

Are there any predictive findings for surgical intervention need in urinary system stones?

Üriner sistem taşı için girişim gereksinimini öngören faktörler var mıdır?

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Abstract

Background: Renal colic is a frequently encountered urologic emergency condition, that often develops due to kidney stone disease, manifests itself with severe pain, which prompt patients to admit emergency departments where it is usually diagnosed and treated. Most of the patients report a history of urinary stone disease or renal colic. In the present study, we aimed to investigate the factors that can predict the diagnosis and the need for intervention in those patients admitted with renal colic.

Methods: Patients who were admitted to the emergency department and urology outpatient clinic of our hospital between May 2016 and June 2018 with the complaints of unilateral or bilateral side pain, abdominal pain, inguinal pain were reviewed retrospectively and patients who were suspected of renal colic were examined and included in the study. Physical examination findings, family history, history and pain scores of the patients were reviewed. Complete urinalysis was done and computed tomography (CT) was performed on patients suspected of having stones. Patients diagnosed with stone disease by CT were divided into two groups according to the criteria of having any need for intervention or not. Group I consisted of those patients who required surgical intervention due to stone while Group II consisted of the patients without stones or with stones that need no intervention other than medical treatment.

Results: A total of 516 patients were included in the study. The mean age was found as $41,17 \pm 20,8$ years in group 1 and $36,08 \pm 18,8$ years in group 2. The male/female ratio was 112/60 in group 1 and 200/144 in group 2. As the result of the study, the presence of microscopic hematuria, familial history of stone, history of stone and history of stone operation were found to be predictive factors in determining the need for intervention due to urinary stone disease, in multiple analysis.

Conclusion: The presence of familial history of stones, the presence of microscopic hematuria in complete urinalysis and the presence of a stone history may be used for predicting the need for interventions due to stones in those patients admitted to the emergency departments or outpatient clinics.

Keywords: Renal colic, Urinary system stone, Hematuria, Stone history

Öz.

Amaç: Renal kolik, sıklıkla böbrek taş hastalığına bağlı olarak gelişen, acil servislerde tanı ve tedavisi yapılan, şiddetli ağrı ile kendini gösteren, sık karşılaşılan ürolojik acil bir durumdur. Hastaların birçoğunda üriner sistem taş hastalığı veya renal kolik geçirme öyküsü vardır. Bu çalışmamızda, renal kolik ile başvuran hastaların tanısı ve patolojiye yönelik girişim gereksinimini predikte eden faktörleri incelemeyi amaçladık.

Materyal ve Metot: Mayıs 2016 ile Haziran 2018 tarihleri arasında acil servise ve üroloji polikliniğine tek ya da iki taraflı yan ağrısı, karın ağrısı, kasık ağrısı şikayeti ile başvuran ve renal kolik olduğu şüphelenilen hastalar retrospektif olarak incelenerek çalışmaya dahil edildi. Hastaların fizik muayene bulguları, aile öyküsü, özgeçmişi ve ağrı skorları sorgulandı. Tam idrar tetkiki ve taş şüphesi olan hastalara bilgisayarlı tomografi çekildi. Taş hastalığı olup olmadığı BT ile ortaya konan hastalar girişim gereksinimi olup olmamasına göre iki gruba ayrıldı. Grup I, taş nedeniyle girişim gerektiren hastalardan, Grup II, taşı olmayan veya taşı olup medikal tedavi dışında girişim gerektirmeyen hastalardan oluşmakta idi.

Bulgular: Çalışmaya 516 hasta dahil edildi. Grup 1 de yaş ortalaması $41,17 \pm 20,8$, grup 2 de yaş ortalaması $36,08 \pm 18,8$ olarak tespit edildi. Grup 1 de erkek/kadın oranı 112/60, grup 2 de 200/144 olarak bulundu. Bu bulguların sonucuna göre mikroskopik hematüri varlığı, ailede taş öyküsü varlığı, özgeçmişte taş öyküsü ve taş operasyon öyküsü varlığı çoklu analizde üriner sistem taş hastalığına bağlı girişim gereksinimini tespit etmede prediktif faktörler olduğu görüldü.

