 DOI:https://doi.org/10.52206/jsmc.2022.12.4.727 OPEN ACCESS

The Effect of Preoperative Tamsulosin on Ureteroscopic Access in Below 16 Years Children

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ABSTRACT

Background: Urolithiasis is the frequent condition in school age children. The treatment modalities for renal stone can be just observation to allow to eliminate spontaneously, expulsive medical treatment, ureterolithotomy and ureteroscopy.
Objective: To determine the effect of preoperative tamsulosin on success of ureteroscopicaccesin below 16 years children.
Materials and Methods: This case control study was conducted on records of 110 patients at department of Urology, Saidu Teaching Hospital, Swat. Half cases recieved preoperative tamsulosin and half not. The children below 16 years who received ureteroscopy, Pakistani national and both gender were included. Children who undergone the ureteroscopy or stent placement in last 12 months, those who received preoperative tamsulosin for less than a week (cases only) and with abnormal genitourinary systems were excluded. All records like age, gender, body mass index (BMI), length of surgery, stone size, failure or success rate were collected. Chi-square test and student t test was used for comparison of data. Logistic regression was run for controlling confounders.
Results: The mean age was 12.91±2.73 years. The females were 61 (55.45%) and the males were 49 (44.55%). The procedure of ureteroscopic access was successful in 40 (72.73%) in cases who received tamsolusin and 29 (52.73%) those who did not. The difference was statistically significant (p=0.03). The only significant predictors for success of ureteroscopic access were type of treatment received and BMI. The success was more in cases who received preoperative tamsulosin (40, 72.7%) than control group (29, 52.7%) statistically (p=0.01).
Conclusion: One week preoperative use of tamsulosin can increase the success rate of ureteroscopic access in below 16 years old children.
Keywords: Tamsulosin, ureteroscopic access, children, renal stone

This article may be cited as: Khan A, Afridi AK, Khan RA, Khan N, Nizamudin, Rashidullah M. The effect of Preoperative Tamsulosin on Ureteroscopic Access in Below 16 Years Children. J Saidu Med Coll Swat 2022;12(4):150-54.

INTRODUCTION

Urolithiasis is the frequent condition in school age children.[1] About 20% of renal stone are found in ureter and causing severe discomfort to the affected patients. If these stones are not removed it can to lead malfunction of the affected kidney.[2, 3] The treatment modalities for renal stone can be just observation to allow to eliminate spontaneously, expulsive medical treatment, ureterolithotomy and ureteroscopy.[4, 5] Ureteroscopy is one of best diagnostic and therapeutic tool in urology which naviagateendoscopically the upper urinary tract and commonly used in pediatric patients.[6,7]

In both children and adults there is high possibility for failure of passage of elastic ureteroscope in first go into ureter.[8, 9]In children the failure is much higher due to anatomical differences as these patients have small anatomy than adults and making the passage of ureteroscopes more challenging.[10] Tamsulosinisα-1adrenocept or blocker which highly selective in natureand causing relaxation of musculature in ureter, decreases basal tonicity, reducesperistaltic activityandintra-luminal tone.[11]

A previous retrospective study reported that tamsulosin open the ureteral orifice with success in 88% patients who received tamsulosin and 65.4% in control group.[12] Another study reported 90.81% success rate in facilitating retrograde ureterorenoscopy.[13]

There is lack of local literature on this subject. Adequate ureteroscopic access in children is of paramount importance for successful surgical procedures to reduce multiple procedures and anesthetics in children. Due to genetic, environmental and anatomical variations the results can be variable across various populations. So the aim of this study was to determine the success of ureteroscopic access in cases received preoperative tamsulosin versus control.

MATERIALS AND METHODS

This case control study was conducted on records of patients at department of Urology, Saidu Teaching Hospital, Swat from 1st June 2021 to 30th March 2022 by non-probability consecutive

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Received: May 30th, 2022 Accepted: November 16th, 2022

sampling technique. Ethical approval letter was obtained from concerned hospital committee(41-ERB/2022). A verbal informed consent was obtained from parents of participants after explaining the aims and benefits of the study. The sample size was 110(55 in each group) by WHO calculator using 88% success rate in cases and 65.4% control from previous study[12] at 5% level of significance and 80% power of test.

