

RAMAZAN AYINDA ACİL SERVİSE RENAL KOLİK NEDENİYLE BAŞVURAN HASTALARIN KLİNİK VE LABORATUVAR BULGULARININ DEĞERLENDİRİLMESİ, TEK MERKEZLİ BİR ÇALIŞMA

EVALUATION OF CLINICAL AND LABORATORY FINDINGS OF PATIENTS APPLYING TO THE EMERGENCY DEPARTMENT DUE TO RENAL COLIC IN RAMADAN, A SINGLE CENTER STUDY

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ÖZET

AMAÇ: Bu çalışmada Ramazan ayında renal kolik (RK) nedeniyle acil servise başvuran hastaların demografik, laboratuvar ve radyolojik sonuçlarını değerlendirmeyi amaçladık.

GEREÇ VE YÖNTEM: Bu retrospektif kesitsel çalışma, 2019 Ramazan ayı ve Ramazan ayından önceki 1 ay içinde acil servise RK tanısı ile başvuran hastaları içermektedir. Yaş, cinsiyet, başvuru saati, idrar tahlili sonuçları (eritrositüri, lökositüri, ketonüri, idrar dansitesi), radyolojik görüntülemeye taş varlığı ve taşın üriner sistemdeki yeri kaydedildi. Hastalar, Ramazan öncesi aydaki hastalar (Grup 1, n = 83); Ramazan ayında oruç tutan hastalar (Grup 2, n = 55); ve Ramazan ayında oruç tutmayan hastalar (Grup 3, n = 37) olarak üç gruba ayrıldı.

BULGULAR: Çalışmaya katılanların %52,6'sı Ramazan ayında ve %47,4'ü bir önceki ay içinde başvurdu. Gruplar arasında yaş, idrarda lökosit, keton, taş varlığı ve taşın lokalizasyonu açısından anlamlı fark yoktu ($p > 0.05$). Grup 3'te idrarda eritrosit anlamlı olarak düşüktü. Grup 2'de erkek oranı ve 16-24 saatleri arasında hasta başvuru sıklığı diğer gruplara göre daha yüksekti. Grup 1'in idrar yoğunluğu grup 2 ve 3'e göre anlamlı derecede düşük bulundu ancak grup 2 ve 3 arasında fark yoktu.

SONUÇ: Oruç tutan hastaların renal kolik nedeniyle acil servise en sık 16-24 saatleri arasında başvurduğu bulundu. Grup 3'te idrarda eritrosit anlamlı olarak daha az bulundu. Ayrıca Ramazan ayında başvuran hastaların idrar dansitelerindeki yüksekliğin oruç ile değil artan hava sıcaklığı ile ilgili olduğunu düşünmekteyiz.

ANAHTAR KELİMELER: Acil servis, Ramazan, Renal kolik

ABSTRACT

OBJECTIVE: We aimed to evaluate the demographic, laboratory and radiological results of patients who applied to the emergency department due to renal colic (RC) during Ramadan.

MATERIAL AND METHODS: This retrospective cross-sectional study included patients applied to emergency department (ED) with a diagnosis of RC during 2019 Ramadan and the 1 month preceding Ramadan. Age, sex, the hour of application, the results of urinalysis (erythrocyturia, leukocyturia, ketonuria, and urine density), presence of stones on radiological imaging and the location of the stone in the urinary system were recorded. The patients were grouped into three groups as the patients in the month preceding Ramadan (Group 1, n=83); patients fasting in Ramadan (Group 2, n=55); and patients not fasting in Ramadan (Group 3, n=37).

RESULTS: Of the study population, 52.6% applied in Ramadan and 47.4% in the preceding month. There was no significant difference between the groups with respect to mean age, urinary leukocytes, urinary ketone, presence of stones and location of stones ($p > 0.05$). Urinary erythrocytes were significantly lower in Group 3. The proportion of men and frequency of patients' admission between 16-24 hours in Group 2 was higher than the other groups. Urine density of Group 1 was found to be significantly lower than groups 2 and 3, but there was no difference between groups 2 and 3.

CONCLUSIONS: It was found that fasting patients applied to the emergency department most frequently between the hours of 4 p.m. and 12 a.m. due to renal colic. Urinary erythrocytes were found significantly less in Group 3. In addition, we think that the high urine densities of the patients who applied during Ramadan are not related to fasting but to the increasing air temperature.

KEYWORDS: Emergency department, Ramadan, Renal colic

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INTRODUCTION

Renal colic is one of the causes of sudden-onset abdominal pain, which is commonly seen in the ED and the incidence of which is increasing each year (1, 2). It constitutes 0.6% of all ED application (3). The pain of RC is usually one-sided, blunt, excruciating, and it radiates to the pelvic region (1).

