

Original Article

Assessment of the relationship between kidney stone pain and fasting in Ramadan

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Abstract

Introduction: Acute pain caused by kidney stones is considered one of the most prevalent reasons for referring to treatment centers or hospitals. One of the essential issues in this field, which still has many questions, is the probability of an increase in kidney stone formation during fasting. This study assessed the relationship between kidney stone pain and fasting during Ramadan.

Methods: This study conducted a descriptive cross-sectional check on the patients who referred to 3 central urgencies named Imam Khomeini-Shahid Labafi Nejad and Baghiatallah due to Colic pain generated from kidney stones during three periods of time, including before, in, and after Ramadan.

Results: The study indicates ureteral stones are more prevalent than kidney stones in patients with Kidney Colic Pain during three periods. Also, it was released that the most amount of Colic pain was experienced by males under 40 years during three periods of time, so there is a significant relevance between the male gender and Renal Colic ($P < 0.05$). A noticeable change in diet and more usage of carbohydrate compounds in addition to high-protein diets was reported here, so there is a significant difference between more carbohydrates and Renal Colic before and after Ramadan ($P = 0.022$).

Conclusion: It is specified that factors such as male gender, age under 40, being overweight, high-calorie diet, and low physical activity are the risk factors associated with Renal Colic. Also, this study found that the reception of renal colic patients in Ramadan had no significant difference in another two months.

Keywords: Diet, Physical activity, Renal Colic, Ramadan.

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Introduction

Acute flank pain (renal colic) is one of the reasons for going to the emergency room. It is the most common cause of kidney stones or nephrolithiasis, and 3-5% of people suffer from it. For example, it has been determined that in Europe, 72% of the reasons for calling ambulances are pain, of which about 9 cases are caused by renal colic. Usually, patients are due to severe pain or the twisting nature of colic that spreads to the groin. It can be accompanied by hematuria or heartburn¹⁻³. This pain should be differentiated from clinically similar cases, such as acute appendicitis, cysts, ovarian rotation, pelvic inflammatory disease, and intestinal inflammatory

disease. Because renal colic is one of the most common kidney emergencies, it is due to excruciating pain, for it is painful for the patient. Because of this, misdiagnosis increases in this situation. Women who have experienced renal colic and labor pain find these two pains to be similar in intensity. The pain felt during renal colic is caused by three mechanisms of urinary obstruction: local and direct stimulation of the collecting system or ureteral mucosa by the stone and stretching of the kidney capsule by the interstitium³⁻⁶.

The possibility of getting renal colic during life is 8-15%. On the other hand, renal colic is the third most

common urinary disease after infections and prostate diseases. The most common clinical manifestation of renal colic is the pain above attack that affects 1.2 million people annually and accounts for one percent of hospitalizations. This attack, also known as renal colic in Farsi, is a symptom that occurs due to increased pressure inside the upper urinary system or the expansion of the kidney capsule and pelvis above the site of obstruction, often caused by stones ⁷⁻¹⁰. The weather is hotter, which can be caused by the combined effect of water loss and exposure to sunlight. It has also been proven that water loss and low urine volume are major risk factors for the development of renal colic ¹⁰⁻¹⁴. Almost all epidemiological studies show that patients with a history of renal colic should increase their water consumption, and the minimum 24-hour urine volume to prevent the formation of renal colic is 2 liters ¹⁴⁻¹⁶.

Ramadan is the ninth month and one of the holiest months of the Islamic Hijri calendar. Healthy adult Muslims refrain from eating and drinking during this holy month from dawn to sunset while continuing their daily social and occupational activities. The most prominent aspect of Ramadan is the beginning of the revelation of the Holy Quran and fasting during the day, which Muslim adults practice every year. Every day, Muslims worldwide wake up before sunrise to eat their Suhoor meal, and immediately after sunset, they break their fast. Compared to the solar calendar, the lunar Hijri calendar moves forward about 11 days every year, so the holy month of Ramadan can occur in any of the four seasons of the year, and the duration of food and drink consumed depends on the exact time of sunrise and sunset in each year. The country or region can vary between 12 and 18 hours ¹⁷⁻¹⁸.

Ramadan is the ninth month and one of the holiest months of the Islamic Hijri calendar. Every healthy Muslim person after puberty is obliged to fast during this month, while weak people and women during pregnancy and menstruation have been exempted from fasting. Since the fasting person does not consume any food or drink for about 12 to 18 hours from the morning call to the evening call, especially in the summer season, he is exposed to dehydration, and waste materials with a high concentration will be excreted in his urine. Therefore, special attention should be paid to patients with kidney and urinary tract stones. In 2012, in the study of Miladypour et al. regarding the effect of fasting on the changes in urinary excretion of calcium, oxalate, citrate, uric acid, magnesium, phosphorus, potassium, sodium, and creatinine in 57 men during the holy month of Ramadan. There was no evidence of increasing the risk of kidney stone formation during fasting ¹⁹⁻²².

