

Patient Perception of Bladder Condition after Treatment with Solifenacin and Tolterodine in Overactive Bladder Patients

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ABSTRACT

Background: Solifenacin and Tolterodine are new generation antimuscarinics claimed to have bladder specific action and less adverse effect like dry mouth. The objective of the study was to compare the improvement in urinary symptoms among patients using solefinacin and tolterodine with overactive bladder symptoms.

Methods: A hospital based cross-sectional comparative study was done for one year duration. All patients with overactive bladder symptoms were included and in every alternate patient's solefinacin and tolterodine were given after taking note of baseline OAB symptoms, PPBC score and UPS score. Participants were followed up after one month and noted improvement in endpoint OAB symptoms. Comparison of baseline to end-point symptoms changes among each group of participants were analyzed for statistical significance.

Results: Among 101 participants included in the study, 49 participants were in solefinacin group and 52 participants were in tolterodine group. The end-point comparison of urgency symptoms were improved by 20.1 ± 6.76 (mean \pm SD) units in solefinacin group and by 17.0 ± 9.18 units in tolterodine group. Urgency perception score improved to 2.1 ± 0.66 for patients under solefinacin and 2 ± 0.73 for tolterodine. Patient perception of bladder condition (PPBC) showed improvement in solefinacin group by 3.2 ± 1.26 units and in tolteradine by 2.8 ± 1.54 units ($p = 0.165$). Comparing the patient's perception of treatment outcome, massive improvement was reported by 81.6% of those receiving Solefinacin and 65.4% receiving tolterodine, though not statistically significant ($p = 0.131$).

Conclusions: Solifenacin and Tolterodine showed improvement in urinary symptoms, UPS and PPBC. Both showed comparable efficacy without significant superiority over one another.

Keywords: Antimuscarinic; overactive bladder; patient perceptions of bladder condition; urgency perception score.

INTRODUCTION

Overactive bladder (OAB) is defined by the International Continence Society as a syndrome that comprises urgency, with or without incontinence, usually accompanied by frequency and nocturia.¹ Patients with storage type of Lower Urinary Tract Symptoms (LUTS) will have overactive bladder symptoms. Overactive bladder is a chronic illness that affects millions of lives worldwide at all age group but commonly affecting elderly women with a prevalence of 31% in women.² Urge incontinence affects only a portion of the OAB population: 33% of patients have OAB with urge incontinence ("OAB wet"), while 66% have OAB without urge incontinence ("OAB dry").³ OAB has a major impact on quality of life; it

affects emotional, social, sexual, occupational, and physical aspects of daily life.^{4,6} Patients Perception of Bladder Conditions (PPBC) is a six point categorical scale to measure severity of overactive bladder, ranging from 1 "no problems at all" to 6 "many severe problems".⁷

Antimuscarinic agents are being introduced for detrusor over activity. Tolterodine and Solifenacin are commonly used antimuscarinics. Tolterodine was introduced first among the two, with bladder specific action and Solifenacin is newer and is more M3 specific and claims to have less general antimuscarinic side-effects.⁸ The objective is to compare improvement in symptoms among patients with Tolterodine and Solifenacin for Overactive bladder.

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METHODS

This is a hospital-based prospective cross-sectional comparative study conducted in Department of Obstetrics and Gynecology, Birat Medical College Teaching Hospital. The duration of study was for one year from April 2021 to March 2022. The study was conducted after approval from Institutional Review Committee (IRC) and all the participants meeting the inclusion criteria were approached, and included after obtaining written informed consent.

Total enumeration technique of sampling method was applied. All patients with history of overactive bladder symptoms (urgency, urge incontinence, frequency, nocturia) were considered for inclusion while with overt diabetes mellitus, pregnancy, neurological disorders were excluded. The patients included in the study received treatment with solefinacin (Tablet 5mg once daily) and tolterodine (Tablet 2 mg twice daily) alternatively. Sociodemographic profile were recorded, baseline urinary symptoms as frequency/24hour, urgency (ability to hold urine), number of urge incontinence/24hour, six point categorical scale on Patients Perception on Bladder Condition (PPBC) and Urgency Perception Score (UPS) were noted to access severity of overactive bladder. The patients were taught and requested to maintain their bladder diary and to bring them during the follow-up. The patients were followed up after four weeks to evaluate endpoint symptoms improvement, Patients Perceptions of Bladder Condition (PPBC), Urgency Perception Score (UPS) and three point patient responses to treatment were noted. Also, participants were inquired regarding dry mouth as adverse effect and plotted its severity using Visual Analogue Score (VAS). Number of participants who needed to switch to either group due to dry mouth was noted.

All the data were entered in Microsoft excel, where cleaning and coding was done. It was then exported to SPSS version 22 for statistical analysis. Categorical variables were described using frequency and percentage, while continuous variables were summarized using mean \pm SD or median (Q1 and Q3). Comparison of background characteristics, clinical history of participants and baseline urinary symptoms was done. The end point comparison of symptoms, urgency perception and patient perception of bladder symptom was done. Chi-square test was used to compare the categorical variables, while Fisher exact test was applied when the expected cell count was less

than 5 (used for comparing the number of participants who stopped the medication or switched to another). For comparison of continuous variables, Independent T Test and Mann_Whitney U test (for non-parametric data) was applied. Independent t-test was done for comparison between pre and post medication PPBC, UPS and improvement in quality of life. Mann-Whitney U test was applied to analyze severity of dry mouth after treatment of solefinacin and tolterodine.

