

2019

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Recommended Citation

Salem Hatroom, Ali Ahmed (2019) "Frequency of lower Ureteric Stones and Their Treatment by Tamsulosin, Aden," *Hadhramout University Journal of Natural & Applied Sciences*: Vol. 16 : Iss. 1 , Article 4.

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Frequency of lower Ureteric Stones and Their Treatment by Tamsulosin, Aden

Ali Ahmed Salem Hatroom*

Abstract

The aim of the study is to find out the frequency of lower ureteric stones related to sex, age, and the outcome of using tamsulosin in their treatment. This was a retrospective study of all patients who suffer from lower ureteral stone and seen in our Private Urology Clinic from January 2014 to December 2017 in Aden. The total patients were 160. They were 98 (61.3%) males and 62 (38.7%) females) with ratio male to female 1.6 :1. The mean age of patients is (35.2 ± 11.2) years, range (15 to 56) years. Most involved side is left ureter 80 (50.0%). The mean size of stones is 6.8 ± 1.6 mm. The most effected age group was 21 – 50 years with 76.3%. Seventy four (46.3%) of the patients treated only with Tamsulosin and the expulsion time ≤ 9 days were in 20(12.5%) of the patients while > 9 days were in 54(33.8%) patients. Patients treated by Tamsulosin with prednisolone were less in the expulsion time of stones ≤ 9 days. By the size of ≤ 7 mm, 38(23.7%) of patients have expelled the stones in the time ≤ 9 days and 66(41.3%) of the patients expelled the stones in the time > 9 days. Also, by the size of > 7 mm, only 10(6.3%) of patients have expelled the stones in time ≤ 9 days and 46(28.7%) expelled the stones in time > 9 days, ($p = 0.010$). We concluded that tamsulosin is an effective and safe treatment modality for lower ureteral stones of less than ≤ 10 mm.

Key words: Frequency, lower ureter, stone, treatment, tamsulosin .

Introduction:

Ureteral stones are a common problem in primary care practice [9], with observed incidences of 3%~18% in various geographical locations [22].

The ureteral stones are most prevalent between the ages of 20 and 40 years and are three times greater in men than women [16]. Women typically excrete more citrate and less calcium than men, which may explain the higher incidence of stone diseases in men [11].

The location and the size of the stone, the availability of the technology, the treatment cost, the experience of the surgeon, and the preference of the patients are considered when a treatment is chosen among the other alternatives [2]. The probability of spontaneous expulsion of the ureteral calculi has two factors: the size of the calculi and the anatomic location of the calculi. Therefore, spontaneous expulsion of the stone protects the patient from surgical intervention, anesthesia risk and additional costs, who does not have infection history and who has pain control and small size of calculi. By this way, with the understanding of the ureter physiology in detail, the concept of medical expulsive therapy has been developed in order to make the spontaneous expulsion of the stone easier [23].

The purpose of the medical expulsive therapy is to increase the spontaneous probability of the stone expulsion by enabling relaxation in the ureter

smooth muscle structure and eventually it reduces the pain level and frequency felt by the patient, shorten the time of stone expulsion, reduces the need of operation, prevents the risk and complications related with the operation and reduces the cost of the treatment. Some main points need attention during the medical expulsive treatment. The most important two factors of them are the location of the calculi in the ureter and the size of the calculi. The maximum upper limit recommended for the treatment of the medical expulsive is 10 mm [24].

The management of ureteral stones includes watchful waiting for spontaneous passage, medical expulsive treatment, extracorporeal shock wave lithotripsy, ureterorenoscopic lithotripsy, open ureterolithotomy and laparoscopic ureterolithotomy. Except watchful waiting and medical expulsive treatment, the other interventions have higher healthcare expenditures and are relatively invasive, so the medical expulsive treatment is preferred by patients, as it might facilitate the spontaneous expulsion of ureteral stones [20].

