

Original Article

The role of Tamsulosin in the Medical Expulsion Therapy for Distal Ureteral Stones.

Taimoor Jan , Haris Jameel , Mehnaz Jabeen , Rabeea Saleem , Pardeep Kumar Maheshwari  & Murli Lal
Sindh Institute of Urology and Transplantation (SIUT), Karachi-Pakistan.



Doi: 10.29052/IJEHSR.v10.i4.2022.373-378

Corresponding Author Email:

haris_yasir@hotmail.com

Received 02/09/2022

Accepted 14/11/2022

First Published 01/12/2022



© The Author(s). 2022 Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>)

Abstract

Background: Advancements in medical technology and the prevalence of various techniques in the treatment of ureteral stones have led to the comprehension of the efficiency of different methods. This study aims to assess Tamsulosin's contribution to spontaneous medical expulsion for distal ureteral stones.

Methodology: The research included 113 patients diagnosed with the distal ureteral stone of 4-10 mm. These patients were introduced to 0.4 mg of Tamsulosin. The technique of Kidneys, Ureters & Bladder (KUB) ultrasonography was adopted as the means of assessment of stone status following the period of Tamsulosin introduction.

Results: There was a high frequency of Spontaneous expulsion among the enrolled patients (86.73%). Furthermore, there was a significant effect of age on the frequency of spontaneous expulsion ($p=0.008$). While gender, disease duration, stone size, and side had no significant effect on the frequency of spontaneous expulsion after Tamsulosin administration for distal ureteral stones.

Conclusion: It is concluded that Tamsulosin has an efficient impact on triggering spontaneous expulsion among patients with distal ureteral stones.

Keywords

Tamsulosin, Expulsion Therapy, Distal Ureteral Stones.



Introduction

Advancements in medical technology and the prevalence of various techniques in the treatment of ureteral stones have led to the comprehension of the efficiency of different methods¹⁻³. There has been enhanced utilization of methods such as extracorporeal wave lithotripsy (ESWL) to reduce the adverse impact of ureteral stone removal, which is one of the least invasive methods⁴.

Other than this, another medical procedure that has led to the prominent decline in invasiveness is Medical expulsive therapy (MET). According to various studies, this therapy works effectively, enabling healthcare experts to administer Tamsulosin, a vital α -adrenoceptor antagonist⁵⁻⁷. The medicine aid the process of relaxation of ureter muscle and is considered an α 1A receptor blocker in the procedure, leading to a decline in the evasive nature of the procedure.

This idea is further supported by studies such as one by Nuraj and his colleagues in which 90.4% of the patients' cases in which the patient received the drug resulted in spontaneous expulsion⁸. Similarly, another study led to the conclusion that spontaneous expulsion is the outcome of using Tamsulosin in the procedure for removing ureteral stones among 87.0% of patients⁹. The conclusive idea presented in these studies summarized the effectiveness of Tamsulosin, keeping the procedure minimally invasive. On the contrary, Kc et al., in their research, reported that only 61.0% of patients who received the medicinal compound experienced spontaneous expulsion of ureteral stones¹⁰. In light of the lack of in-depth results regarding the rate of spontaneous expulsion of ureteral stones among patients, the study has emphasized the effectiveness of receiving Tamsulosin for managing distal ureteral stones among patients.

This is crucial as the comprehension of this aspect is crucial for the continuation of the drug as a mandatory medicine in removing distal ureteral stones^{11,12}. Hence, the current study is focused on determining the role of Tamsulosin in medical expulsion therapy for distal ureteral stones.

Methodology

A descriptive cross-sectional study was conducted from May to November 2019 at the Department of Urology, Sindh Institute of Urology and Transplantation, Karachi. All the enrolled patients were diagnosed with distal ureteral stones and were between 18 and 65 years of age. In consideration of the role of stone size on the intensity of the removal procedure, patients with stone sizes 4-10 mm were included. Considering the variance of patients with distal ureteral stones, the calculated sample size was 113, keeping a 61.0% CI and a 9.0% margin of error.

