

Determination of kidney stone prevalence in Sivas city center: A retrospective research

Frequency of urinary system stone disease in Sivas

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Abstract

Aim: In this study, it was aimed to determine the prevalence of urinary stone disease (USD) in the center of Sivas based on data from patients who were diagnosed with USD at the urology clinic of the hospitals in Sivas center.

Material and Methods: This is a retrospective study. The records of the patients who applied to the Urology Department of the Faculty of Medicine of Sivas Cumhuriyet University and Sivas Numune Hospital i between 2014 and 2019 were examined in this research. Evaluations of statistics were made on the basis of data to determine the prevalence of USD in Sivas center.

Results: The data of 30218 people (20114 males and 10104 females) who applied to the Urology Polyclinic of Sivas Central Hospitals in 2014 and 2019 were evaluated for USD. Also, 4739 patients who were operated in both hospitals were evaluated according to gender and age. Results significantly increased with age for both genders ($p < 0.05$). On the other hand, the number of people treated with Extracorporeal Shock Wave Lithotripsy (ESWL) in both hospitals was 1543. They were evaluated by age and gender, and results were not statistically significant ($p > 0.05$).

The prevalence of USD in the Sivas Center was determined as 8%. Agglomeration was observed in 31-70 age groups in both sexes. The results showed that the risk of USD was twice as high among men in both Numune Hospital and C.U Hospital.

Discussion: Our country is one of the regions where USD is common, but there are not enough prevalence studies on this subject. It is a known fact that processes of diseases and treatment put a great burden on the economy of the country. Knowing the frequency of the disease makes it easier to take precautions. More epidemiological studies in larger populations are needed to direct health policies.

Keywords

Urinary stone disease; Sivas; Prevalence

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Introduction

Changings of economic balances, living conditions, eating habits and the huge amount of refugees, which increased in last years have changed the frequency and distribution of diseases in our country.

Epidemiological researches give an idea about the prevalence of diseases and provide precautions to be taken. However, epidemiological researches are rarely done in our country. It is a known fact that processes of diseases and treatment put a great burden on the economy of the country. Knowing the frequency of the disease makes it easier to take precautions.

Prevalence studies are widespread in the world [1-7]. Our country is considered a risky area for urinary stone disease (USD), but epidemiological studies are scarce [8-10]. USD is seen from birth to death at any age and sex and may lead to chronic kidney disease (CKD), which is extremely troublesome for the patient and expensive to treat when untreated [11-13]. In this study, it was aimed to determine the prevalence of USD in the center of Sivas based on the data of patients who were diagnosed with USD at the urology clinic of the hospitals in Sivas center.

Material and Methods

This is a retrospective study. Records of the patients who applied to Sivas Cumhuriyet University Faculty of Medicine, the Urology Department and Sivas Numune Hospital between 2014 and 2019 were examined in this research. The number of patients diagnosed with USD, the number of patients who received ESWL and the number of operated patients was determined. The data obtained from the study was uploaded to SPSS (ver: 22.01 program). Age, gender and years were compared. Statistical evaluations were made based on the data to determine the prevalence of USD in the Sivas center. The Ethics Committee of Sivas Cumhuriyet University approved this study (2020-01/23).

Results

In the study, the data of 30214 people who received a diagnosis of USD and applied to the Urology outpatient clinics of Sivas Central Hospitals from 2014 to 2019 were determined (C.U. Hospital 11732, Numune Hospital 18482 patients).

These patients, who were treated in both hospitals, were evaluated according to gender. There were 10100(♀) females and 19914 (♂) males in both hospitals. There were twice as many male patients as female patients. When age distribution was examined, the frequency was seen in both sexes in the age range of 31-70 years (Table1). Patients with bladder stones were excluded because their primer etiology is lower urinary system obstructions and commonly seen in males older than 65. Age and gender groups were compared. The result was statistically significant (p<0.05).

In the hospital, 6418/10100 (♀) females and 13627/20114 (♂) males were in the 31-70 age range. Age and gender groups were compared. The result was statistically significant (p<0.05) (Table 1). The prevalence significantly increased with age for both genders (p<0.05).

In the hospital, 7818 /12210 males (64%) and 4392/12210 females (36%) had kidney stones. For ureteral stones, 7186/10238 men (70.2%) and 3052/10238 women (29.8%), for kidney + ureteral stones, 5110/7766 (65.8%) males and 2656/7766 (34.2%) females, in total 20114 men (66.6%) and 10100 women (33.4%) were included in the study.