Several pharmacological agents are used in medical expulsive treatment, including α -blockers, calcium channel antagonists, phosphodiesterase inhibitors, and corticosteroids. These have been demonstrated to facilitate ureteral stone passage. Of these interventions, α -blockers have the highest ranking, and the most commonly used α -blocker is tamsulosin [17].

Objective:

To find out the frequency of lower ureteric stones related to sex, age, and the outcome of using tamsulosin in their treatment

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Received on 22/10/2018 and Accepted for Publication on 17/12/2018

Materials and method:

A retrospective study of all patients who suffer from lower ureteral stone and seen in our Private Urology Clinic in Al-Mansoura, Aden over a 4-years-period, from January 2014 to December 2017.

During this period, a total of 160 patients were found with lower ureteric stones.

The patients' charts were retrieved and obtained information about sex, age, residency, stone side, stone size, type of treatment, and expulsion time of stone.

The data was entered into a computer and analyzed using SPSS version 17, statistical package. For variables difference, chi-square tests, and P values were calculated, with differences at less than 5% level being regarded as significant.

Results:

During the four years study period, 160 patients diagnosed with lower ureteric stones in our private clinic. They were 98 (61.3%) males and 62 (38.7%) females with ratio male to female 1.6 :1.

The mean age of all patients was (35.2 ± 11.2) years, range (15 to 56) years, (33.6 ± 10.6) years for males, and (37.6 ± 11.6) years for females, (Table 1 & Figure 1).

Most of the patients were from rural areas 108(67.5%).

The predominant stone sides involved were in the left ureter 80 (50.0%), followed by the right ureter 54(33.8%) while the bilateral sides were 26 (16.2%). The stone size ranges from 5mm to 10 mm and the mean size is 6.8 ± 1.6 mm.

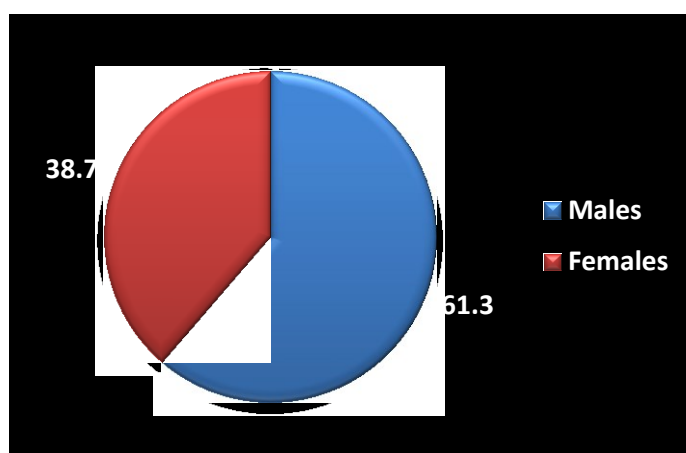


Figure 1: Distribution of patients related to sex

Table 1: Distribution of ratio, means and variables frequency of study patients

Items	Mean	No	%
Sex:			
Male		98	61.3
Female		62	38.7
Ratio male to female	1.6 :1		
Age (Range 15 - 56 years):			
Mean age of all patients \pm SD (years)	35.2 ± 11.2		
Mean age of males \pm SD	33.6 ± 10.6		
Mean age of females \pm SD	37.6 ± 11.6		
Residency:			
Urban		52	32.5
Rural		108	67.5
Stone side:			
Left ureter		80	50.0
Right ureter		54	33.8
Bilateral		26	16.2
Stone size (Range 5mm – 10 mm):			
Mean size \pm SD (mm)	6.8 ± 1.6		
Expulsion time of stone: (Range 7–14 days)			
Mean \pm SD (days)	10.5 ± 2.8		

SD: standard deviation

Table 2 shows that most effected age group was 21 – 50 years with 76.3% followed by the age group ≤ 20 years 12.5% then the age group > 50

years with 11.2% and they were in both sex predominance. The difference between values was not statically significant (p > 0.05).