A patient who was included in the research administered Tab. Tamsulosin 0.4 mg in the morning, half-hour prior to breakfast for 28 days provided. The technique of Kidneys, Ureters & Bladder (KUB) ultrasonography was adopted as the data collection method. In addition, the information related to the age, gender, duration of ureteral stone disease, stone size, and side of ureteral stones among patients was recorded using a pre-designed proforma. The collected data were analyzed using SPSS version 20.0; mean and standard deviation were used for presenting quantitative variables such as age, stone size, and duration of stone disease, while all categorical variables were given as frequency and percentages. The effect modifiers, including age, gender, duration of ureteral stone disease, stone size, and side of stones on spontaneous expulsion of stones, were stratified, and the post-stratification Chi-square test was used to assess the associations. In considering the significance of the relationship between independent and dependent variables, $p < 0.05$ was considered to be the value of statistical significance.

The ethical clearance for the research was taken from the ethical review board of [Sindh institute of urology and transplantation] [Reference no; SIUT-ERC-2019/PA-152 Dated 18-02-2019], and written informed consent was obtained from the patients before enrolment.

Results

The assessment of the data collected led to the results that out of the 113 patients, most participants were discovered to be females, as this gender makes up 52.21% of the entire population. Among the sample analyzed, the mean value comprehended that the population's average age is 46.87 ± 11.80 years. Moreover, the average

length of the disease was calculated to be 8.52 ± 7.21 months, and the maximum duration among patients is 24 months. Additionally, the mean size of ureteric stones found among patients was 5.98 ± 1.80 mm. Among the enrolled participants, 60% were found to be affected more frequently in the right ureter. Moreover, the rate of occurrence of spontaneous expulsion was found to be high, as 86.73% of patients experienced it.

Table 1: Baseline demographic and clinical characteristics of the study population.

Variables		n=113
Age (Years); Mean \pm SD		46.87 \pm 11.80
Gender	Male	54(47.79)
	Female	59(52.21)
Duration of Disease (Months)		8.52 \pm 7.21
Size of Stone (mm); Mean \pm SD		5.98 \pm 1.80
Side of Stone	Left Ureter	53(46.90)
	Right Ureter	60(53.10)
Spontaneous Expulsion	Yes	96(86.73)
	No	15(13.27)

Another analysis technique employed in the study is that of stratification, which was adopted for the variables age, gender, duration of stone disease, and size, as well as the side of the stone. For the demographic variable of age, the evaluation showed that with a significant p-value of 0.008, spontaneous expulsion was discovered among 47% of the included patients between the ages of 46 and 65 (Table 2). Furthermore, gender-based stratification suggested that spontaneous expulsion was more frequent among females (54.16%) than males (47.91%). Although, the difference was found to be insignificant ($p=0.644$). Furthermore, there was no significant effect of stone disease duration on the frequency of spontaneous expulsion ($p=0.442$). Additionally, the size of the stone and the side of the stone also displayed no significant effect on spontaneous expulsion.

Table 2: Stratification of demographic and clinical characteristics to determine their association with Spontaneous Expulsion.

Variables		Spontaneous Expulsion		p-value
		Yes (n=96)	No (n=15)	
Age Group	20-45 Years	49(51.04)	02(13.30)	0.008*
	46-65 Years	47(48.95)	13(86.70)	
Gender	Males	46(47.91)	8(53.33)	0.644
	Females	52(54.16)	7(46.66)	
Duration of Stone Disease	1-6 Months	46(47.91)	8(53.33)	0.442
	7-24 Months	52(54.16)	7(46.66)	
Size of Stone	4-5 mm	51(53.12)	6(40)	0.385
	6-10 mm	47(48.95)	9(60)	
Side of Stone	Left Ureter	47(48.95)	6(40)	0.565

	Right Ureter	51(53.12)	9(60)
*p<0.05 is considered significant.			

Discussion

The study focused on understanding the role of Tamsulosin in medical expulsion therapy for distal ureteral stones. The emphasis was to determine the treatment effectiveness, as the selection of the clinical procedure depends on different criteria, including the size of the stone and its type along with the availability of the equipment as well as the surgeon's precision in terms of adopting a particular method^{13,14}.

The effectiveness of these methods is determined on the basis of the outcome it has on the patient's health. One of the researchers derived the conclusion that due to the presence of $\alpha 1A$ and $\alpha 1D$ adrenergic receptors in the ureter in its detrusor and intramural parts. Therefore, $\alpha 1$ antagonists can potentially significantly impact the process of elimination of stones from the ureteral-bladder junction, which is smaller than 8mm, in a spontaneous painless elimination¹⁵. The stone burden, which is the primary factor in selecting the appropriate technique, results in the intense focus on the non-evasiveness of the method.