RESULTS

Total patient in outpatient of Department of Obstetrics and Gynecology during study period was 26182. 103 participants were included in the study. 49 participants were in solefinacin group and 52 participants were in tolterodine group. Two participants from solefinacin group were omitted due to loss to follow up, thus total participants for study was taken as 101.

Table. 1 shows general characteristics and clinical history of participants. Mean age of the participants in our study was 50.6 years. 50 participants were menopause and 51 participants were menstruating. History of participants showed 61.4% had burning micturition, 37.6% had pain abdomen, 63.4% had history of being treated for urinary tract infection, and 54.5% of the participants had history of being treated with antibiotics. Mean duration of symptoms of the participants were 2 years. On examination, 27.7% of the participants also had stress urinary incontinence.

Table.2 shows Baseline urinary symptoms before starting treatment. The average duration participants could hold urine was 2.3 ± 1.4 (mean \pm SD) minutes. Mean daytime urinary frequency were 19 ± 4.8 SD (per day). Mean baseline Urgency Perception Score (UPS) was 3.6 ± 0.5 SD and mean patient perception of bladder condition (PPBC) was 5.5 ± 0.76 SD.

Table no. 3 shows comparison of side effect, discontinuation between study drugs and need of switch to each other. Feeling of dry mouth being important side effect of anti-muscarinic drugs, the severity was assessed using visual analogue score (VAS), participants seemed to respond well with both the drugs, which showed median range of 2(0,4) with $p=0.398$. Seven participants under Tolterodine discontinued due to dry mouth and throat, of which 3 had to switch to Solefinacin. Three participants under Solefinacin had to discontinue and 2 participants were switched to other drug. None of the participants had incident of hypersensitivity reactions.

Table 1. Comparison of background characteristics among the comparison groups. (n = 101)

Characteristics		Groups		Total	p-value
		Solifenacin (n =49)	Tolterodine (n = 52)		
Age	mean ± sd (min, max)	52 ± 13.39 (21, 75)	49.2 ± 13.66 (21, 78)	50.6 ± 13.54 (21, 78)	0.293 [#]
Menopause	no	22 (44.9%)	29 (55.8%)	51 (50.5%)	0.275
	yes	27(55.1%)	23(44.2%)	50 (49.5%)	
Burning Micturition	no	28(57.1%)	34(65.4%)	62(61.4%)	0.395
	yes	21(42.9%)	18(34.6%)	39(38.6%)	
Pain abdomen	no	25(51%)	38(73.1%)	63(62.4%)	0.022*
	yes	24(49%)	14(26.9%)	38(37.6%)	
Duration_ symptoms	median (Q1, Q3) [min, max]	2 (1, 3) [0.33, 8]	2 (1, 3) [0.167, 10]	2 (1, 3) [0.167,10]	0.609 ^{##}
Treatment of UTI	no	16(32.7%)	21(40.4%)	37(36.6%)	0.420
	yes	33(67.3%)	31(59.6%)	64(63.4%)	
History of antibiotics	no	22(44.9%)	24(46.2%)	46(45.5%)	0.899
	yes	27(55.1%)	28(53.8%)	55(54.5%)	
Stress Urinary Incontence	no	35(71.4%)	38(73.1%)	73(72.3%)	0.853
	yes	14(28.6%)	14(26.9%)	28(27.7%)	
Total		49(100%)	52(100%)	101(100%)	

*p<0.05 (Level of significance)

[#]Independent t-test applied^{##}Mann-Whitney U test applied**Table 2. Baseline symptoms in groups before anti-muscarinic drugs.**

Urinary symptoms		group		Total	p-value
		Solifenacin	Tolterodine		
Urgency (mins)	mean ± sd (min, max)	2.2 ± 1.41 (0, 5)	2.4 ± 1.4 (0, 5)	2.3 ± 1.4 (0, 5)	0.571 [#]
Frequency	mean ± sd (min, max)	19 ± 5.05 (8, 25)	19 ± 4.63 (8, 25)	19 ± 4.81 (8, 25)	0.966 [#]
UPS	mean ± sd (min, max)	3.5 ± 0.5 (3, 4)	3.6 ± 0.5 (3, 4)	3.6 ± 0.5 (3, 4)	0.512 [#]
PPBC	mean ± sd (min, max)	5.5 ± 0.84 (3, 6)	5.5 ± 0.67 (4, 6)	5.5 ± 0.76 (3, 6)	0.959 [#]

Table 3. Comparison of side-effect, discontinuation and switching of treatment.

