

Comparison of efficacy with and without Tamsulosin as medical adjuvant therapy after Extracorporeal shockwave lithotripsy in renal stone

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Objective: To compare the efficacy with & without tamsulosin as medical adjuvant therapy after extracorporeal shockwave lithotripsy in renal stone.

Methodology: A total of 160 patients were enrolled in this Randomized control trial from January 17, 2013 to July 16, 2013, having single renal stone. They were divided in two groups by lottery method; Group A, received capsule tamsulosin 0.4mg/once daily and Group B received only diclofenac 50mg/twice daily. All underwent extracorporeal shockwave lithotripsy. Patients were called every 14 days for follow up with X-ray KUB and pain was assessed by analogue numerical score. Final outcome was taken at 8 weeks, those who has no stone, mild to no pain and no steinstrasse was considered

efficacy positive.

Results: Mean age of patients was 31.29 ± 9.06 years. Out of 160, 61(38.1%) were female and 99(61.9%) were male. Rate of stone clear ness was 90.6%. Regarding severity of pain, 54.4% had no pain, 26.3% had mild, 11.3% had moderate pain and 8.1% had severe pain. Absence of steinstrasse formation was 86.3% cases. Tamsulosin 0.4 mg was significantly high as compare to without Tamsulosin (93.8% vs. 62.5%; $p 0.0005$).

Conclusion: Extracorporeal Shockwave Lithotripsy in combination to Alpha-1 Blocker was more effective than ESWL alone. (Rawal Med J 201;43:471-474).

Key Words: Renal stone, extracorporeal shockwave lithotripsy, tamsulosin.

INTRODUCTION

Stone is 3rd most common disease of urinary system, exceeded firstly by infections of urinary tract and secondly by diseases of prostate.¹⁻³ Stones have world-wide incidence of 5-15% and constitute 50% of urological work load in hospitals, with a prevalence of 12% in our country.^{3,4} In recent past, Extracorporeal shockwave lithotripsy (ESWL) is used for treating stone.^{2,5,6} Since then it became 1st line of treatment for renal stones due to few side effects and high success rate from 75-85%.⁵ It disintegrate the stone in particles while without anesthesia and high level of patient tolerance.³ Through the utilization of both ESWL and medical adjuvant therapy (Tamsulosin), most of time stone is cleared in a single procedure and at low cost to the patient.⁷ In 1970, Malin demonstrated presence of alpha receptors in human ureters.⁸

Previously alpha blockers were introduced in treatment of BPE (Benign prostatic enlargement)

but nowadays their effectiveness to facilitate urinary stone fragments passage.⁶

Tamsulosin is an alpha blocker, due to high tolerability, requiring no dose adjustment and uro selective with overall efficacy after ESWL of 92% with and 78% without it, having clearance rate of 95%, steinstrasse 10% with tamsulosin, while 80% and 25% without tamsulosin respectively.⁶ Transport of stone fragments from kidney to ureter is accompanied by tone of smooth muscle of ureter, edema and pain.³ Alpha blockers are able to decrease the tone and peristaltic frequency hence dilating ureteral lumen, while encouraging stone movement and reducing analgesics use.^{3,6,9} The objective of this study was to compare the efficacy with and without tamsulosin as medical adjuvant therapy after ESWL in renal stone.

METHODOLOGY

This trial was conducted at Urology Department,

Chandka Medical College Hospital, Larkana, Pakistan from January 17, 2013 to July 16, 2013. Age >18 < 50 years, single radio-opaque and size <20 mm were included in the study. Pregnancy, uncontrolled coagulopathy, severe hydronephrosis, ipsilateral lower ureter stone, multiple or bilateral stone, solitary kidney, renal insufficiency and stone with urinary tract infection were excluded. After approval from the Ethical Review Committee, patients were randomized in two groups by lottery method; equal slips was made and kept in one box and patients were asked to take one slip. Group A, study group in whom capsule tamsulosin 0.4mg/once daily at bed time was given along with pain killer diclofenac 50mg/twice daily. Group B, control group, received only diclofenac 50mg/twice daily. All underwent ESWL.

Patients were called every 14 days for follow up with X-ray KUB and pain was assessed using analogue numerical score. Patients with absence of radio-opaque stone, mild to no pain and no steinstrasse formation were labeled as efficacy positive. Final outcome was taken at 8 weeks, those who has no stone, mild to no pain and no steinstrasse was considered efficacy positive.

Data were analyzed on SPSS version 20 and two groups were compared with respect to stone clearance, pain intensity and Steinstrasse formation. Mean and standard deviation were calculated for quantitative variables like age and stone size and t-test was applied. Two groups were compared using chi-square test considering p-value 0.05 as significant.

RESULTS

Out of 160 cases, 61(38.1%) were female and 99(61.9%) were male. Mean age was 31.29 ± 9.06 years. Age and size of stone were not significant between groups (Table 1).

Table 1. Mean age and stone size between groups.

Variables	Group A N = 80	Group B N = 80	p-value
Age (Years)	31.13 ± 7.79	31.46 ± 10.21	0.81
Size of Stone (cm)	10.4 ± 2.59	10.61 ± 3.01	0.63

Table 2. Stone clearance, severity of pain and steinstrasse formation.

