Research Article

# Role of medical expulsive therapy in lower ureteric calculi less than 1 cm

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## Abstract

Lower ureteric stones and accompanying ureteric colics represent one of the most common medical problems faced by urologist, the treatment usually starts with conservative therapy, however, if the stone fails to pass within 4-6 weeks, a prompts action should be taken to save the kidney, this usually involves one of the minimally invasive therapy options like shock wave lithotripsy(ESWL), of ureteroscopy. However this is not free of risk, and cost, for these reasons, urologists now concentrate on what's called medical expulsive therapy, which means using drugs to enhance stone passage. This study is taken up to assess the possible role of the combined alpha 1a & alpha1d Selective antagonist Tamsulosin alone and in combination with corticosteroid deflazacort for facilitating spontaneous expulsion of distal ureteral stones.

**Keywords:** expulsive therapy, lower ureteric calculi.

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## INTRODUCTION

Urinary calculus disease is one of the oldest known to man. The treatment that can be offered to the patient depends on many factors such as the size of the stone, obstruction or infection, site of impaction. Most of the stones up to size 2 -5mm pass spontaneously.[1] although this is not without discomfort and expense to the patient. Ureteral calculi of any size are often associated with renal obstruction, and care must be taken to prevent irreversible damage to the kidney whether choosing expectant or active management. Currently, alpha-1 adrenergic receptor antagonists represent the treatment of choice for lower urinary tract symptoms as shown in many randomized controlled clinical trial as well as in several case studies.[2] Corticosteroid notably, Deflazacort is recommended in combination with other medical therapies to promote stone passage. Recently, Porpiglia *et al* randomized patients with stone 1 cm or smaller located in the distal ureter to treat with deflazacort and tamsulosin compared wirh deflazacort alone. They found the use of corticosteroid [Deflazacort] proves efficient only when administered together with alpha 1 blocker [Tamsulosin].[3] This study is taken up to assess the possible role of the combined alpha 1a and alpha1d Selective antagonist Tamsulosin alone and in combination with corticosteroid deflazacort for facilitating spontaneous expulsion of distal ureteral stones.[4]

## MATERIAL AND METHOD

This is prospective study design. Patients presenting with colicky abdominal pain radiating to groin, burning micturition, hematuria, fever and vomiting were admitted. These patients were investigated with NCCT KUB. A detailed written informed consent was taken. Patients with lower ureteric and Vesicoureteric junction calculi having size less than 10 mm and falling under age group of 18 to 60 yrs were considered for medical expulsion therapy. These patients underwent ECG, routine hematological, biochemical and urine investigations.patients were excluded according to predetermined exclusion criteria.

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### Inclusion Criteria

1. Clinically and radiologically diagnosed cases of ureteric colic.
2. Patients of age > than 18 year and < 60 year
3. Unilateral stone
4. Size < 1 cm and lower ureteric calculi.71

### Exclusion Criteria

1. Patient with bilateral ureteric stone / calculi
2. Patient <18 year and > 60 year
3. Size > 1 cm
4. Pregnancy and lactating female patient
5. Solitary kidney
6. H/o previous surgery for ureteric calculi on same side
7. Presence of infection
8. Moderate to severe hydronephrosis
9. Patient already on, □– blocker therapy, calcium channel blocker therapy.
10. Patient allergic to Tamsulosin
11. Renal insufficiency
12. H/o spontaneous passage of stone.
13. Bus driver, railway driver, pilot.

### Study Design

All patients with lower ureteric calculi less than 1 cm were randomly
divided into 3 groups
Group A - □ - Blocker (Tamsulosin)
Group B - □ - Blocker + steroid
(Tamsulosin + Daflazocort)
Group C - Observation with analgesic only. 72
Data regarding Age, Gender, Stone, Expulsion rate and Time. Analgesic requirement were collected and analyzed. All patients in group a received Tab. Tamsulosin 0.4 mg at bed time for 4 weeks. Group B (Tamsulosin for 4 week + Daflzocort – 30 mg OD for 10 days). Group C and all groups received Analgesic in the form of Diclofenac or Tramadol or pain reliever. Follow up – Weekly for 4 weeks. In each follow up – patients were accessed by history / clinical examination / urine examination and History of passage of stone. At the end of 4 weeks, NCCT KUB was repeated and presence or absence of stone recorded. If still stone was present, then the patient was shifted for endoscopic management. Absence of stone is the end of treatment Absence of stone expulsion after day 28 was considered failed therapy. In these cases continued watchful waiting, ureterorenoscopy (URS) was performed.73

## OBSERVATIONS AND RESULTS

All patients with lower ureteric calculi less than 1 cm were randomly divided into three groups according to inclusion and exclusion criteria. All of them were started on medical expulsive therapy and following observations were made–

**Table 1:** Distribution of patients according to symptoms

| Symptoms | No. of patients (n=75) | Percentage |
|---|---|---|
| Loin pain | 73 | 97.33 |
| Burning micturition | 23 | 30. 66 |
| Vomiting | 12 | 16 |
| Hematuria | 10 | 7.5 |
| Fever | 05 | 6.66 |

**Table 2:** Distribution of patients according to size of calculus

| Size (in mm) | No. of cases (n=75) | Percentage |
|---|---|---|
| 5-6mm | 34 | 45.33 |
| 7-8mm | 31 | 41.33 |
| 9-10 mm | 10 | 13.33 |

**Table 3:** Rate of Expulsion of calculi according to different Medical expulsion therapy

| Therapy given | Expulsion of calculi | | Total |
|---|---|---|---|
| | Yes | No | |
| Control | 6(24%) | 19 (76%) | 25 |
| Tamsulosin | 22(88%) | 03(12%) | 25 |
| Tamsulosin+Deflazacort | 23(92%) | 2(8%) | 25 |
| **Total** | **51(68%)** | **24(32%)** | **75(100%)** |

Chi square = 33.4559. P value <0.00001 the result is significant at p<0.05. Which is concluded as difference in the expulsion rate of Tamsulosin and Tamsulosin + Deflazocort is greater than control.