The children below 16 years who received ureteroscopy (Korlstorz Germany incop.) by consultant urologist have more than one years post fellowship experience, Pakistani national and both gender were included in the study. Childrenwho undergone the ureteroscopy or stent placement in last 12 months, those who received preoperative tamsulosin for less than a week (cases only) and with abnormal genitourinary systemswere excluded from study. In this study participants received 0.4 mg per day dose of tamsulosin. The operational definitions of ureteroscopic access was as the passage of ureteroscope easily without hindrance in ureter.

The sterilized ureteroscope is introduced per urethra in anesthetized patients over the guide wire by urologist under aseptic condition to evaluate the diagnostic and therapeutic status of ureter.
All records like age, gender, body mass index (BMI), length of surgery, stone size, failure or success rate were collected from the department files. The success was defined as the passage of ureteroscope on initial surgical attempt and failed was non-passage of ureteroscopeinto ureter and required stent placement.

The data were analyzed by R package version 4.1.2. Frequencies with percentages were calculated for categorical data and mean with SD for continuous data. Chi-square was run to compare the success rate in tamsulosin versus non-tamsulosin group. Logistic regression was applied for controlling confounders using success as a dependent variable. The level of significance was p=0.05.

RESULTS

The mean age of the participants was 12.91±2.73 years. The females were 61 (55.45%) and the males were 49 (44.55%). Overall success of procedure was 69 (62.73%). The mean body mass index, length of surgery and stone size are given in table 1.

The difference in gender, age, weight, BMI, length of surgery and stone sizes were not statistically significant. The detailed statistics are given in table 2.

The procedure of ureteroscopic access was successful in 40 (72.73%) in cases received tamsolusin and 29 (52.73%) those who did not. The difference was statistically significant (p=0.03). (Table 3)

The only significant predictors for success of ureteroscopic access were type of treatment received and BMI. The success was more in cases who received preoperative tamsulosin (40, 72.7%) than control group (29, 52.7%) statistically (p=0.01). The Mean BMI was higher in successful ureteroscopic access cases (26.1±7.3 kg/m^2) than failed (22.2±7.7 kg/m^2) statistically (p=0.01). (Table 4)

Table I. Descriptive Statistics for Age, Weight, BMI, Length of Surgery, Stone Size success of Procedure and Gender

Characteristic	n = 110
Age of Patients (Years)	12.91 (2.73)*
Weight (Kg)	46.98 (16.31) *
BMI (kg/m^2)	24.65 (7.68) *
Length of surgery (minutes)	42.31 (21.23) *
Stone size (mm)	7.01 (3.66) *
Failure of procedure	41 (37.27)**
Success of procedure	69 (62.73) **
Female	61 (55.45) **
Male	49 (44.55) **

*Mean(SD), **n(%)

Table 2. Comparison of Baseline Parameters between Control and Tamsulosin Group

Characteristic		Control, n = 55[1]	Tamsolusin, n = 55[1]	P-value
Gender	Female	31 (56.36)	30 (54.55)	0.85**
	Male	24 (43.64)	25 (45.45)	
Age of Patients (Years)		12.91 (2.57)	12.90 (2.90)	0.97**
Weight (kg)		44.75 (15.40)	49.21 (17.02)	0.15**
BMI (kg/m2)		25.19 (7.48)	24.10 (7.91)	0.46**
Length of surgery(min)		40.70 (22.37)	43.91 (20.11)	0.43**
Stone size (mm)		7.44 (3.74)	6.59 (3.56)	0.22**

*Chi-square test, **independent t test

Table 3. Comparison of Success of Ureteroscopic Access Procedure in Tamsulosin Versus Control Group

Characteristic	Control, N = 55[1] n(%)	Tamsolusin, N = 55[1] n(%)	P-value*
Failure	26 (47.27)	15 (27.27)	0.030
Success	29 (52.73)	40 (72.73)	

*Chi-square test

Table 4. Univariate and Multivariate Analysis for Success of Ureteroscopic Access