Variables	Group A N = 80	Group B N = 80	Total n=160
Stone Clearance			
Yes	76(95%)	69(86.3%)	145(90.6%)
No	4(5%)	11(13.8%)	15(9.4%)
Pain severity			
No Pain	59(73.8%)	28(35%)	87(54.4%)
Mild Pain	18(22.5%)	24(30%)	42(26.3%)
Moderate pain	2(2.5%)	16(20%)	18(11.3%)
Severe Pain	1(1.3%)	12(15%)	13(8.1%)
Steinstrasse Formation			
Yes	4(5%)	18(22.5%)	22(13.8%)
No	76(95%)	62(77.5%)	138(86.3%)

Table 3. Comparison of efficacy between groups.

Efficacy	Group A N = 80	Group B N = 80	Total	p-Value
Yes	75(93.8%)	50(62.5%)	125(78.1%)	0.0005
NO	5(6.3%)	30(37.5%)	35(21.9%)	

Chi-Square= 22.857

Rate of stone clearness was 90.6%, regarding severity of pain, 54.4% had no pain, 26.3% had mild, 11.3% had moderate pain and 8.1% had severe pain. Similarly, absence of steinstrasse formation was 86.3% cases (Table 2). Efficacy of tamsulosin was significantly higher as compared to without tamsulosin [93.8% vs. 62.5%; p 0.0005] as shown in Table 3. Tamsulosin was significantly effective as compared to patients treated without tamsulosin for stone size ≥ 10 mm (p=0.0005) and for stone size >10 mm (p=0.012).

DISCUSSION

Expulsion of Stone particles after ESWL is similar to spontaneous discharge, many factors play pivotal role for the migration of stone i.e. size, shape, composition, location in renal system, smooth muscle spasm, edema, anatomical narrowing within ureter, its peristalsis and infection.¹⁰

Most of these factors can be modified by an appropriate therapy, but nowadays medical expulsion therapy (MET) has shown promising results in assisting natural clearance of residual fragments.^{11,12} Not only tamsulosin but various other drugs were tried for stone clearance, like steroids, glyceryl-tri-nitrate, inhibitors of

prostaglandin synthesis and calcium channel blockers.¹³ Hence, not only tamsulosin increases the stone fragments rate but on other hand it decreases retreatment in the form of surgery around 65%.¹¹

Alpha receptors are present in significant quantity in the urinary bladder and part of the ureter that lies inside the bladder with a predominance of $\alpha 1A$ and $\alpha 1D$ subtypes in the lower one-third of the ureter.¹³

Alpha-1 blockers work by increasing in the intra ureteral pressure gradient around the stone, that is an increase in the urine bolus proximal to stone along with reducing peristalsis distal to ureter (that reduce ureteral pressure distal to stone). In association to both of these mechanisms, they also reduces tone of bladder muscle and voiding pressure at bladder neck; hence all these factors increases stone expulsion rate.

In our study, efficacy of tamsulosin 0.4 mg was 93.8% as compared to without tamsulosin 62.5%, which is similar to study by Kupeli et al, who had stone expulsion rate 70.8% with tamsulosin versus 33.3% without tamsulosin.¹⁴ Bhagat et al found even better stone clearance with tamsulosin undergoing ESWL of 96.6% versus 79.3% without tamsulosin.¹⁵ Conversely, Gravas et al got same success rate in patients either receiving or not receiving tamsulosin (66.6% versus 58.1%; $P > 0.05$).¹⁶

In our study, absence of steinstrasse formation was 86.3%. Spontaneous clearance occurred in 75% in tamsulosin group and in 65% in placebo group.¹⁷ Salem et al reported high rate of stone expulsion in 72.7% tamsulosin versus 56.8 without tamsulosin in patients with steinstrasse.¹⁸

Most troubling symptom in steinstrasse is pain. Tamsulosin not only reduces the frequency of pain episodes but also decreases analgesic requirement. ESWL in combination with tamsulosin facilitates in reducing the threshold of pain hence facilitating easier management as outpatient department while reducing overall cost and morbidity. This way, severity of pain is related to tone of ureteric muscle and tamsulosin reduces the frequency of peristaltic contractions while facilitating stone expulsion.¹⁹ In our study, pain analogue score signified that 54.4% had no pain, 26.3% had mild, 11.3% had moderate pain and 8.1% had severe pain, these all parameters of pain severity were less with tamsulosin.

Gravina et al showed that ESWL along tamsulosin required low dose of analgesic; 57 mg versus 119 mg without tamsulosin.¹⁹ In another study by Autorino et al showed low analgesic requirement 9% in tamsulosin versus 31% without tamsulosin and need for admission for colic 9% with tamsulosin versus 21% without tamsulosin.²⁰

CONCLUSION

Extracorporeal Shock Wave Lithotripsy in association with tamsulosin was more effective than Extracorporeal Shock Wave lithotripsy alone and was equally safer. Hence tamsulosin is superior as medical adjuvant therapy after Extracorporeal shockwave lithotripsy as compared to without tamsulosin.

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