The emphasis on invasiveness is due to the likeness of the spontaneous passing of distal and right-sided smaller stones^{16,17}. The method considered beneficial is discovered to have an adverse impact on patient health. The findings are supported by various studies, such as those presented by Abdel Rahim et al. and Gok et al., in which the researchers concluded the spontaneous passing method causes complications among patients^{18,19}. MET is therefore considered effective in the clinical treatment of patients, specifically in the case of ureteral stones, as it initiates the process of passing stones, which commonly takes 6 weeks following the onset of symptoms.

However, there are limited trials that determine the status of stones through the use of precise techniques such as CT imaging^{20,21}. Moreover, two meta-analyses similarly presented inefficient results as the conclusive remarks in these two

comprehended that the passage rate for the clinical outcomes of α -blockers is 53–90% and 77–90%^{22,23}. Contrary to these findings, our study concluded the passage rate of the compound to be 86.7% in the case of distal ureteral stones. Our present study, which is under consideration, also discovered that the administration of Tamsulosin ensures the success of spontaneous expulsion of ureteral stones to 86.73%. However, the set of steps taken to achieve the results also added to the limitations of this study as only a limited dose of 0.4 mg of Tamsulosin was used, which is the dosage for treating diseases such as benign prostatic hyperplasia. The study results are also solely focused on the presence of a single ureteral stone with a 4-10 mm surface, which is a large dimension.

Conclusion

The results derived in our study through the adopted assessment technique led to the conclusion that Tamsulosin is significantly effective in treating the clinical condition of distal ureteral stones as it enhances the rate of spontaneous expulsion. Therefore, this can be adopted as an efficient clinical approach for uncomplicated distal ureteral calculi prior to evasive treatments such as ureteroscopy or extracorporeal lithotripsy. Thus, Tamsulosin results in a decline in interventional procedures among patients with distal ureteral stones.

Limitations

High-quality multicentric, randomized, double-blinded, controlled trials are required to demonstrate the efficacy of Tamsulosin as an expulsive medical treatment for distal ureteral calculi before a firm clinical recommendation can be made.

Conflicts of Interest

The authors have no conflicts of interest to declare. All co-authors agree with the contents of the

manuscript and there is no financial interest to report.

Acknowledgment

The assistance provided by department staff was greatly appreciated.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