Table 2: Distribution of patients with lower ureteric stones related to age group

Age group (years)	Sex				Total	
	Male		Female		No	(%)
	No	(%)	No	(%)		
≤ 20	16	(10.0)	4	(2.5)	20	(12.5)
21 – 30	20	(12.5)	16	(10.0)	36	(22.5)
31 – 40	34	(21.3)	14	(8.7)	48	(30.0)
41 – 50	20	(12.5)	18	(11.3)	38	(23.8)
> 50	8	(5.0)	10	(6.2)	18	(11.2)
Total	98	(61.3)	62	(38.7)	160	(100)

Chi-square = 8.643 ; p-value > 0.05

Table 3 and Figure 2 show the treatment types and the expulsion time of stones. Seventy four (46.3%) of the patients treated only with Tamsulosin and the expulsion time ≤ 9 days were in 20(12.5%) of the patients while > 9 days were in 54(33.8%) patients.

Patients treated by Tamsulosin with prednisolone were less in the expulsion time of stones ≤ 9 days; they represented 24(15.0%). The difference between values is not statistically significant (p > 0.05).

The table 3 illustrates also the expulsion time related to the size of stones. By the size of ≤ 7 mm, 38(23.7%) of patients have expelled the stones in the time ≤ 9 days and 66(41.3%) of the patients expelled the stones in the time > 9 days. Also, by the size of > 7 mm, only 10(6.3%) of patients have expelled the stones in time ≤ 9 days and 46(28.7%) expelled the stones in time > 9 days. The difference between values is statistically highly significant (p = 0.010).

Table 3: Expulsion time of stones related to treatment types and the size of stone

Variables of medication & size	Expulsion time of stone (days)				Total		P-value
	≤ 9 days		> 9 days		No	(%)	
	No	(%)	No	(%)			
Treatment:							
Tamsulosin	20	(12.5)	54	(33.8)	74	(46.3)	P > .05
Tamsulosin with prednisolone	24	(15.0)	40	(25.0)	64	(40.0)	
Tamsulosin with antibiotic	4	(2.5)	18	(11.2)	22	(13.7)	
Total	48	(30.0)	112	(70.0)	160	(100.0)	
Size (mm):							
≤ 7	38	(23.7)	66	(41.3)	104	(65.0)	P = 0.010
> 7	10	(6.3)	46	(28.7)	56	(35.0)	
Total	48	(30.0)	112	(70.0)	160	(100)	

Millimeters = mm;

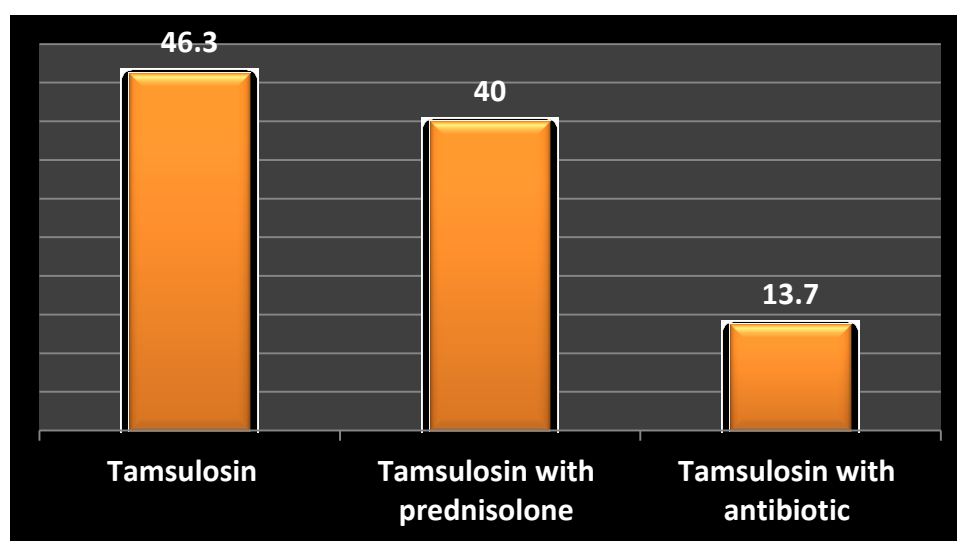


Figure 2: Distribution of treatment types

Discussion:

Symptomatic ureteric calculi represents the most common condition encountered by a urologist in an emergency setting [14]. Among all ureteral stones, 70% are found in the lower third of the ureter [11]. The goal of the surgical treatment of patients suffering from ureteral calculi is to achieve complete stone clearance with minimal morbidity [15].

In the present study, we found a total of 160 patients were diagnosed with lower ureteral stones according to their medical records. Males were significantly more affected than females; they were 98(61.3%) males and 62(38.7%) females with the ratio of males to females 1.6:1. Pradhan et al [19] and Trinchieri [27] reported that the prevalence of urolithiasis varies according to the geography, race/ethnicity, climate, gender, age and occupation.

Dong-Un, et al (8) mentioned that the prevalence in China is yet to be determined life time prevalence is estimated at 10% to 15%. It is afflicting 13% of men and 7% of women [11].

Symptomatic ureterolithiasis is one of the important issues that the urologists face in emergency clinical settings. Of all urinary tract stones, 20% are ureteral stones, and 70% of these ureteral stones are located in the distal portion of the ureters [29].

The frequency of occurrence of ureteric stones in a population and the type of ureteric stone may vary with the ethnicity. This may be attributed to the dietary pattern and changes in the climate and environment [25].

In the current study we found the mean age of all patients was (35.2 ± 11.2) years, range (15 to 56) years, (33.6 ± 10.6) years) for males, and (37.6 ± 11.6) years) for females,

Also, we found that most effected age group was 21 – 50 years with 76.3% followed by the age group ≤ 20 years 12.5% then the age group > 50 years with 11.2% and they were in both males and females predominance. The difference between values was not statically significant ($p > 0.05$).

Jeevaraman et al [12] reported in their study in India that the peak age incidence of ureteric calculi was found in the age group of 21-49 years and the male to female ratio was 1.7:1.

Also, there are other published studies found the same findings to our mentioned results of mean age and most effected age group [5,13,18].

In our current study the predominant stone sides involved were in the left ureter 80 (50.0%), followed by the right ureter 54(33.8%) while the bilateral sides were 26 (16.2%).

Degaonkar et al [5] found in their study in India that the left side of ureter more involved of lower ureter stones by 55%.

Our study revealed that the stones size range from 5mm to 10 mm and the mean size is 6.8 ± 1.6 mm. Other published studies reported to some extent similarly results as ours [1,4,13].

We found in our study 74 (46.3) of the patients treated only with Tamsulosin and the expulsion time ≤ 9 days were in 20(12.5%) of the patients and expulsion time with > 9 days were in 54(33.8%) patients.

The patients treated by Tamsulosin with

prednisolone were less in the expulsion time of stones ≤ 9 days; they represented 24(15.0%). The difference between values is not statistically significant ($p > 0.05$).

Prednisolone drug in association with tamsulosin seemed to induce more rapid stone expulsion [6]. Thapa et al [26] mentioned that due to the more adverse effect of other drugs, the use of alpha-blockers has increased recently, in which it was observed that tamsulosin is a safe and effective drug that enhances spontaneous passage of distal ureteral stones sized less than 10 mm.