Among 30214 patients, 4739 were operated; 4739 patients (15.6%) who underwent surgery in both hospitals were evaluated according to gender. There were 3332 men (70.3%) and 1407 women (29.7%) for percutaneous nephrolithotomy (PCNL) and ureterorenoscopy (URS) (Table2).

Among 30218 patients, 1543 (5.1%) underwent ESWL. Patients were examined by age, gender and years. The difference was not statistically significant (p>0.05) (Table 2).

Table 1. Assessment of patients applying to urology polyclinic by age and gender

	KIDNEY STONE					URETERAL STONE					KIDNEY + URETERAL STONE				
	♂	%	♀	%	Total %	♂	%	♀	%	Total %	♂	%	♀	%	Total %
0-5	132	1.7	101	2.3	233 %1.9	49	0.7	24	0.8	73 %0.7	165	3.2	141	5.3	306 %3.9
6-10	160	2.0	154	3.5	314 %2.6	34	0.5	35	1.1	69 %0.7	107	2.1	109	4.1	216 %2.8
11-20	331	4.2	269	6.1	600 %4.9	241	3.4	199	6.5	440 %4.3	262	5.1	245	9.2	507 %6.5
21-30	968	12.4	655	14.9	1623 %13.3	1296	18.0	565	18.5	1861 %18.2	816	16.0	404	15.2	1220 %15.7
31-40	1429	18.3	686	15.6	2115 %17.3	1804	25.1	522	17.1	2326 %22.7	1153	22.6	396	14.9	1549 %19.9
41-50	1266	16.2	740	16.8	2006 %16.4	1324	18.4	501	16.4	1825 %17.8	834	16.3	436	16.4	1270 %16.4
51-60	1284	16.4	793	18.1	2077 %17.0	1074	14.9	550	18.0	1624 %15.9	770	15.1	416	15.7	1186 %15.3
61-70	1236	15.8	586	13.3	1822 %14.9	806	11.2	452	14.8	1258 %12.3	647	12.7	340	12.8	987 %12.7
71-80	739	9.5	321	7.3	1060 %8.7	434	6.0	164	5.4	598 %5.8	271	5.3	148	5.6	419 %5.4
81 +	273	3.5	87	2.0	360 %2.9	124	1.7	40	1.3	164 %1.6	85	1.7	21	0.8	106 %1.4
TOTAL	7818	100	4392	100	12210 %100	7186	100	3052	100	10238 %100	5110	100	2656	100	7766 %100
	X ² =127.58 P=0.001 P<0.05 Statistically Significant					X ² =169.42 P=0.001 P<0.05 Statistically Significant					X ² =151.90 P=0.001 P<0.05 Statistically Significant				

Table 2. Assessment of operation and ESWL cases by age and gender

	PCNL					URS					ESWL				
	♂	%	♀	%	Total %	♂	%	♀	%	Total %	♂	%	♀	%	Total %
0-5	5	1.1	5	1.5	10 %1.3	2	0.1	0	0	2 %0.1	0	0	0	0	0 %0
6-10	10	2.2	5	1.5	15 %1.9	7	0.2	4	0.4	11 %0.3	2	0.2	1	0.2	3 %0.2
11-20	5	1.1	12	3.5	17 %2.1	61	2.1	37	3.5	98 %2.5	13	1.2	9	2.0	22 %1.4
21-30	49	10.8	25	7.3	74 %9.3	537	18.6	172	16.2	709 %18.0	209	19.0	94	21.3	303 %19.6
31-40	83	18.4	41	11.9	124 %15.6	754	26.2	203	19.1	957 %24.3	231	21	87	19.7	318 %20.6
41-50	101	22.3	50	14.5	151 %19.0	620	21.5	199	18.7	819 %20.8	228	20.7	91	20.6	319 %20.7
51-60	91	20.1	87	25.3	178 %22.4	461	16.0	203	19.1	664 %16.8	213	19.3	76	17.2	289 %18.7
61-70	78	17.3	69	20.1	147 %18.5	316	11.0	155	14.6	471 %11.9	133	12.1	45	10.2	178 %11.5
71-80	24	5.3	45	13.1	69 %8.7	97	3.4	72	6.8	169 %4.3	61	5.5	32	7.2	93 %6.0
81 +	6	1.3	5	1.5	11 %1.4	25	0.9	18	1.7	43 %1.1	11	1.0	7	1.6	18 %1.2
TOTAL	452	100	344	100	796 %100	2880	100	1063	100	3943 %100	1101	100	442	100	1543 %100