**Table 4:** Rate of expulsion by different medical expulsion therapies in lower ureteric calculi

| Therapy given | No. of calculi expelled | No. of calculi not expelled | Total |
|---|---|---|---|
| Control | 04(28.57) | 10 (71.43) | 14 (56) |
| Tamsulosin | 09 (90) | 01 (10) | 10 (40) |
| Tamsulosin + Deflazacort | 12(92.30) | 01(7.69) | 13 (52) |
| **Total** | **25 (67.56)** | **12 (32.43)** | **37 (100)** |

Chi square = 15.6426 P value <0.000401 the result is significant at p<0.05. Which is concluded as difference in the expulsion rate of Tamsulosin and Tamsulosin + Deflazocort is significant than control.

**Table 10:** Comparison of expulsion rate with different Medical expulsion therapy

| Therapy given | No. of calculi expelled | No. of calculi not expelled | Total |
|---|---|---|---|
| Control | 02 (18.18) | 09 (81.81) | 11 (44) |
| Tamsulosin | 13 (86.66) | 02 (13.33) | 15 (60) |
| **Total** | **15 (57.69)** | **11 (42.31)** | **26 (100)** |

Chi square = 20.7792, P value <0.00001 the result is significant at p<0.05. which is concluded as expulsion rate of Tamsulosin is greater than control

## DISCUSSION

Many minimally invasive interventional (e.g.-ESWL, and ureteroscopy) as well as expectant (watchful waiting) treatment exist for the management of lower ureteric calculi. But the choice of the ideal method to be taken up largely depend on the type of equipment available, type and size of stone,needs of the patient and the skills of the surgeon Recently, use of the watchful waiting approach has been extended by using pharmacological therapy, which can reduce symptoms and facilitate stone expulsion. The likelihood of ureteral stone spontaneous passage essentially depends on stone size and site, the internal anatomical structure of the ureter and a history of spontaneous expulsion, which are unmodifiable factors. The possible causes of stone retention are spasm, edema and ureteral infection, which are modifiable factors. The goals of medical conservative therapy are to prevent modifiable factors and increase expulsion rate, decrease time to expulsion and control painful symptoms until stone expulsion. In this study, we used the selective alpha-1a blocker tamsulosin alone and in combination with glucocorticoid (deflazacort) to evaluate the efficacy of medical expulsive therapy in lower ureteric and vesico-ureteric junction calculi less than 10 mm. The mean expulsion time in the Tamsulosin + Deflazocort group in our study was 6.21 days which was in concurrence with other studies i.e. Porpiglia *et al*, [2004], R Ranjan, P Kumari, M Mundu R Baxla *et al* (2013). Dellabella *et al*, 2005 and May Liu; BA Sean O Henderson, MD 2007 having lesser expulsion time than our study. We had used NCCT KUB as main investigation for detecting ureteral stone in our study and we foud that NCCT KUB accurately determines the presence or absence of ureterolithiasis, stone size and location in patient with acue flank pain, and presence or absence of stone after medical expulsive therapy. Which was in concurrence with other study i.e. N. Khan *et al* 2012.[5] NCCT compared with IVU had a higher detection rate for ureterolithiasis, especially for stones in the distal ureter. An added benefit of NCCT was the detection of significant additional findings like more accurate determination of stone size, higher sensitivity and specificity for detecting small sized stones and perinephric stranding. The medical therapy based on Tamsulosin demonstrated positive results in 88% of patients, tamsulosin + Deflazocort demonstrated positive results in 92% of patients. These figures do not demonstrate any statistically significant difference on internal comparison. However differences were statistically significant in stone expulsion between afore mentioned two groups and control group (24%). So we can conclude that these two therapies can improve stone expulsion as compared to control group. On proportion basis we can also say that Tamsulosin + Deflazocort is having better expulsion rate in comparison with Tamulosin alone.[6] As far as expulsion time was concerned, we observed stone passage after medical therapy based on Tamsulosin demonstrated expulsion time of 7 days, tamsulosin + Deflazocort demonstrated expulsion time of 6.21 days.

Further evaluation using larger groups will provide an opportunity to confirm these findings. No patients developed serious side effects during the study period. Patients who were not stone-free after the 4-week follow up were successfully treated with ureteroscopy. Therefore, it is possible to suggest that the effect of tamsulosin on the obstructed ureter is to induce an increase in the intraureteral pressure gradient around the stone, that is an 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.[7] Corticosteroids (Deflazacort) stabilize neutrophil lysosomes, therefore decreasing inflammation and edema related to mechanical irritation and facilitate stone passage.

## SUMMARY

The expulsion rate was significantly higher in the tamsulosin (88%) and Tamsulosin + Deflazocort (92%) than control (24%). The expulsion time was significantly less in the tamsulosin (7 days), tamsulosin + Deflazocort(6.21 days) groups than controls(11.66 days).

## CONCLUSION

NCCT is most rapid and accurate technique for evaluating ureteric calculi, confirmation of stone passage after medical expulsive therapy. Medical expulsive therapy is good alternative therapy for patient suffering from lower ureteric calculi less than 1cm.

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