The human ureter contains predominantly alpha receptors which are further classified as alpha 1 and alpha 2 receptors. In turn alpha 1 receptors, which are divided into subtypes on the basis of their selectivity. Alpha 1a (proximal urethra, prostate, bladder outlet), alpha 1b (smooth muscles of vessels) and alpha 1d (detrusor, lower ureter) [3]. When stimulated, they inhibit the basal tone, peristaltic wave frequency and the ureteral contractions even in the intramural part of lower ureter. They may work on the obstructed ureter by inducing an increase in the intraureteral pressure gradient around the stone, which increase in the urine bolus above the stone as well as decreased peristalsis below the ureter, in association with the decrease in basal and micturition pressures even at the bladder neck, thereby an increased chance of stone expulsion [21]. Ukhal and co-workers were the first to

report positive result in accelerating the lower ureteral stone passage using alpha blocker agent [28]. De Sio et al published a study of 96 patients and achieved 90% expulsion rate with tamsulosin therapy [7]. Griwan et al, noticed overall stone expulsion rate of 21 out of 30 patients (70%) was observed for control group and 27 out of 30 patients (90%) in study group [10].

Cervenakov et al [3], concluded that the treatment by $\alpha 1$ blockers considerably decreased not only lower urinary tract symptoms but also helped to accelerate the passing of minor calculi from the terminal parts of the ureter of 80.4% of patients.

Dellabella et al [6], used tamsulosin as a spasmolytic drug during episodes of ureteral colic due to juxtavesical calculi, observed an increased stone expulsion rate and with a decrease in stone expulsion time, the need for hospitalization and endoscopic procedures. Similar results were reported by other published studies [4,5,12].

Conclusion:

Tamsulosin is an effective and safe treatment modality for lower ureteral stones of less than ≤ 10 mm. The tamsulosin has been found to increase and hasten stone expulsion rates, decrease acute attacks by acting as a spasmolytic, reduces mean days to stone expulsion and decreases analgesic dose usage. Further researches in this filed are recommended.

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تواتر أحجار الحالب الأسفل وعلاجها بواسطة تامسولوسين ، عدن

علي أحمد سالم حطروم

الملخص

الهدف من الدراسة هو معرفة تواتر الحجارة البولية في الحالب الأسفل وفقاً للجنس والعمر ونتائج استخدام تامسولوسين في علاجها كانت الدراسة عبارة عن دراسة استرجاعية لجميع المرضى الذين يعانون من أحجار الحالب الأسفل وتمت معاينتهم في عيادة المسالك البولية الخاصة من يناير 2014 إلى ديسمبر 2017 في عدن. تم تشخيص 160 مريضاً بأحجار الحالب الأسفل وكانوا 98 (61.3%) من الذكور و 62 (38.7%) من الإناث مع نسبة الذكور إلى الإناث 1.6:1. متوسط عمر المرضى (11.2 ± 35.2) سنة، المدى (15 إلى 56) سنة. وكانت غالبية الإصابة في الحالب الأيسر 80 (50.0%). متوسط حجم الأحجار هو 1.6 ± 6.8 مم. وكانت الفئة العمرية الأكثر تأثراً هي 21 - 50 سنة بنسبة 76.3%. أربعة وسبعون (46.3%) من المرضى الذين عولجوا فقط بواسطة تامسولوسين بلغت الفترة حتى إخراج الحجر ≥ 9 أيام وكانت في 20 (12.5%) من المرضى بينما كانت < 9 أيام في 54 (33.8%) من المرضى. إن المرضى الذين عولجوا بواسطة تامسولوسين مع بريدنيزولون كانوا الأقل في الفترة الزمنية ≥ 9 أيام. وبالنسبة لمقياس الحجر ≥ 7 مم، فإن 38 (23.7%) من المرضى تخلص من الحجرة في زمن ≥ 9 أيام و 66 (41.3%) من المرضى تخلصوا من الحجرة في زمن < 9 أيام. أيضاً، والأحجار مقياس < 7 ملم، طرد فقط 10 (6.3%) من الحجرة في الزمن المحدد ≥ 9 أيام و 46 (28.7%) طرد الأحجار في الزمن المناسب < 9 أيام، $(P = 0.010)$. نستنتج أن تامسولوسين هو علاج فعال وآمن للأحجار في الحالب الأسفل وذات قياس ≥ 10 ملم.

الكلمات المفتاحية: تردد، حالب أسفل، أحجار، معالجة، تامسولوسين