Independent Variables	Characte-ristics	Failure	Success	OR (Univariate)	OR (Multivariate)
Gender	Female	23 (37.7)	38 (62.3)	-	-
	Male	18 (36.7)	31 (63.3)	1.04 (0.48-2.28, p=0.917)	1.01 (0.44-2.36, p=0.978)
Type of treatment received	Control	26 (47.3)	29 (52.7)	-	-
	Tamsolusin	15 (27.3)	40 (72.7)	2.39 (1.09-5.39, p=0.032)	3.18 (1.35-7.93, p=0.010)
Age	Mean (SD)	12.7 (2.8)	13.0 (2.7)	1.04 (0.90-1.20, p=0.636)	1.06 (0.90-1.25, p=0.502)
BMI	Mean (SD)	22.2 (7.7)	26.1 (7.3)	1.07 (1.02-1.13, p=0.013)	1.08 (1.02-1.15, p=0.010)
Length of Surgery	Mean (SD)	41.3 (20.3)	42.9 (21.9)	1.00 (0.99-1.02, p=0.712)	1.00 (0.98-1.02, p=0.743)
Stone Size	Mean (SD)	6.4 (3.6)	7.4 (3.6)	1.08 (0.97-1.21, p=0.158)	1.09 (0.97-1.24, p=0.142)
Weight	Mean (SD)	48.0 (17.6)	46.3 (15.6)	0.99 (0.97-1.02, p=0.594)	0.99 (0.97-1.02, p=0.522)

*Logistic regression, OR: Odds ratio

DISCUSSION

This study was performed to determine the effect of tamsolsulosin on ureteroscopic access in below 16 years children. Our findings show the preoperative use of tamsolsulosin can increase the success rate of ureteroscopic access.

Urolithiasis is the frequent condition in school age children and the reported prevalence is upto 40%.[14, 15] Most of the renal stone are in renal parenchyma or in ureters. Literature shows that in upto 25% children the surgical intervention is needed for removal of these stones.[16, 17]

Ureteroscopy is difficult in children due to smaller lumen of ureter. Due to failure of ureteroscopy the number of surgeries and anesthetic complications can increases. Tamsulosin is α1-receptor blocker causing relaxation of ureter muscles.[18]

Our study revealed that the preoperative use of 0.4 mg per day tamsulosin for one week can increase the success rate of ureteroscopy. McGee et al. conducted a study on forty-nine children in which 13 received preoperative use of tamsulosin and 36 were controls. Their results showed that tamsulosin open the ureteral orifice with success in 63% patients who received this treatment and 34% in control group.[12] Another study conducted on Egypt population in which 51 cases received preoperative tamsulosin and 47 did not. Their results showed that success rate in tamsulosin was very high (90.81%).[13] Another investigation was conducted on United Arab Emirates in which 44 patients were given tamsulosin and 17 did not. Their findings showed that success was found in 88% patients who received this treatment and 65.4% who did not.[17]These all previous studies support our findings.

Another study tested whether preoperative use of tamsulosin improve the success rate of laser-assisted ureteroscopy for removing proximal ureteral stones. Their findings showed that success increase upto 91.4% in patients who used tamsulosin as compared to control group in which success was 79%.[19] Another randomized clinical trial on 150 patients also reported that preoperative tamsulosin administration increased the success rate.[11]

This study have some limitations like the surgeries was performed by different surgeons and this was retrospective study conducted on available records. But this study is first kind in our population conducted on calculated sample size and there were no differences in baseline parameters between the two groups.

CONCLUSION

Within the limitation of this study it can be concluded that preoperative use of tamsulosin can increase the success rate ureteroscopic access in below 16 years children.

RECOMMENDATIONS

The results should be interpreted with cautions due to weak study design and small sample size. Clinical judgment and case selection should be done while using preoperative tamsulosin.

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DATA SHARING STATEMENT: The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

CONFLICT OF INTEREST: Authors declared no conflict of interest.
GRANTED SUPPORT AND FINANCIAL DISCLOSURE: Nil

AUTHOR'S CONTRIBUTION
The following authors full fill authorship criteria as per ICMJE guidelines;

Khan A, Nizamudin:	Idea conception, data acquisition, final approval, agreed to be accountable for all the work.
Khan RA, Khan N:	Design of the work, drafting the work, critical rivision, final approval, agreed to be accountable for all the work.
Afridi AK:	Data analysis, drafting of the work, final approval, agreed to be accountable for all the work.
Rashidullah M:	Data interpretation, critical revision, final approval, agreed to be accountable for all the work.