

Review Article

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Is any High Incidence of Kidney and Urinary Stones during the Ramadan Fasting? : A Review study

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Abstract

Fasting is considered as one of the most important religious and social practices of Islam, Numerous biological and behavioral changes occur in some people who observe the fast in Ramadan and some researchers believe that urinary stone increases during this month. Some believe that increased incidence of urinary stones in Ramadan is not related to fasting, but to the rise of weather temperature in hot months, and an increase in humidity. After reviewing some studies about the relationship of urinary stones and their incidence in Ramadan are not alike and are even sometimes contradictory.

The aim of this study is to evaluate the effects of fasting on kidney and urinary stones.

Keywords: Fasting; Ramadan; Kidney and Urinary Stones

Introduction:

Before the birth of Jesus, there were common surgeries found included circumcision, piercing the skull and bladder stone. The oath of Hippocrates has said, “Do not operate on bladder stones and leave it to its people.” The first bladder stone presented at the English surgery museum belonged to a young 16-year-old Egyptian who lived in 4800 BC, in a region called ‘Almra’.^[1] The first ever history of urinary stones have afflicted humankind since antiquity. The earliest recorded example of bladder and kidney stones detected in Egyptian mummies dated 2488 B.C.^[2]

Urolithiasis has been a well-known condition for a long time. Some countries, located on “kidney stone belt”, have high rates of urinary stones. This belt starts from Turkey, Iraq, and Iran and expands to Afghanistan, Pakistan, India, Thailand, and Australia. Environment temperature, atmospheric pressure, and sunlight are important factors in causing stone, but among these factors, the most significant one is the environment temperature.^[3]

In most countries with a relatively high incidence of renal calculi due to climate, environmental temperature, global warming, local geology with hydro mineralogy and sanitation increased the risk

of urinary stone. There are concerns about the impact of dehydration and the subsequent renal hypoperfusion during Ramadan fasting for patients with renal diseases. This concern particularly arises when Ramadan month occurs during hot and dry summers with long daytime duration. All the world’s religions recommend a period of fasting, and of these, one whole month of intermittent fasting every year is particular to Islam. Muslims have two meals, one immediately after sunset and the other just before dawn with a period of fasting ranging from 11-18 hours. During Ramadan in summer, a maximum number of patients with renal colic refers to hospitals every day.^[4]

Quran said, O’ Believers! Fasting has been written upon you as it was upon those before you to make you righteous. A few days (you should fast) and whosoever of you is ill or a traveler, (fast) some other days, and for those who fasting is exhausting (e.g. those with chronic diseases, aged men, and women), they need to atone, and fasting is better for you if you know.^[5] According to Islam, sick people are exempted from fasting especially people with chronic diseases as diabetics, hypertensive, hepatic and renal patients,

still a significant number of them insist on observing this religious practice due to their personal beliefs and satisfaction.^[6]

In these cases, physicians face a dilemma as to how they can offer clinical advice for their fasting patient.^[7] Every year during Ramadan, the Muslim adults are obliged to abstain from drinking, eating and sexual activities, from dawn until sunset; although, the barriers are removed from dusk until dawn. Ramadan is a lunar month, and since lunar months are 11 days shorter than other calendar months, Ramadan migrates throughout the seasons and in some cases is in long, hot months of summer. For instance, once every 33 years, Ramadan falls in the summer months.^[8] Based on Islamic principles, patients are exempted from fasting during Ramadan. However, each year, many Muslim patients express their willingness to observe the fast during Ramadan month to respect the traditional customs.^[9]

In the literature, there is scarce scientific data about the safety of Ramadan fasting for patients with different renal diseases. The existing published reports are mainly focused on the impact of Ramadan fasting on patients with renal transplantation, patients with chronic kidney disease, and patients with the renal stone disease. In this study, we comprehensively reviewed all published articles in the field and provide the readers with the current recommendations for renal patients who decide to fast during the month of Ramadan.^[10]

Problem Of Kidney And Urinary Stones

A kidney stone, one of the most painful of the urologic disorders and it is one of the most common disorders of the urinary tract. A large number of people are suffering from the urinary stone problem all over the world. Kidney stones, which are solid crystals that form from dissolved minerals in urine, can be caused by both environmental and metabolic problems. A kidney stone is a hard mass developed from crystals that separate from the urine and build upon the inner surfaces of the kidney. Normally, urine contains chemicals that prevent or inhibit the crystals from forming. These inhibitors do not seem to work for everyone; however, some people form stones than others. If the crystals remain tiny enough, they will travel through the urinary tract and pass out of the body in the urine without being noticed. Kidney stones may contain various combinations of chemicals. The most common type of stone contains calcium in combination with either oxalate or phosphate. Kidney stones are quite common and usually affect people who are between 30 and 60 years of age. It is estimated that renal colic (severe pain caused by a kidney stone) affects about 10-20% of men, and 3-5% of women. In India, 12% of the population is expected to have urinary stones, out of which 50% may end up with loss of kidneys or renal damage. Kidney stone formation is a multifactorial condition that involves the interaction of environmental and genetic factors. The incidence of urinary stone is more frequent in populations residing in mountains, deserts, and tropical regions.^[11]