Ramadan is a sacred month during which Muslims fast, which is one of the fundamental rituals of Islam. Fasting Muslims avoid earthly pleasures (food, beverages, sex, etc.) for a period from sunrise until sunset (4, 5). Ramadan month begins 11 days earlier each year compared to the year before and corresponds to a different time of the year because the time of the Ramadan month is determined according to Hijri calendar. The duration of the fasting depends on the period of the year, which Ramadan month coincides with, and location. This duration can increase up to 18 hours, especially in summer months. There are concerns about not drinking enough water during Ramadan month and the subsequent renal hypoperfusion. This concern particularly increases in Ramadan months when days last longer (6). Studies investigating the effect of Ramadan fasting on laboratory and radiological results are limited in the literature.

In this study, we aimed to evaluate the patients who applied to the emergency department due to renal colic during Ramadan and to identify if there was a difference in urine analysis and radiological imaging results fasting and non-fasting individuals.

MATERIAL AND METHOD

This was a retrospective and cross-sectional study. Our study was carried out among patients applying to the Kırşehir Training and Research Hospital ED with RC during Ramadan (fasting month) of 2019 (6 May - 3 June) and the 1-month preceding Ramadan (7 April - 5 May). Our hospital is the only hospital in the city center and serves as a tertiary emergency department. Patients having the diagnostic code of RC recorded in the hospital automation system were called via telephone and informed about the study; they provided the necessary information for the study.

The patients were grouped into three groups as the RC patients admitting to the ED in the month preceding Ramadan (Group 1, n=83); RC patients fasting in Ramadan (Group 2, n=55); and RC patients not fasting in Ramadan (Group 3, n=37). Age, sex, the hour of the application, urine analysis results (erythrocyturia, leukocyturia, ketonuria, urine density), whether a stone is present on radiological imaging and if so the location of the stone were recorded. Patients' hours of admission to the emergency department were stratified as 8 a.m.-4 p.m., 4 p.m.- 12 a.m. and 12 a.m.- 8 a.m.. Non contrast abdominal tomography or urinary ultrasonography was used for the detection of stones and their locations in the urinary system.

Additionally, daily weather temperature values and moisture levels during the time period of the study were obtained from Regional Meteorology Directorate. Patients younger than 18 years and patients with comorbidity diseases such as chronic kidney disease, metabolic disorder, hepatic or endocrinological disorders were excluded from the study. Twenty patients among 195 patients diagnosed with RC were excluded from the study due to missing information and having excluding criteria.

Ethical Committee

Research involving human subjects complied with all relevant national regulations, institutional policies and is in accordance with the tenets of the Helsinki Declaration and has been approved by the Ethics Committee of the Faculty of Medicine of Ahi Evran University under number 2019-23/221 and approval date 24.12.2019. Informed consent was obtained from all individuals included in this study.

Statistical Analysis

Statistical analyses were performed with SPSS (Statistical Package for Social Sciences) Windows 25.0 software package (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp). Descriptive statistics included mean, standard deviation, (SD), and number and percentage of cases. Data distribution was tested with the Kolmogorov-Smirnov test. As quantitative data met the parametric test assumptions, inter-group comparisons of quantitative data with quali-

tative data were carried out using ANOVA test (Tukey test was used as a post-hoc test); a comparison of qualitative data was performed with Pearson's Chi-Square test and Fisher exact test. Independent Samples t test was used for comparing air temperature and humidity rates on 1-month preceding Ramadan and Ramadan month. P values of <0.05 was taken as statistically significant.

RESULTS

Of the study population, 52.6% (n=92) applied to the ED in Ramadan (6 May - 3 June) and 47.4% (n=83) in the preceding month (7 April - 5 May). While 59.8% of the applicants were fasting during Ramadan, 40.2% were not fasting. The mean age of the patients was 43.3 ± 15.3 years in Group 1, 39.4 ± 12.4 years in Group 2, and 43.5 ± 15.8 years in Groups 3. There was no significant difference between the study groups with respect to mean age ($p=0.244$). Men constituted 43.4% of Group 1, 69.1% of Group 2, and 51.4% of Group 3. The proportion of men was statistically significantly higher in Group 2 ($p=0.012$). An analysis of the presenting hour to the hospital revealed that patients in Group 2 significantly more commonly applied between 4 p.m. and 12 a.m. ($p=0.002$), (Table 1).