In the study of Hadramy et al. regarding the changes in the incidence of renal colic in different seasons of the year for three consecutive years in Saudi Arabia, they found no significant changes in the incidence of renal colic during the holy month of Ramadan compared to the periods. They did not observe the year ²³.

In a study (2012) regarding the causes and methods of preventing kidney stones in fasting patients, Kord Afshary and his colleagues announced that people are exposed to dehydration during Ramadan, especially in the hot season. Moreover, waste materials with a high concentration are excreted in their urine if Fasting is not prohibited for them in addition to strengthening the stomach, doing massages and valuable exercises, and avoiding the consumption of harmful high-salt and high-protein foods ²⁴. Abdoreza et al. showed that the highest admission rate of renal colic patients compared to other periods was in the first two weeks of Ramadan. Admissions increased after the first two weeks of the holy month of Ramadan. They believed that sudden changes in eating habits and reduced water consumption may be responsible for increasing the admission of renal colic in the first two weeks of Ramadan ²⁵. Basiri et al. studied 574 patients with renal colic. The admission rate of actual colic patients in Varamin city's medical centers during Ramadan was not significantly different from other months. However, this rate was lower than the rate of patients in the hot seasons of the year ²⁶.

Finally, considering the existence of this difference of opinion also considering that the three treatment centers considered for participation in the study are from the mother's center and referred by many people, and also considering that there is still no substantial evidence to show whether Fasting in the holy month of Ramadan can be more effective in the formation of kidney stones and the occurrence of pain caused by it in people who are prone to it or not, so we analyzed the relationship between Fasting and renal colic caused by kidney stones in patients living in the climatic conditions of Tehran. It should be available to doctors to treat acute renal colic patients. The results of this study will help improve society's health.

Methods

Three hundred sixteen patients diagnosed with renal colic were examined based on headcount during three periods before, during, and after Ramadan. In this observational study, which was carried out as a cross-sectional-analytical review, the hospitalization records of patients who were referred to the emergency room of three medical educational centers of Imam Khomeini-Shahid Labafinejad and others with complaints of colicky pain caused by kidney stones. It was investigated in three

periods: before, during, and after Ramadan. This study aims to present a proper analysis to the doctors and persons who make decisions for treating acute kidney colic in patients who fast by comparing influential factors in kidney stone formation and the pain caused by this stone in patients with Renal Colic during three periods, includes before, in and after Ramadan in 3 central hospitals named Imam Khomeini-Shahid Labafi Nejad and Baghiatallah located in Tehran city in 2019.

A checklist of patient information, including demographic information - common complaints (nausea and vomiting - change in urine color) - risk factors for the presence or absence of hematuria in urinalysis - the location of stones in the ultrasound of the kidney, ureter, and kidney (medicines used to prevent stones in Patients with recurrent stones (vitamin B6 - thiazides - allopurinol and captopril) and the medical treatment used in pain control, non-steroidal anti-inflammatory drugs - opium, morphine sulfate, vitidine - and the combination of the two mentioned cases) and the activity level of the patients and the prevailing combination It was extracted in the consumed diet (including protein, salt, fats, sugars, and sweets). Finally, after collecting the required information from all the subjects, the data was entered into the Excel software and then analyzed.

In this context, we used the statistical software SPSS version 21 to check the existing statistical relationships; chi-square, Fisher, and independent t-tests were used, and the significance level was considered 5 percent. A P-value <0.05 was considered a significant level.

Results

In this study, 316 patients referred to the emergency rooms of the other three medical training centers with pain caused by kidney stones were included.

There was no significant difference in the frequency of clients in the month of Ramadan compared to the other two months. The frequency of ureteral stones in the clients was far more than kidney stones, calices and pelvic stones. The average age of the clients before Ramadan was 40.12. Most of the clients were overweight in all three time periods, that is, they had a body mass index above 24.13 of the clients had a previous history of kidney stones, and 184 had kidney stones for the first time, 60 of the clients had a family history of kidney stones, and 256 had no family history of stones, 8 of the clients were in the previous month of Ramadan. had diabetes and this rate was 6 and 6 respectively in the month of Ramadan and after it 38 of the clients had blood pressure disease in the month before Ramadan and this rate in the month of Ramadan and after the dominant diet

combination Most people in all three periods had protein in addition to consuming carbohydrates in the month.

They were examined during one month before, during and after Ramadan. The frequency of referrals from men to women was much higher. They were kidneys. They were 8 and 12 respectively. Ramadan was much longer than the other two months. Most of the studied patients had low physical activity.