A diet such as the average diet changes, with an increase in saturated and unsaturated fatty acid; an increase in animal protein and sugar; and a decrease in dietary fiber, higher consumption of fructose, vegetable protein and unrefined carbohydrates may have a

significant impact on the incidence of urinary stones. Increased animal protein intake, lower potassium intake, lower fluid intake are recently identified to higher stone risk. The habit of late night eating, Pure vegetarians Nonvegetarians mixed diet, consume coffee and tea more than 8 ounces a day, consume soft drinks, higher sodium intake, frequently consume processed foods, taking high sugar, habits of smoking, Alcohol consumption are also identified to a higher risk of urinary stone.

Fluid intake may also be important another factors in the development of urinary stones, did not drink required water (2-3 lit/day) daily can increase the risk of urinary stone. Dehydration has been linked to stone disease, particularly in warmer climates, and global warming will exacerbate this effect. Postmenopausal women with low estrogen levels have an increased risk for kidney stones. Women who have had their ovaries removed are also at increased risk of urinary stone.

The correlation between increased environmental temperature and increased number of stone events supports the conclusion that global warming has an impact on the development of stones. Used NSAID frequently BMI between <25 and ≥39.99 Childhood obesity Problem in voiding Stressful life, Lacks of physical , Associated with hypertension, Associated with Diabetes, Associated with UTI History of ovaries removed, Rapid weight loss - including gender; age; place of work; occupation; amount of exercise, sweat, outdoor activity; smoking; eating eggs and meat; presence of kidney stones in relatives, parents, and siblings; as well as personal history of hypertension, urinary stone, urinary tract infections, chronic gastric diseases, hyper lipidaemia, diabetes, kidney surgery, ureter surgery; and prescription of a diuretic etc . One of the major reasons for kidney stones, however, is the high concentration of calcium in drinking water.

Review of literature/ A Discussion

In this review article, we will discuss the previous studies on Ramadan and fasting and urinary diseases.

A study done by Egyptian Abdul Rahim on urinary stone and fasting suggested that fasting has a protective effect against urinary stones, and even those with urinary stone or urinary tract infection can fast. ^[12] In the study of Abdolreza N et al. confirms the increased ureteral colic in the first two weeks of Ramadan and suggests that it is due to changes in eating habits. Moreover, they report that other causes of increased ureteral colic are high weather temperature, more than 27°C, and humidity less than 45%. In this study, a large number of colic cases referring to Ramadan of 2008 (between August and October) to emergency departments of two biggest academic hospitals of Mashhad, Ghaem and Imam Reza hospitals. ^[13]

In the study of Gumma et al. (1978) revealed that the incidence of urinary stone and kidney angina significantly increases in Ramadan, especially if coinciding with hot dry summer months. It is estimated that increased serum uric acid is due to purine increase coinciding with breaking the fast or RNA (ribonucleic acid) breaking in the tissues during fasting. Authors believed that the simultaneous increase of serum uric acid with oliguria caused by dehydration may underlie the uric acid crystal formation in the urinary

system and cause dysuria and colic attacks in fasting months. [14]

An another study was conducted by Mohammed Salim Alhadrami from the Hospital of Soltan Abdul-Aziz in Jeddah with symptoms of ureteral colic in the month before Ramadan, during Ramadan and the month after Ramadan. Emergency doctors using Dipstick and KUB tests diagnosed the disease. A significant correlation was found between the mean number of patients, outdoor temperature and atmospheric pressure ($P < 0.001$). No significant relationship was observed between the number of patients with colic and the relative humidity. The maximum number of patients was in summer months (June to August), the minimum number was observed in winter months, and the lowest number was in March, which is prior to two coldest months of the year. Alhadrami's study confirms an inverse relationship between atmospheric pressure and ureteral colic, but unlike others does not confirm the effect of humidity on stone formation. In addition, he has suggested that increased colic caused by stones in the month of Ramadan is due to increased temperature. [15]