Sonuç: Acil servise veya polikliniğe yan ağrısı ile başvuran hastalarda ailede taş öyküsünün olması, tam idrar analizinde mikroskopik hematüri varlığı ve taş öyküsünün varlığı taş hastalığına bağlı girişim gereksinimini öngörmeye kullanılabilir.

Anahtar kelimeler: Renal kolik, Üriner sistem taşı, Hematüri, Taş öyküsü

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Introduction

Many cases apply to the urology and emergency clinics every day with the complains of acute renal colic. Urolithiasis is detected in about 3% to 5% of the general population. There is a risk of recurrence in 50% of patients with urinary stones, within 10 years (1,2). Renal colic is a frequently encountered urologic condition diagnosed and treated in the emergency departments, often developing due to kidney stone disease and manifesting itself with severe pain. Most of the patients report a history of urinary stone disease or renal colic. The pain is typically felt at costovertebral angle as a blunt, continuous and gripping pain. In this study, we aimed to investigate the factors that can predict the diagnosis and need for surgical intervention in patients admitted with renal colic.

Materials and Methods

Patients who were admitted to the emergency department and urology outpatient clinic of our hospital between May 2016 and June 2018 with the complaints of unilateral or bilateral side pain, abdominal pain and inguinal pain were reviewed retrospectively and patients who were suspected of renal colic were examined and included in the study. Physical examination findings, history, family history and pain scores of the patients were reviewed. Complete urinalysis was done and computed tomography (CT) was performed on patients suspected of having stones. Patients who were diagnosed with stone disease by CT were divided into two groups according to the criteria of having any need for intervention or not. Group I consisted of those patients who required surgical interventions (URS, PCN, ESWL, DJS) due to stone while Group II consisted of the patients without stones or with stones that need no intervention other than medical treatment.

IBM SPSS (Statistical Package for Social Sciences, Chicago, IL) v20 program was used for statistical analysis. Differences between the groups were assessed by Chi-square test for categorical variables, by T test. $P < 0.05$ was considered statistically significant

Results

A total of 516 patients were included in the study. The mean age was found as $41,17 \pm 20,8$ years in group 1 and $36,08 \pm 18,8$ years in group 2. The male/female ratio was 112/60 in group 1 and 200/144 in group 2. According to the study results, presence of microscopic hematuria, familial history of stone, history of stone and history of stone operation were found to be predictive factors in determining the need for intervention due to urinary stone disease, in multiple analysis (Table). It was determined that age, gender and pain score can not predict the need for intervention.

Discussion

Renal colic is an emergency condition induced by kidney stone disease, manifesting itself by sudden onset of severe and stabbing pain, and usually diagnosed and treated in emergency departments (3). Patients describe the condition as "the most painful and enfeebling experience

ever". The risk of having renal colic attack in lifetime is between 1-10% (4). Initial complaint of the patients admitted to emergency department with urinary system stone disease is typically an acute and sudden onset of intense, convulsive and intermittent pain, starting in the lumbar region and extending towards the groin. Pain arising from the ureter is visceral, it does not cause peritoneal irritation. Patients squirm in intense pain, find it difficult to find a comfortable position (5).

Renal colic pain is one of the most common causes of admission to emergency departments in our country as it is in the world. Patients suffering renal colic constitute 7-9% of first-aid emergency ambulance service calls in Europe (3).

Renal colic is more common in the age range of 35-45 years, although can be seen at any age (6, 7). In their study, Türk et al. found the mean age of patients with renal colic as 41 years and determined no differences with respect to gender (8). In another study evaluating 213 patients, the mean age was reported as 40.9 years (9). In our study too, the mean age was found to be 35.2 years with no difference between study groups.

There are different data in the literature regarding the incidence of colic pain between genders. Although it was generally reported to be more common in males than females, such a difference has gradually disappeared in recent publications (7,8,10-12). In our study too, the need for stone intervention was not statistically significant with respect to gender.