There is a significant relationship between male gender and colicky pain caused by kidney stones ($p>0.05$). There was no significant relationship between gender and colicky pain caused by kidney stones before, during, and after Ramadan ($P=0.379$).

The mean age of those with renal colic was significantly lower than those with natural colic ($P<0.05$). However, there was no significant difference before, during, and after Ramadan.

This study found that most of the clients are overweight ($BMI < 24$), so the average BMI of the clients before Ramadan, during and after Ramadan was 25.8, 26.9-25.6, respectively.

In the analysis, no significant relationship was found between average BMI and colic pain caused by kidney stones in clients before and after Ramadan ($P = 0.110$).

Also, there is a significant relationship between male gender and pain caused by kidney stones in all three time periods ($p<0.05$).

During the three mentioned periods, there is a significant relationship between the average age of clients and renal colic.

There was a significant relationship between carbohydrate consumption and colic pain caused by kidney stones before and after Ramadan ($P=0.022$).

In this study, clients had underlying DM disease before Ramadan 8 (8 cases) - Ramadan 5 (6 cases) and after Ramadan 6 (6 cases). The analysis showed no significant relationship between DM and D due to kidney stones in all three time periods.

In this study, 38 patients before Ramadan - 24 patients and 27 patients after Ramadan had underlying hypertension. In the analysis conducted between the increase of HTN and the pain caused by kidney stones before Ramadan, during and after Ramadan, no significant relationship was found. In this study, 142 people had a previous history of kidney stones, and 174 people had new cases of kidney stones; in the analysis conducted between the previous history of kidney stones and the colic pain caused by it before Ramadan and after, there is a meaningful connection. According to the present study, 60 patients had a positive family history of kidney stones, and 258 patients did not report any family history of kidney stones. In the analysis, no significant

relationship was found between a family history of kidney stones and colic pain caused by it before and after Ramadan ($P=0.945$).

Discussion

One of the essential topics in this field is the possibility of kidney damage during fasting in some people who are at risk. Islamic teachings are for certain groups of people, such as weak and older adults - sick people - women during pregnancy, and children who have forbidden fasting.

In this descriptive cross-sectional study, some of the known factors in the development of kidney stones in fasting and non-fasting people who were referred to the emergency room of three medical centers of Imam Khomeini, Shahid Labafinejad and others with the complaint of renal colic in a period. The three months (before, during and after Ramadan) have been compared in order to obtain a suitable analysis for the doctors and decision-makers in the matter of treatment and continuation of fasting based on the current study of the number of patients before Ramadan. One hundred people - the month of Ramadan was 110 people, and after the month of Ramadan, there were 106 people; this shows that the number of clients in the month of Ramadan was not significantly different from the other two months, which is consistent with the studies done in the past fasting patients suffering from renal colic.

In this study, 316 patients with renal colic referred to the emergency room of three medical training centers were examined three months before, during, and after Ramadan. For example, in a study conducted by Basiri et al. ²⁶ in 2004 on 574 patients with renal colic, the admission rate of actual colic patients during the month of Ramadan was not significantly different from other months of the year, but this rate was evident. It was less than the clients in the hot seasons of the year. During the three mentioned periods, there is a significant relationship between the average age of clients and renal colic.

The results of this study are consistent with other studies, such that the average age of patients was 38.6 in the descriptive study by Abdoreza et al., which was conducted in 2008 ²³. Therefore, the age group below 40 years is at greater risk for kidney stones and colic caused by it, and this factor is similar in fasting and non-fasting people. In this study, it was found that most of the clients were men, so that before Ramadan, 90 - 87 of them were men, and after Ramadan, 67 of them were men. Also, there is a significant relationship between male gender and pain caused by kidney stones in all three time periods. The result of this study is consistent with other studies. So, in the study of Basiri et al. in 2004, there were about

84 male and 16 female clients ²⁶. The average of this issue shows that men are at greater risk for kidney stones and colic caused by it. This study revealed that most clients are overweight ($BMI < 24$), so the average BMI of the clients before and after Ramadan was 25.8, 26.9, and 25.6, respectively.

In the analysis, no significant relationship was found between average BMI and colic pain caused by kidney stones in clients before and after Ramadan and after Ramadan. The result of this study is not consistent with other studies because in the study conducted in 2002-2006 by Mateo and his colleagues, obesity and overweight were mentioned as a risk factor for the formation of kidney stones and the pain caused by them. This research showed that people who were obese were not more likely to develop kidney stones than those who were obese ²⁹⁻³⁰.

In the current study, the overwhelming majority of the patients referred had low physical activity, so the percentage of the patients before the month of Ramadan 78- the month of Ramadan was 86, and after the month of Ramadan was 81, which indicates the role of the amount of physical activity in the occurrence or prevention of developing It is renal colic. The analysis shows no significant relationship between low physical activity and pain caused by kidney stones in all three mentioned periods. The result of this study is inconsistent with other studies, as in the study of Sorensen et al., moderate physical activity reduced the risk of kidney stones and colic caused by it ³¹.

