

## Evaluation of Patients Presenting with Renal Colic in Emergency Department

*Acil Servise Renal Kolik ile Başvuran Hastaların Değerlendirilmesi*

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### ABSTRACT

**Objective:** This study aimed to assess some demographical and clinical aspects and laboratory findings of patients presenting with the complaint of renal colic to the emergency department.

**Material and Methods:** The study included a total of 150 adult patients presenting to the emergency department of our University hospital with the complaint of renal colic between January 2009 and January 2010. The data were derived from the patient files of our hospital. Demographical data, time of admission, clinical findings together with laboratory and radiologic findings of patients were assessed. Mean values were calculated as mean value  $\pm$  standard deviation.

**Results:** Of the patients 91 (68,4 %) were male and the mean age was 38,9 $\pm$ 16,5 years. Most of the patients were admitted in October (n= 22, 16,6 %). The most common complaint of the patients was flank pain. The erythrocytes was revealed in 72,2 % of the patients by the urinalysis. Calculus formation was determined in 71 (53,4 %) of the patients. The urinary system ultrasonography (USG) was applied to 39,1 % of the patients and localized renal calculus was detected in 52,0 % of those patients. It was identified that the most common region of localization was the ureter and detected in 29 of the patients (40,9 %).

**Conclusion:** Ultrasonography is considerably a valuable method in identifying renal complications that might lead to dysfunctions in these patients. However, the absence of hematuria does not necessarily rule out the renal colic. We think that emergency physicians should rule out the urinary obstruction in such kind of patients.

**Keywords:** Renal colic; emergency department; side pain.

### ÖZET

**Amaç:** Bu çalışmada acil servise renal kolik ile başvuran hastaların bazı demografik ve klinik özelliklerinin ve laboratuvar bulgularının değerlendirilmesi amaçlandı.

**Gereç ve Yöntem:** Çalışmamız Ocak 2009-Ocak 2010 tarihleri arasında Üniversite hastanesi acil servisine renal kolik nedeniyle başvuran, erişkin, 150 hastayı kapsamaktadır. Veriler, hastanemizin hasta dosyalarından elde edilmiştir. Hastaların demografik özellikleri, başvuru zamanı, klinik bulguları, laboratuvar ve radyolojik verileri değerlendirildi. Ortalama değerler, ortalama  $\pm$  standart sapma olarak verildi.

**Bulgular:** Hastaların 91'i (% 68,4) erkekti ve yaş ortalamaları 38,9 $\pm$ 16,5 yıl idi. En fazla hasta başvurusu ekim ayında oldu (n= 22, % 16,6). Hastaların en sık şikayeti yan ağrısı idi. Yapılan idrar analizinde hastaların % 72,2' sinde eritrosit tespit edildi. Hastaların 71'inde (% 53,4) taşın lokalizasyonu belirlendi. Üriner sistem ultrasonografi (USG)'si uygulanan hastalarda (n=52, % 39,1) taşın görülme oranı % 52,0 idi. Tespit edilen en sık taş yerleşim yerinin 29 hasta (% 40,9) ile üreter olduğu belirlendi.

**Sonuç:** USG, bu hastalarda böbreğin işlev kaybına sebep olabilecek komplikasyonları saptamak için oldukça değerli bir yöntemdir. Renal kolikli hastalarda mutlak hematüri olmayabilir. Acil hekimlerinin bu tür hastalarda üriner obstrüksiyonu dışlamaları gerektiğini düşünmekteyiz.

**Anahtar Kelimeler:** Acil servis; renal kolik; yan ağrısı.

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## INTRODUCTION

Renal colic is a common urological state of emergency that generally develops based on the kidney stone disorder, manifests itself with sharp pain, occurs as a result of ureter obstruction, spasm, strain and dilatation, and is frequently diagnosed and treated in emergency departments of hospitals. It is considered that many factors, including but not limited to genetic factors, gender, age, geography, dietary habits, race, seasonal situation and profession, have role in the etiology of the urinary calculus disease (1).

Pain lasting for 12 hours in the abdominal, lumbar and costovertebral region and haematuria (>10 erythrocytes/microscopic area) are the most significant symptoms for diagnosing acute renal colic. Accurate diagnosis, early and effective treatment are the issues of the greatest sense that emergency physicians who frequently encounter these cases, should be aware of.

In this study, we aimed to assess some demographical and clinical aspects and laboratory findings of patients presenting to the emergency department with the complaint of renal colic.

