0.8	0.98
Platelets	1000/cmm	210±78.6	215±88	0.37
creatinine	mg/dl	1.1 ± 0.9	1 ± 0.7	0.6
ALT	U/L	28.9 ± 21.5	29 ± 23.1	0.42
PT	s	14.5 ± 1.2	14.6 ± 1.1	0.86
aPTT		33.5 ± 5.2	34 ± 4.2	0.43
INR		1.3 ± 0.3	1.3 ± 0.1	0.87

Table 4. Clinical criteria of the studied groups

	Ramadan	Shawal	p-value
On anticoagulant	2	4	0.447
NIHSS on admission	13.5(5-24)	12.9(4-24)	0.268
NIHSS on Discharge	11.6(3-21)	11.4(3-20)	0.282
mRS	2(0-5)	3(0-5)	0.428
CT brain hematoma Expansion	18	22	0.704
Number of patients died	31	33	0.418

(mRS: modified Rankin Scale. NIHSS: national institute of health stroke scale)

The current prospective study revealed that the frequency of hemorrhagic stroke in patients admitted during fasting days in the month of Ramadan and those in non-fasting months following it had no significant difference, this was in concordance with previous retrospective studies by Ince and Kutluhan and their colleagues as they studied the effect of fasting among patients with stroke and they noticed that there were no significant differences between Ramadan and other times of the year [7,8]. Also, Akhan noticed Ramadan fasting neither worsen the outcome after stroke nor increase the rate of need to admission in hospital after stroke [9].

There were no statistically significant differences in our recent laboratory findings between fasting and non-fasting groups. They confirmed other reported studies that dietary change did not affect the composition of plasma biochemical parameters and blood glucose was not influenced by fasting [1]. Ramadan fasting has not adversely affected coagulation parameters [10].

Although overall stroke occurrence among patients did not change during Ramadan, the occurrence of ICH strokes in hypertensive patients was lower though diabetic patients exhibited a higher frequency of CI stroke during Ramadan [11]. Hunger is known to positively affect the health of the heart. When hungry, sympathetic tone is suppressed leading to a fall in blood pressure, heart rate, and cardiac output [12]. Given the prolonged period of starvation during Ramadan, these protective effect on hypertensive patients could have led to reduced frequency of ICH [11].

After repeated search, we found that there were no studies demonstrated the effect of the duration of fasting on either stroke frequency or type, the present study showed that the duration of fasting neither affects frequency or type of stroke. More studies should be done to confirm these results.

5. CONCLUSION

Ramadan fasting showed neither protective effect nor worsening as regard incidence or bad impact on patients with spontaneous intracerebral hemorrhage.

DISCLAIMER

The materials used for this research are commonly and predominantly use materials in

our area of research and country. There is absolutely no conflict of interest between the authors and producers of the materials because we do not intend to use these materials as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing companies rather it was funded by personal efforts of the authors.

CONSENT AND ETHICAL APPROVAL

This clinical study was conducted on patients with primary ICH admitted at neurology department, Mansoura University Hospital, and written consents from all patients included in the study or their relatives were taken after obtaining approval from Faculty of Medicine, Mansoura university.

AVAILABILITY OF DATA AND MATERIAL

The datasets generated and/or analyzed during the current study are not publicly available due to current Mansoura University regulations & Egyptian legislation but are available from the corresponding author on reasonable request and after institutional approval.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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