In this study, it was found that the dominant composition in the clients' diet is protein. Also, the change in the diet composition of fasting people and the use of more carbohydrates and sweets in Ramadan was evident, so the consumption of carbohydrates and sweets in the clients before Ramadan was 30 - in Ramadan 44 and after Ramadan 32. The analysis showed a significant relationship between carbohydrate consumption and colic pain caused by kidney stones before and after Ramadan.

This result indicates that changing the diet during Ramadan and consuming more calories due to the consumption of more carbohydrate compounds along with protein compounds is a significant risk factor in the development of kidney stones and colic pain caused by it. Therefore, planning to get a correct diet is one of the main ways to prevent the occurrence of kidney stones and the colic pain caused by them. It is essential for fasting people. The result of this study is consistent with other studies. In the study conducted by Sorensen et al., they found that consuming more than 2,200 calories per day increased the risk of kidney stones by 42 ³¹. In this study, there was no significant relationship between DM and diabetes caused by kidney stones in all three time periods

mentioned. This study's result is inconsistent with other studies conducted in the past, so in a study conducted by Azizi et al. in 1998, the prevalence of kidney stones in diabetics, especially DM2, was reported to be 40 times higher than that of ordinary people ¹⁷.

In this study, no significant relationship was found between the increase of HTN and pain caused by kidney stones before, during, and after Ramadan. However, the studies showed that the prevalence of blood pressure decreases in patients during Ramadan and after that, suggesting the preventive role of fasting in reducing blood pressure. This study's result differs from the contents mentioned in the reference books. In the reference books, the blood pressure in people with kidney stones is higher than in ordinary people. In this study, there is a significant relationship between previous history of kidney stones and colic pain caused by it before and after Ramadan. The higher frequency of clients with a previous history of kidney stones in Ramadan can suggest fasting as a factor that initiates renal colic in these people. According to the present study, no significant relationship was found between a family history of kidney stones and colic pain caused by it before and after Ramadan.

Conclusion

In this study, it was shown that age below 40 years - male sex - overweight - high protein diet - and low physical activity are among the risk factors of kidney stone formation that are associated with renal colic. Also, based on the present study, it was found that the frequency of admission of patients with renal colic during Ramadan was not significantly different compared to the other two months. However, the admission of people with a positive history of kidney stones, overweight people, and those who follow a high carbohydrate diet in addition to the diet they use more protein in Ramadan than in the other two months.

Therefore, based on this study, from a medical point of view, fasting people who are overweight with a history of kidney stones and consume a high-calorie diet are at a higher risk for the onset of renal colic. Particular attention should be paid to these people, especially to achieve an ideal weight and adjust their diet. Food under the supervision of a nutritionist and the use of pharmaceutical protocols can be effective in preventing the occurrence of renal colic.

It is recommended that more studies in this field be conducted to confirm the findings obtained in this study with a larger sample size and to investigate other socioeconomic conditions. It is recommended that fasting patients with kidney stones use a unique and correct diet under the supervision of a doctor and nutritionist to

prevent the onset of renal colic. In order to achieve a single result, it is suggested to conduct a study in several university centers as a national project.

Highlights

What Is Already Known?

Acute pain caused by kidney stones is considered one of the most prevalent reasons for referring to treatment centers or hospitals. One of the essential issues in this field, which still has many questions, is the probability of an increase in kidney stone formation during fasting.

What Does This Study Add?

It is specified that factors such as male gender, age under 40, being overweight, high-calorie diet, and low physical activity are the risk factors associated with Renal Colic. Also, this study found that the reception of renal colic patients in Ramadan had no significant difference in another two months.

Authors' Contributions

Concepts: Hamid Reza Javadzadeh, Abolhassan Alikhani, Soleyman Heydari, Behzad Einollahi, Sadrollah Mahmoudi, Hasan Goudarzi, Mehrdad Faraji. Data gathering: Hamid Reza Javadzadeh, Abolhassan Alikhani, Soleyman Heydari, Behzad Einollahi, Sadrollah Mahmoudi, Hasan Goudarzi, Mehrdad Faraji. Writing and editing the paper: Hamid Reza Javadzadeh, Abolhassan Alikhani, Soleyman Heydari, Behzad Einollahi, Sadrollah Mahmoudi, Hasan Goudarzi, Mehrdad Faraji.

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Conflicts of Interest Disclosures

We declare there was no conflict of interest.

Consent For Publication

We declare consent for publication.

Ethics approval

Ethical committee of Baqiyatallah University of medical sciences confirmed the proposal of this study.

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