## MATERIAL and METHODS

The present retrospective study, for which permit was acquired from the ethical council, covers 150 adult patients presenting to the emergency department of our University Hospital with the complaint of renal colic between January 2009 and January 2010. Pediatric patients and 17 adult patients who could not be reached their data were excluded from this study. The data were derived from the patient files of our hospital. Demographic characteristic, application time as monthly and seasonal variation, clinical findings together with laboratory and radiologic data of patients were assessed. Age, gender of the patient, accompanying symptoms (nausea, vomiting etc.), findings of the urinalysis, urinary system ultrasonography (USG) findings, whether consultation request was filed, whether the patient was hospitalized were assessed.

The study data were analyzed in SPSS 21.0 for Windows. Continuous variables were stated as mean value  $\pm$  standard deviation, and frequent variables as rates. We used the chi-square test for evaluation of differences between in application times of all patients to our hospital. *p* value < 0.05 was accepted as significant.

## RESULTS

Out of 133 patients, 91 (68,4 %) of them were male and 42 (31,6 %) were female. Average age of the patients was  $38,9 \pm 16,5$  (min.18 - max.76) years. The most frequent number of the patient admissions was detected in October (22 patients, 16,6 %) and November ( 20 patients, 15,1 %). During May, the admissions to emergency department revealed the lowest frequency ( 4 patients, 3,0 %) (Table I). The difference of the distribution of the patients according to the months of the year was evaluated and found to be different ( $p=0,004$ ).

Seventy-three of the patients (54,9 %) had a history of urinary system calculus. It was observed that the most common complaint of the patients was flank pain (109 patients, 82,0 %), and the most significant symptoms accompanying the flank pain were burning during urination (23 patients, 17,3 %) and nausea-vomiting (18 patients, 13,5 %). The physical examination revealed that 107 patients (80,5 %) had costovertebral angle tenderness. The urinalysis revealed the presence of erythrocytes in 96 patients (72,2 %), urinary crystals in 6 patients (4,3 %), and the presence of epithelium in 7 patients (5,3 %). Upon direct urinary system radiography, urinary calculus was found in 33,8 % (45 patients) of the patients. It was found that the urinary system USG was applied to only 39,1 % (52 patients) of the patients. In 27 of the patients undergoing USG, the calculus could be localized. In 11 of the patients undergoing USG, a dilatation of Grade III-IV was found (Table II). Calculus was localized in 71 of the patients (53,4 %) and diagnosed by USG or direct urinary system radiography. It was identified that the most common region of localization was the ureter (40,9 %) (Table III). Spiral computed tomography was performed to 37 (27,8 %) of the patients for the detection of urinary calculus, but renal calculus were not detected in two of them. The achievement rate of spiral CT for urinary calculus is 94,2 %. It was found that urologic consultation was requested by the emergency service for 48 (36,1 %) of the patients, out of which 38 (28,6 %) were hospitalized in the urology clinic. It was further found that 85 patients (63,9 %) were discharged from the emergency department without urology consultation and 10 (7,5 %) patients were discharged after the urology consultation.

**Table I:** Distribution of renal colic visits according to the months and season.

Season	Months	n	%
<b>Autumn</b>	September	13	9,7
	October	22	16,6
	November	20	15,1
	<b>Total</b>	<b>55</b>	<b>41,4</b>
<b>Winter</b>	December	10	7,5
	January	9	6,8
	February	7	5,2
	<b>Total</b>	<b>26</b>	<b>19,5</b>
<b>Spring</b>	March	8	6,0
	April	11	8,3
	May	4	3,0
	<b>Total</b>	<b>23</b>	<b>17,3</b>
<b>Summer</b>	June	7	5,3
	July	10	7,5
	August	12	9,0
	<b>Total</b>	<b>29</b>	<b>21,8</b>
<b>Total</b>		<b>133</b>	<b>100,0</b>

**Table II:** Sonographic renal dilatation grades.

Grade	n	Frequency (%)
No dilatation	15	28,8
Grade I	12	23,1
Grade II	14	26,9
Grade III	8	15,4
Grade IV	3	5,8
Total	52	100,0

**Table III:** Stone localization.

Stone localization	n	Frequency (%)
Renal Parenchyma	15	21,1
Renal pelvis	22	30,9
Ureter	29	40,9
Bladder	5	7,1
Total	71	100,0

## DISCUSSION

Renal colic remains to be one of the most common complaints for patients to present to emergency departments in our country like in the whole world. For those with a history of passing kidney stones in the family, the risk of passing kidney stones rises by two folds compared to normal population.

This occurs 2-3 folds more frequently in men than women (2, 3). In our country, Akıncı (4) determined male/ female rate upon his research as 60 / 40 %, whereas Aktas et al. (5) reported the same rate as 64,5 / 35,5 %, Yiğit et al. (6). as 57,9 / 42,1 %, and, Uluocak et al. reported (7) as 49,4 / 50,4 %. And our study reveals a similar finding, in agreement with the literature, where it is two folds higher in men compared to women.