If the kidney stone is obstructing, it produces colic pain. If stones located in renal pelvis and the calyces cause partial obstruction, then blunt pain occurs in the lumbar region. Renal colic occurs due to distention and hyperperistalsis of the ureter and the collector system. Distention of the kidney capsule causes non-colic blunt pain. Ureteral stones are the cause in 60-95% of the patients presenting with acute side colic pain (6,13). Local conditions such as mucosal irritation, inflammation, edema, hyperperistalsis can also produce pain. In particular, edema may cause colic pain due to stretching of free nerve endings. Severity of the pain may lead the clinician to follow a more aggressive approach in diagnostic tests. Actually, the size of the stone does not change the pain score (8). In addition, this present study demonstrated that severity of pain was not a parameter

indicating the need for intervention.

Other symptoms such as nausea and vomiting may accompany acute flank pain. This may be due to the stimulation of the celiac ganglion (3,6). In our study, urinary stones were found at significantly higher rates in those patients with concomitant nausea and vomiting. In those patients presenting with side pain, questions about any additional accompanying complaints may be helpful to establish diagnosis. Ureteral stones show symptoms by

getting settled at anywhere in a section of the ureter. As the stone descends into the pelvis, pain may spread to the abdomen. In case of distal ureteral stones, the pain tends to spread towards the ipsilateral groin and genital area. Symptoms of vesical irritability may occur in stones located at ureterovesical junction (2). This study demonstrated that patients with new onset of voiding symptoms due to vesical irritability required no intervention due to urinary system stones.

Table 1. Factors predicting the need for surgical intervention and statistical analysis

	Group I	Group II	Univariate Analysis p Value	Multivariate Analysis p Value
Age	41,17	36,08		
Gender			0,127	
Male	112	200		
Female	60	144		
Pain Score	6,3			
1-----4	32 (18,6%)	28 (8,1%)	0,206	
5-----8	128 (74,4%)	276 (80,2%)	0,596	
9-----10	12 (6,9%)	40 (11,6%)	0,131	
Need for Pain Relief			0,244	
Yes	156	300		
No	16	44		
Admission to ED			0,059	
Yes	144	308		
No	28	36		
Microscopic Hematuria			<0,001	<0,001
Yes	160	272		
No	12	72		
Stone History			<0,001	<0,001
Yes	104	84		
No	68	60		
Stone Operation History			<0,001	<0,001
Yes	44	12		
No	128	332		
Familial Stone History			<0,001	<0,001
Yes	104	140		
No	68	204		

Hematuria can occur due to traumatizing effect of the stone on calyceal or pelvic mucosa. Most patients have microscopic hematuria. Macroscopic hematuria may manifest as intermittent episodes of gross hematuria or tea-colored urine (14,15). However, the absence of hematuria does not exclude the possibility of urinary tract stones. In a study, hematuria was detected in 72.2% of patients (7). Our study showed that the presence of microscopic and/or macroscopic hematuria may statistically significantly indicate the need for intervention. The likelihood of developing renal stone disease at least once in a lifetime is about 10% for each individual in the society. It appears two times more common in men with

respect to women. The recurrence rate of stone disease is 50% and 75% in 10 and 20 years, respectively. Recent studies reveal that its prevalence is increasing both for women and for the whole population (16,17). Although there is no similar study in the literature, our study show that a history of stone or a history of operation due to stone statistically significantly indicate a need for a reintervention due to the stone.

For those with a family history of kidney stones, the risk of developing kidney stones is twice compared to normal population. Recurrence occurs 2-3 folds more frequently in men than women (6,8). In our study too, the rate of detecting renal stones and the need for intervention due

to stone were found to be statistically significantly higher in those patients with a family history of urinary system stones.

Although there is no similar study in the literature, we determined some parameters indicating the need for intervention in those patients presenting with colic pain, which can be used to direct the clinician for additional tests during examination.

The major limitation of our study seems to be its small sample size. Nevertheless, we think that is an important study where the patients are evaluated with both clinical and laboratory data, regarding the stone disease requiring intervention. With the parameters given here, a scoring system can be established in prospective studies including more patients. In this respect, with the parameters given here, our study can be an important source of reference for establishing a scoring system in prospective studies with more patients.

Conclusion

In patients presenting to the emergency department or outpatient clinic with flank pain, history of stone, family history of stone, presence of microscopic hematuria in the complete urinalysis can be useful for predicting the need for stone-related intervention and the appropriate imaging method can be determined based on these parameters.

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