Table 1: Comparison of the demographic, laboratory, radiological data of the patients presenting with renal colic

| | Group 1 (n:83) | Group 2 (n:55) | Group3 (n:37) | p |
|---------------------------|----------------|----------------|---------------|-------|
| Age, Mean±SD | 43.3±15.3 | 39.4±12.4 | 43.5±15.8 | 0.244 |
| Sex, n(%) | | | | |
| Male | 36 (43.4) | 38 (69.1) | 19 (51.4) | 0.012 |
| Female | 47 (56.6) | 17 (30.9) | 18 (48.6) | |
| Hour of presentation n(%) | | | | |
| 24.00-08.00 | 14 (16.9) | 8 (14.5) | 11 (29.7) | 0.002 |
| 08.00-16.00 | 33 (39.8) | 9 (16.4) | 15 (40.5) | |
| 16.00-24.00 | 36 (43.4) | 38 (69.1) | 11 (29.7) | |
| Urinary Erythrocyte n(%) | | | | |
| Absent | 3 (3.6) | 3 (5.5) | 3 (8.1) | 0.002 |
| Trace | 1 (1.2) | 4 (7.3) | 0 | |
| +1 | 26 (31.3) | 6 (10.9) | 6 (16.2) | |
| +2 | 17 (20.5) | 5 (9.1) | 2 (5.4) | |
| +3 | 36 (43.4) | 37 (67.3) | 26 (70.3) | |
| Urinary Leukocyte n(%) | | | | |
| Absent | 42 (50.6) | 27 (49.1) | 17 (45.9) | 0.617 |
| Trace | 13 (15.7) | 12 (21.8) | 4 (10.8) | |
| +1 | 10 (12) | 9 (16.4) | 7 (18.9) | |
| +2 | 8 (9.6) | 2 (3.6) | 2 (5.4) | |
| +3 | 10 (12) | 5 (9.1) | 7 (18.9) | |
| Urinary Ketone n(%) | | | | |
| Absent | 72 (86.7) | 39 (75) | 30 (70.9) | 0.280 |
| Trace | 7 (8.4) | 9 (16.4) | 3 (8.1) | |
| +1 | 3 (3.6) | 4 (7.3) | 4 (10.8) | |
| +2 | 1 (1.2) | 3 (5.5) | 0 | |
| Presence of Stone, n(%) | | | | |
| Present | 33 (39.8) | 25 (45.5) | 19 (51.4) | 0.481 |
| Absent | 50 (60.2) | 30 (54.5) | 18 (48.6) | |
| Location of Stone, n(%) | | | | |
| Kidney | 6 (18.2) | 3 (12) | 2 (10.5) | 0.593 |
| Ureter | 27 (81.8) | 21 (84) | 17 (89.5) | |
| urinary bladder | 0 | 1 (2.3) | 0 | |
| Density | 1018.9±9.0 | 1022.6±6.0 | 1023.08±9.9 | 0.013 |

In our study, urinary erythrocytes were found significantly lower in Group 3 ($p=0.002$). However, no difference was found among groups in terms of urinary leukocytes, urinary keto-

ne, presence of stones and location of stones ($p>0.005$) (Table 1). The mean urine density level was 1018.9 ± 9.0 in Group 1; 1022.6 ± 6.0 in Group 2; and 1023.08 ± 9.9 in Group 3. The urine density level of the patients in Group 1 was significantly lower than that of the patients in Group 2 and Group 3 ($p=0.042$, $p=0.039$, respectively). On the other hand, there was no significant difference between Group 2 and Group 3 ($p=0.959$) (Table 1). In our study, the distribution of patients applying for renal colic during Ramadan was examined by week. While the rate of those who did not fast was 20% in the first week, this rate reached 42.2% in the last week (Figure 1).

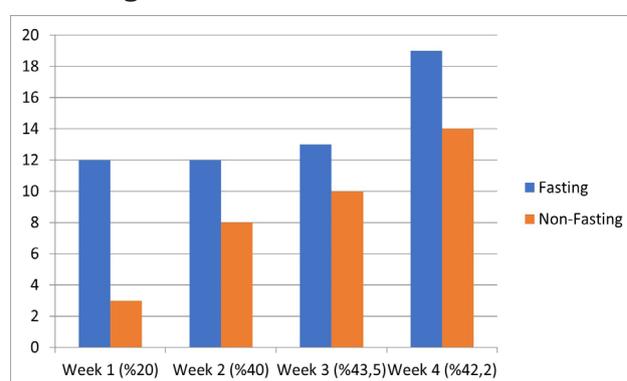


Figure 1: Rates of whether fasting or not among patients admitting with renal colic in Ramadan according to weeks

During Ramadan month, average weather temperature was $18.9\pm 4.4^\circ\text{C}$ and average humidity was 50.9 ± 103 ; while average weather temperature was $9.7\pm 3.6^\circ\text{C}$ and average humidity was 63.9 ± 10.4 during the month preceding Ramadan. Average, minimum and maximum air temperatures in the month of Ramadan were found to be significantly higher than the month before Ramadan, while the average humidity in the month of Ramadan was found to be significantly lower than the month before Ramadan ($p<0.05$) (Table 2).