Characteristics		group		Total	p-value
		Solifenacin	Tolterodine		
Hyper-sensitivity	no	49(100%)	52(100%)	101(100%)	..
Dry mouth(VAS)	median (Q1, Q3) [min, max]	2 (0, 4) [0.8]	2 (0, 4) [0.8]	2 (0,4) [0, 8]	0.398 ^{##}
	no	46(93.9%)	45(86.5%)	91(90.1%)	
Discontinued	yes	3(6.1%)	7(13.5%)	10(9.9%)	0.320*
	no	47(95.9%)	47(94%)	94(94.9%)	
Switch	yes	2(4.1%)	3(6%)	5(5.1%)	1.000*
	no	47(95.9%)	47(94%)	94(94.9%)	
Total		49(100%)	52(100%)	101(100%)	

*Fisher exact test applied

^{##}Mann-Whitney U test applied

Table 4. End point comparison of symptoms, urgency perception score and patient perception of bladder symptoms.

Characteristics		Group		Total	p-value
		Solifenacin	Tolterodine		
Urgency improvement (min)	mean ± sd (min, max)	20.1 ± 6.76 (0, 34)	17 ± 9.18 (0, 33)	18.5 ± 8.21 (0, 34)	0.054 [#]
frequency	mean ± sd (min, max)	14.2 ± 5.52 (0, 22)	12.9 ± 5.81 (-5, 21)	13.5 ± 5.68 (-5, 22)	0.275 [#]
UPS improvement	mean ± sd (min, max)	2.1 ± 0.66 (1, 3)	2 ± 0.73 (1, 3)	2 ± 0.69 (1, 3)	0.762 [#]
PPBC improvement	mean ± sd (min, max)	3.2 ± 1.26 (0, 5)	2.8 ± 1.54 (0, 5)	3 ± 1.42 (0, 5)	0.165 [#]

[#]Independent t-test applied

Table no. 4 shows end point comparison of symptoms, urgency perception score and patient perception of bladder symptoms. The urgency symptoms were improved to mean 20.1±6.76 SD in solefinacin group and in tolterodine group showed mean of 17±9.18SD. Day time frequency reduced to mean of 14.2±5.52SD in solefinacin group and 12.9±5.81SD in tolterodine group. Urgency perception score improved to 2.1±0.66 SD for patients under solefinacin and 2±0.73 SD for tolterodine, patient showed improvement but with level of significance 0.762. Patient perception of bladder condition (PPBC) showed improvement in solefinacin group 3.2±1.26 SD and tolteradine 2.8±1.54 SD with level of significance 0.165.

Table no 5 shows patient assessment treatment benefits. Which showed 81.6% under solefinacin responded with massive improvement and 65.4% under tolterodine showed massive improvement. (p = 0.131)

Table 5. Patient assessment of treatment benefits.

Patient assessment	Solefinacin (%)	Tolterodine (%)
Not improved	4.1	13.5
Little improved	14.3	21.2
Massive improved	81.6	65.4

DISCUSSION

Lower Urinary Tract Dysfunction with urgency symptoms are frequently seen in out patients and are commonly treated with various available anti-muscarinic drugs. This study was done among 101 participants to compare the symptomatic improvement and any adverse affects of solefinacin and tolterodine prescribed for patients

with urgency and urge incontinence.

Lower Urinary Tract Symptoms with storage dysfunctions were found in older women and mean age was 52±13.39 in solefinacin group and 49.2±13.66 in tolterodine group. The mean age group showed similarity with study done by Ho CH et al.⁸

Meta-analysis done using 7 studies involving 1805 patients of overactive bladder by Bingqian Liu et al. showed symptomatic relief from urgency symptoms and dry mouth were significantly lower in patients with solefinacin.⁹ A systematic literature review and network meta-analysis for comparative study of efficacy and tolerability by Jameel Najir et al also showed significant symptomatic improvement especially urinary urge incontinence (UUI) and less dry mouth in solefinacin group.¹⁰ In contrast to our study, though it showed symptomatic improvement in urgency, PPBC and UPS after medication but was not significant and also didn't show any superiority among both medication. But solefinacin group was found to be effective when assessed for patient's assessment of treatment benefit.

Study published on 75 patients by Ho CH et al. showed equal efficacy in reducing frequency of micturition, incontinence. There was no statistically significant difference in patient and physician assessment of treatment benefits among patients under solefinacin and tolterodine. Similar to our study, both the drugs showed equal efficacy on improvement of urinary syptoms but without statistical significance. But, patient perceptions of treatment benefit were high among solefinacin group.⁸ Study sample size and duration of follow-up maybe helpful in getting significant results, which our study will be doing for our future publications.

CONCLUSIONS

Solifenacin and Tolterodine showed improvement in urgency, urgency perception score and patient perception of bladder condition from baseline symptoms. Both the drug showed minimum adverse effect. Solifenacin group showed more patients perceptions of treatment benefits with no statistical significance. Thus, both drugs showed comparable symptomatic improvement but without significant superiority over one another.

ACKNOWLEDGEMENTS

Author would like to express appreciation to faculty in Department of obstetrics and gynaecology and all interns involved during the study period.

CONFLICT OF INTEREST

None

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