Though renal colic may be seen at any age, it reaches the climax at the age range of 35-45 years (3). In their study, Uluocak et al. found a patient age average of 41 years, and reported that there is no significant statistical difference between two genders in terms of age (7). In their study for renal colic treatment involving 213 cases, Temeltas et al. reported an age average of 40,9 years, in agreement with the literature (8). Similar to the literature, our study has revealed an age average of 38,9 years for renal colic occurrence.

The frequency of admissions to emergency department caused by renal colic can be different according to the months, seasons and climates. Regarding to the seasons, age and the gender, the incidence of renal colic can be found significantly different as reported by Chauhan et al (6), and it was shown that the incidence was found to be higher in June, July and August compared to December, January and February. Another study also revealed that the frequency of admissions to emergency department due to renal colic has changed by the seasons and reported as 21,6 % in winter, 25,6 % in autumn and 29,5 % in summer period (9). We also found that the number of admissions increased in autumn with the highest level in October (n=22, 16,6 %) and decreased in spring and winter with the lowest level in May (n=4, 3,0 %). The frequency is different by the seasonal changes (p=0,004). We think that, reason why our patients were admitted in autumn is the characteristics of the climate in Black Sea Region as it has a temperate climate which is rainy almost in every season.

Costovertebral angle tenderness is the most common finding of physical examination, and acute flank pain is the most common symptom followed by other frequent complaints including burn during urination, nausea, vomiting, abdominal pain and change in urine colour (3, 10). Most of the cases exhibit hematuria (10, 11). However, it should be known that non-presence of hematuria does not necessarily rule out the renal colic. Bozkurt et al. reported that 43,0 % of the patients had hematuria and flank pain was accompanied by abdominal pain, discomfort and burn during urination (12). In our study, the physical examination revealed a costovertebral angle tenderness in 80,5 % of the patients. The most common symptom was flank pain, and usual complaints of burn during urination, nausea-vomiting, in agreement with the literature, were also present in our patients.

In our study, urinalysis revealed the presence of urinary erythrocytes in 72,2 % of the patients.

The sensitivity and specificity of direct urinary system radiographies, particularly in identifying urinary calculi, are respectively around (45 - 58 %) and (60 - 77 %) (13). It is not individually sufficient to diagnose renal colic. Also more specific diagnostic methods such as IVP, ultrasonography (USG) and spiral CT are employed. As USG is a fast, smoothly practicable, non-invasive and relatively more affordable method, it has turned out to be an ideal method in assessing and following-up patients with renal colic. The achievement of USG in imaging urethral calculi is around 70,0 %. It displays calculi in kidney and urinary bladder at an elevated rate of achievement (10, 14). Contrary to the literature, Uluocak et al. could find calculi only in 44 of the patients (4,0 %) out of 1095 to whom USG was applied in their field study. In a study in which ultrasonography and spiral tomography were compared in terms of their performance in locating urethral calculi, Aktas et al. reported that spiral BT could locate calculi at an achievement rate of 97,0 % whereas it was 70,0 % for ultrasonography (5). In their study, Özden et al. reported that the most common location of calculi in patients with renal colic was renal pelvis and upper ureter followed by lower ureter (15). In our study, direct urinary system radiography could reveal calculi in 33,8 % of the patients. It was observed that the urinary system USG was applied to around 40,0 % of the patients, and could localize calculi in 52,0 % of them. This rate was lower than the literature because USG is a diagnosing tool that depends on the per-

former and is effected by the characteristics of the patients. And our study revealed the most common location of calculi as ureter. In our study, we were detected similar an achievement rate of spiral CT for urinary calculus with literature (5).

While solitary or transplanted kidney, urethral calculi together with fever, sepsis or pyelonephritis accompanying proven calculi in patients with renal colic presenting to the emergency department are definite indications for hospitalization. Cases such as ureteral calculi larger than 7 mm and not passing despite hydration, and additional history of disease (renal failure, dehydration) constitute indefinite indications for hospitalization (16). Indeed, there is not sufficient information in the literature as to the rate of hospitalization, yet in the study by Akıncı, it is reported that 7,98 % of the patients presenting with the complaint of acute renal colic receive inpatient therapy (4). In our study, it was observed that 22,8 % of the patients presenting with the complaint of acute renal colic were hospitalized in urology department. A significant difference is observed between these two rates, and we are of the opinion that patients presenting or referred to our hospital are particularly selected from among the group of patients with high indication of inpatient therapy due to the location of our hospital which is far from city center.

In conclusion, it is observed that renal colic is more commonly seen in middle-aged male patients. USG is considerably a valuable method in identifying renal complications that might lead to dysfunctions in these patients. We are of the opinion that emergency physicians should rule out of urinary obstruction in such kind of patients.

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