$X^2=36.93$ $P=0.001$
 $P<0.05$ Statistically Significant

$X^2=67.37$ $P=0.001$
 $P<0.05$ Statistically Significant

$X^2=6.94$ $P=0.542$
 $P>0.05$ Statistically Nonsignificant

For ESWL, 1101 male (71.3%) and 442 female (28.7%) patients were found. Evaluation of operation cases (PCNL/URS) and ESWL results were also reported by years (Figure 1). The frequency was observed in the 31-70 age group. The incidence of stone was twice as high in males. This study was based on the 2019 Sivas/Center population registration systems, a database of the Turkish Statistical Institute. The prevalence of USD in the Sivas Center was determined as 8%. All statistical evaluations, (except ESWL) were found significant ($p<0.05$)

disease is 35-50% in 10 years [16,17,20]. Obesity, diabetes, malnutrition and rural-urban migration have become more common problems, increasing the risk of stone disease [18,20]. As the prevalence increases, the cost of treating kidney stone disease increases, and the productivity loss generates the socio-economic side of the problem [12]. The prevalence of stone disease is reported to be 2-8% in the USA [5,6]. In studies conducted in other countries, prevalence was found as follows: in Argentina 4%, in China 8% (♂), 5% (♀), in Korea 3.5%, in Taiwan 9.6%, in Iran 5.7% [4,19,21-23]. The prevalence of stone disease was 4.7% in Germany, 4.3% in Iceland and 10% in Italy [24,25]. Studying the relationship between uric acid stone and gout in Italy, Borghi et al. found a positive correlation between family history and stone disease and gout. The frequency of uric acid stones was high 26.5% [7].

Our country is one of the regions where stone disease is common, but there is not enough prevalence study on this subject. Akıncı et al. have reported that the prevalence of the disease in general was 14.8% [8]. Their study involved 1500 people from 14 regions throughout the country, with the incidence of 2.2% in 1989. It is reported that the disease is most commonly seen between the ages of 30 and 40, 1.5 times higher in males, and more common in people with low socio-economic status and lower education, whereas there is no difference in prevalence between urban and rural residents.

According to the study by Uluocak et al. in Tokat province, the lifetime prevalence of urinary stone disease was 11.42% [9]. In another regional study, individuals with stone disease were separated according to their regions, and 28.6% of the cases were from the Southeastern Anatolia region, 28.6% from the Eastern Anatolian region, 22.8% from the Marmara region, 14.3% from the Black Sea region. and 5.7% from the Central Anatolia region [10].

Türkan et al. performed a retrospective review of patient files in the Western Black Sea Region. In their study, the distribution of

EVALUATION OF OPERATIONS AND ESWL CASES BY YEARS



Figure 1. Evaluation of operations and ESWL cases by years

Discussion

The incidence of kidney stone disease in adults increases within time, and its prevalence ranges from 2 to 20% worldwide [14-16]. The urinary stone disease affects 1-5% of the industrial population. Regardless of gender and race, there has been an increase in prevalence since the last quarter of the twentieth century [6,17-19]. It is reported that the disease is most commonly seen (1.5 times more) in 30-40 years old males, and there is no difference in the prevalence among urban and rural inhabitants [8,15,16]. The recurrence rate of urinary stone

stone diseases according to localized kidney stones was found as 9040 (34.7%), ureter stones: 15264 (58.6%) and bladder stones: 1740 (6.7%) [14]. In our research, the prevalence of USD in the Sivas Center was determined as 8%, kidney stones: 12214 (40.4%), ureteral stones: 18004 (59.6%).

USD leads to varying degrees of kidney dysfunction and some secondary diseases [11]. It is noteworthy that recurrent febrile urinary tract infections and renal stone may cause permanent kidney damage, especially in children [11]. CKD progresses to renal failure, resulting in the need for renal replacement such as hemodialysis, peritoneal dialysis and transplantation. This puts a serious economic burden on society and impairs the quality of life of patients [13].

As a result, stone disease is an important public health problem in our country. If we think that the main purpose of modern medicine is to protect against diseases, improve nutritional habits, lifestyle and fluid intake, which are corrected risk factors for stone disease, and it is necessary to revise health education policies to balance socio-economic level. It is important for Turkey to determine a more accurate incidence. Making incidence studies in all cities lets us gather more accurate data. Training activities can be conducted in risk groups and high-risk areas. The population can be warned about "lifestyle, fluid intake and proper nutrition". More epidemiological studies in larger populations are needed to direct health policies.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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