A study of Mustafa K, et al. (1978) investigates the effects of fasting in Ramadan on fluids and electrolyte balance. Volunteers' urine samples were collected one day before Ramadan, during weeks 1 to 5, and 10 days after Ramadan, and then they were tested. Also, fluid intake, urine volume, and perpetrated water were measured. All the patients were complicated by negative fluid balance, which reached its peak in the first three weeks of fasting. This study showed that intermittent fasting and breaking the fast are associated with increased uric acid and triglycerides. [16]

In a study, Abdolreza et al.(2011) compared the number of patients admitted with renal colic between the four periods of i) 2 weeks before Ramadan, ii) the first 2 weeks of Ramadan, iii) the second 2 weeks of Ramadan, and, iv) 2 weeks after the month of Ramadan (August-October 2008). Their investigations revealed that the number of renal colic admissions was the highest in the first 2 weeks of Ramadan in comparison with the other periods. Interestingly, after the first 2 weeks of Ramadan, the number of renal colic admissions decreased. This trend (i.e. reduction in renal colic admissions) continued during the second 2 weeks of Ramadan and also during 2 weeks after Ramadan. As a conclusion, the authors suggested that the sudden changes in dietary habits (primarily the reduction in water intake) may be responsible for the increase in the renal colic admission during the first 2 weeks of Ramadan. Finally, there is a discrepancy in the literature regarding the incidence of renal colic in the fasting month of Ramadan. Study of Abdolreza N, et al. (2011) showed an association between Ramadan and the increase in renal colic admission. [17]

Patients with renal diseases are of special concern for physicians due to the fear of deleterious effects of dehydration on their renal function. In this study, we reviewed the current published reports on the impact of Ramadan fasting in patients with renal transplantation, patients with chronic kidney disease, and patients with renal colic. [18]

In the study of BaHammam AS et al. (2013) suggested that there is still no strong evidence that reveals whether Ramadan fasting can induce renal stone formation in susceptible patients or not. [19]

A study done by Al-Hadramy et al (1997) investigated the variations in the incidence of renal colic in different seasons for three consecutive years in a western region of Saudi Arabia. This study did not observe any significant change in the incidence of renal colic during the Ramadan months compared with the other periods of the year. [20]

A study was conducted by Basiri A et al (2004) in the tropical city of Varamin, Iran suggested that the number of patients admitted due to stones in Ramadan is not considerably higher than other months of the year, and the number of patients in Ramadan was not more than warm months of the same year. Basiri et al. (2004) found no significant change in renal colic incidence during the month of Ramadan. [21]

A study was conducted by Miladipour et al.(2012) investigated the changes in urinary excretion of calcium, oxalate, citrate, uric acid, magnesium, phosphate, potassium, sodium, and creatinine in 57 men (including 37 recurrent stone formers and 20 healthy subjects) during Ramadan fasting. Their investigations revealed no evidence in favor of increased risk of stones formation during Ramadan fasting. Miladipour et al. (2012) failed to offer sufficient evidence for an increase of urethral colic in Ramadan. They also attribute the increased urinary stones to hot months of the year rather than Ramadan month. [22]

A study done by Qureshi S et al (2012) concluded that Ramadan Fasting has no negative effects on the activity of kidney". [23] An another study was done by Wein AJ. Et al (2012) found that American soldiers, who had gone to desert regions, had an increase in their symptomatic colic attacks during summer months. [24]

There is a discrepancy in the literature regarding the incidence of renal colic in the fasting month of Ramadan. First International Congress on Health and Ramadan held in Casablanca, Morocco in (1994) concluded that individuals with high rates of stone formation should avoid fasting due to the high incidence of stone in Ramadan. [25] According to Emami-Naini A, et al. (2012) suggested that dehydration and low urinary volume are the main risk factors for the development of renal stones. [26] According to Pak CY. (2004) and Worcester EM, et al. (2008) revealed that patients with a history of renal stones should increase their water intake and have at least a 24-h urinary volume of 2 liters to avoid renal stone formation. [27,28] In the study of Amine EIM, et al. (2013) suggested that consuming adequate amounts of water from dusk to dawn to attain the recommended 24-h urinary volume and reduce the potential risk of dehydration in developing renal stones. [29] Regarding 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 any signs/symptoms of acute tubular necrosis occurred, the fasting should be discontinued. Fasting should be under medical supervision and the graft function should be closely observed.

Conclusion

There is a discrepancy in the literature regarding the incidence of renal colic, kidney and urinary stone in the fasting month of

Ramadan. The results of studies about the relationship of urinary stones and their incidence in Ramadan are not alike and are even sometimes contradictory. Some studies believed that increased incidence of urinary stones in Ramadan is not related to fasting, but to the rise of weather, increase humidity, the temperature in hot months and depending on the hours of fasting.

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