Table 2: Comparison of weather temperature and humidity rates between Ramadan and the preceding month

| | Preceding Month Mean±SD | Ramadan Mean±SD | p |
|-------------------------|-------------------------|-----------------|--------|
| Average Air Temperature | 9.7±3.6 | 18.9±4.4 | <0.001 |
| Maximum Air Temperature | 16.5±4.9 | 26.8±5.1 | <0.001 |
| Minimum Air Temperature | 4.0±3.0 | 11.2±4.1 | <0.001 |
| Relative Humidity | 63.9±10.4 | 50.9±103 | <0.001 |

DISCUSSION

Al-Hadramy et al. reported that no significant increase incidence of renal colic during the Ra-

madan months compared with the other periods of the year (7). In another similar studies reported that no significant change in renal colic incidence during the month of Ramadan (4, 5). In contrast to these studies, Abdolreza et al. reported that the incidence of renal colic during the first half of Ramadan was significantly higher than two weeks before and after the month of Ramadan (8). In the study of Çevik et al., when the number of patients who applied to the emergency department for renal colic in the month of Ramadan and the month before Ramadan was compared; even though the average weather temperature in the month of Ramadan was higher, it was found that the number of patients was not significantly different from the month before Ramadan (9). Similarly, in our study, there was no significant difference between the two months.

In a study that evaluated 30358 cases, it was found that the average age of the patients who applied for renal colic was 44 and 63% of these patients were male (10). The results of our study are in line with the literature in terms of age; while, in terms of gender, the prevalence of women was higher in the month preceding Ramadan and the prevalence of men was higher in Ramadan month.

Fukuhara et al. reported that 57.3% of patients with stone-induced renal colic presented to the ED between 8:30 AM and 13:00 PM (2). Our study, on the other hand, found that fasting individuals more commonly applied to the ED between the hours of 4 p.m. and 12 a.m. We hypothesize that fasting people apply to the emergency department after iftar because they think that their fasting will be broken when painkillers and serums are given to the body (intramuscularly, intravenously etc.).

Günaydın et al. showed that there was no significant difference between fasting and non-fasting subjects in terms of urinary erythrocyte, leukocyte and ketone levels (11). Çevik et al. showed that there was no significant difference between urine erythrocyte, leukocyte, ketone levels of patients applying with RC in Ramadan versus those applying in preceding month Ramadan. The same study also showed the absence of any significant difference between

urine erythrocyte, leukocyte and ketone levels in the first and second halves of Ramadan (9). In our study, there was no significant difference in terms of leukocyte and ketone levels in the urinalysis of the patients among groups in line with literature. However, erythrocyte level in urine was found to be lower in group 3 compared to other groups.

Urine density is the ratio of solutes (NaCl, Sulfate, Phosphate, K, Cl) in unit volume to the density of distilled water in unit volume. It is normally 1002-1020 and it is an indicator of the kidneys' concentration ability (12). Günaydın et al. reported similar urine density values for fasting and non-fasting individuals (11). Çevik et al. found a higher urine density in Ramadan compared to that in the preceding month. The same study reported comparable urine densities in the first and second halves of Ramadan (9). In our study, consistent with the literature, urine density of group in the month before Ramadan was found to be significantly lower than the groups in Ramadan. However, no statistically significant difference was found in terms of urine density the fasting group than the non-fasting group in Ramadan. The fact that the urine density was higher in Ramadan compared to the previous month, but there was no difference between those who fasted and those who did not in the same month, suggested us that the increase in urine density might be related to the increased air temperature in Ramadan rather than fasting. In a study, 73% of RC patients had urinary stones (2). Al Mahayni et al. found that the ureter was the most common location that urinary stones were formed comparing to other locations during the month of Ramadan (4). Our study revealed that the most common location of urinary stones was ureters (84.4%). Furthermore, we did not detect any significant difference between the study groups with respect to the presence and location of urinary stones.

Some studies compared the prevalence of renal colic in the first and last two weeks of Ramadan and found that the prevalence of renal colic was higher in the first half (8, 9). In our study, the rate of patients who applied with renal colic in the first week of Ramadan was higher in fasting individuals than those who did not fast;

yet it was found that this rate started to decrease in the following weeks. We believe that this finding may be explained by the possibility that patients who had renal colic might have stopped fasting.

As a result, it was found that fasting patients were most likely to visit the emergency department for renal colic between the hours of 4 p.m. and 12 a.m. Erythrocytes were found significantly less in the urine analysis of those who did not fast during Ramadan. It was also found that the urine density was higher in patients who came during Ramadan. However, we believe that this is not related to fasting but to the increasing air temperature.

The limitations of our study may be its retrospective design and that it does not compare the month of Ramadan with all months of the year.

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