References

1. Elbaset MA, Hashem A, Eraky A, Badawy MA, El-Assmy A, Sheir KZ, Shokeir AA. Optimal non-invasive treatment of 1–2.5 cm radiolucent renal stones: oral dissolution therapy, shock wave lithotripsy or combined treatment—a randomized controlled trial. *World J Urol.* 2020;38(1):207-212.
2. Coe F, Worcester EM, Lingeman JE, Evan AP. *Kidney stones: medical and surgical management.* Jaypee Brothers Medical Publishers; 2019.
3. Lai S, Jiao B, Diao T, Seery S, Hu M, Wang M, Hou H, Wang J, Zhang G, Liu M. Optimal management of large proximal ureteral stones (> 10 mm): A systematic review and meta-analysis of 12 randomized controlled trials. *Int J Surg.* 2020;80:205-217.
4. Basulto-Martínez M, Klein I, Gutiérrez-Aceves J. The role of extracorporeal shock wave lithotripsy in the future of stone management. *Curr Opin Urol.* 2019;29(2):96-102.
5. Falahatkar S, Akhavan A, Esmaeili S, Amin A, Kazemnezhad E, Jafari A. Efficacy of tamsulosin versus tadalafil as medical expulsive therapy on stone expulsion in patients with distal ureteral stones: A randomized double-blind clinical trial. *Int braz j urol.* 2021;47:982-988.
6. Saeed K, Ayub M, Kanjoo SR. Efficacy of Danzen DS-Added Tamsulosin Combination Therapy for the Expulsion of Symptomatic Lower Ureteral Calculi. *National Editorial Advisory Board.* 2020;31(11):192-195.
7. Goyal SK, Singh V, Pandey H, Chhabra MK, Aggarwal SP, Bhat A. Comparative efficacy of tamsulosin versus tadalafil as medical expulsive therapy for distal ureteric stones. *Urol Ann.* 2018;10(1):82-86.
8. Nuraj P, Hyseni N. The role of the tamsulosin in the medical expulsion therapy for distal ureteral stones. *Med Arch.* 2017;71(2):137-140.
9. Furryk JS, Chu K, Banks C, Greenslade J, Keijzers G, Thom O, Torpie T, Dux C, Narula R. Distal ureteric stones and tamsulosin: a double-blind, placebo-controlled, randomized, multicenter trial. *Ann Emerg Med.* 2016;67(1):86-95.
10. Kc HB, Shrestha A, Acharya GB, Basnet RB, Shah AK, Shrestha PM. Tamsulosin versus tadalafil as a medical expulsive therapy for distal ureteral stones: A prospective randomized study. *Investig Clin Urol.* 2016;57(5):351-356.
11. Islam DM, Rahman MM, Akhtar W. Comparative Study between Tamsulosin and Silodosin as a Medical Expulsive Therapy for Lower Ureteral Stones. *J. Med. Sci. Clin. Res.* 2020;8(9):29-35.
12. Tang QL, Wang DJ, Zhou S, Tao RZ. Mirabegron in medical expulsive therapy for distal ureteral stones: a prospective, randomized, controlled study. *World J Urol.* 2021;39(12):4465-4470.
13. Ramesh A, Karthick P, Kumar RS. Medical expulsion therapy for ureteric calculus—possible!. *Int Surg J.* 2016;3(1):113-118.
14. Cui Y, Chen J, Zeng F, Liu P, Hu J, Li H, Li C, Cheng X, Chen M, Li Y, Li Y. Tamsulosin as a medical expulsive therapy for ureteral stones: A systematic review and meta-analysis of randomized controlled trials. *J Urol.* 2019;201(5):950-955.
15. Pricop C, Novac C, Negru D, Ilie C, Pricop A, Tănase V. Can selective alpha-blockers help the spontaneous passage of the stones located in the uretero-bladder junction?. *Rev Med Chir Soc Med Nat Iasi.* 2004;108(1):128-133.
16. Jendeborg J, Geijer H, Alshamari M, Cierznia B, Lidén M. Size matters: The width and location of a ureteral stone accurately predict the chance of spontaneous passage. *Eur Radiol.* 2017;27(11):4775-4785.
17. Kucukpolat S, Kocaaslan R, Kadihasanoglu M, Bagcioglu M, Kocan H, Sarica K. Is Medical Therapy for Distal Ureteral Stones Efficient? Tamsulosin versus Deflazacort: A Prospective Randomised Trial. *Aktuelle Urologie.* 2019;53(05):454-460.
18. Abdel Rahim AM, Abdel-Raheum MA, Sayed M, Hussein AA. Tadalafil versus Tamsulosin as a medical expulsive therapy for solitary unilateral lower ureteric stone less than 1 cm: a prospective randomized study. *Minia Journal of Medical Research.* 2022;31(3):413-420.
19. Gok B, Tarik Atik Y, Uysal B, Koc E, Tastemur S, Ibrahim Cimen H. Gilaburu extract (*Viburnum opulus* Linnaeus) is as effective as Tamsulosin in medical expulsive therapy of distal ureteral calculi. *Int J Clin Pract.* 2021;75(12):e14950.
20. Ye Z, Zeng G, Yang H, Tang K, Zhang X, Li H, Li W, Wu Z, Chen L, Chen X, Liu X. Efficacy and safety of tamsulosin in medical expulsive therapy for distal

- ureteral stones with renal colic: a multicenter, randomized, double-blind, placebo-controlled trial. *Eur urol.* 2018;73(3):385-391.
21. Türk C, Knoll T, Seitz C, Skolarikos A, Chapple C, McClinton S, European Association of Urology. Medical expulsive therapy for ureterolithiasis: the EAU recommendations in 2016. *Eur Urol.* 2017;71(4):504-507.
22. Hollingsworth JM, Rogers MA, Kaufman SR, Bradford TJ, Saint S, Wei JT, Hollenbeck BK. Medical therapy to facilitate urinary stone passage: a meta-analysis. *Lancet.* 2006;368(9542):1171-1179.
23. Seitz C. Medical expulsive therapy of ureteral calculi and supportive therapy after extracorporeal shock wave lithotripsy. *Eur Urol Suppl.* 2010;9(12):807-813.