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EFFECTIVENESS OF TAMSULOSIN COMPARED WITH MIRABEGRON IN TREATMENT OF DOUBLE-J STENT-RELATED LOWER URINARY TRACT SYMPTOMS

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ABSTRACT Introduction: The ureters stent has side effects that the complaint is called stent-related syndrome (SRS). The complaint is equal to Lower Urinary Tract Symptoms (LUTS) and overactive bladder (OAB). Alpha-blocker and antimuscarinic therapy used for benign prostatic hyperplasia (BPH) and OAB therapy can also be used to reduce complaints of SRS. The purpose of this research is to determine the effectiveness of Tamsulosin 0.4 mg/day compared with Mirabegron 50 mg/day against changes in LUTS complaints in patients after the installation of the Ureteric Stent. **Methods:** The design of this research uses a double-blinded experimental method. Samples taken randomly were 50 patients with Double-J (DJ) Stent post-installation LUTS complaints. Data collection is taking place from July to November 2019, using a tool measuring instrument ureteral stent symptom questionnaire (USSQ). Data were analyzed using SPSS 24.0. a P-value < 0.05 was considered to be statistically significant. **Results:** In the entire patient group, the average age of respondents is 44.86 ± 11.85 year, in groups with Tamsulosin 5 mg/day treatment compared with Mirabegron 50 mg/day gives a good effect in lowering the complaint score LUTS during four weeks post-installation of Double-J (DJ) Stent, in this case, Urinary Symptoms, pain, general circumstances, work activity, and other complaints ($P < 0.05$). The average rate reduction of USSQ Urinary Symptoms, pain, general circumstances, greater work activity in the Tamsulosin group. **Conclusion:** Tamsulosin Therapy 5 mg/day compared with Mirabegron 50 mg/day can effectively cure complaints of post-installation LUTS DJ Stent.

KEYWORDS Stent-Related Symptoms, Tamsulosin, Mirabegron, USSQ

Introduction

Stent ureters is a tool to facilitate the flow of urine from the kidneys to the bladder that is interrupted due to obstruction.[1] The

Ureteric stent becomes a simple and effective method of ureteric drainage to maintain kidney function, overcome pain due to obstruction in the ureters, and to the urinary tract.[1,2] Joshi et al. [3] and Sheng-Wei et al. [4], reported that the incidence of complaints of Double-J (DJ) stent side effects in patients could reach 50%-80%. Complaints related to this stent is also referred to as stent-related syndrome (SRS) can be varied, ranging from the lower urinary tract symptoms (LUTS) such as frequency (60%), urgency (60%) and Dysuria (40%), in addition to the pain complaint (80%) and hematuria (54%).[5-7] Along with advances in technology and the modification of the Ureteric stents that are continuously being developed to date, various

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studies to address side effects are associated with symptoms of post-installation of DJ stent, including design modifications stent, medicaments, Position of the stent, coating stent, and intravesical therapy[8,9]. Ureteral stent symptom questionnaire (USSQ) is a standard gold questionnaire to assess morbidity and provide better data comparisons.[10,11]

Complaints of the lower urinary tract symptoms as a side effect of post-installation of a DJ stent is similar to the lower urinary tract symptoms caused by benign prostatic hyperplasia (BPH), and complaints of urgency and frequency are the same as in patients with OAB. Alpha-blocker and antimuscarinic therapy used for BPH and overactive bladder (OAB) therapy are also used to reduce complaints of SRS.[12,13] The complications caused by the DJ-stent insertions have not been widely researched and published, especially in Indonesia.

The study specifically discussed the comparative efficacy of the drug tamsulosin (anti-muscarinic) and Mirabegron (beta-3 adrenergic agonists) to cope with side effects in the patient's post-installation of DJ stent. Tamsulosin is a competitive muscarinic receptor antagonist drug that precludes acetylcholine binds with muscarinic M-3 receptors that exist in the vesica urinary detrusor muscle, thereby preventing contraction in vesica urinary. Mirabegron is a selective agonist for beta-3 adrenergic receptors. Beta-3 adrenoreceptor is a predominant beta receptor that is found in the detrusor smooth muscle cells, and its stimulation will cause detrusor muscle relaxation.[3,6]

Methods

This research uses experimental design, double-blinded. Samples as many as 50 respondents were selected with the consecutive random sampling technique, which was divided into two groups: Group I (n = 25) gained Tamsulosin 0.4 mg/day, group II (n = 25) Get Mirabegron 50 mg/day. All procedures were performed following the ethical standards of the 1964 Helsinki declaration and its later amendments. Informed written consent was obtained from all patients before enrollment into the study.

The provision of USSQ in patients who had undergone a DJ stent installation procedure. On the 7th day of post-surgery, patients who showed the symptoms of the lower urinary tract complaints were randomly given the drug for three weeks. Then the USSQ questionnaire was assessed back on the 14th, 21st, and 28th Post-operative days.

Patients with an endoscopic urology indication of insertion of a DJ stent, diagnosed with a < 10 mm ureteric stone (with or without pelvic dilation, renal calyx, ureters), ureteric stenosis and or kidney stones will undergo shockwave lithotripsy (SWL), with the first unilateral DJ Stent installation. The criteria of patient inclusion are those who undergo endorsement operations, or PCNL followed by DJ Stent insertions, men and women, aged 18-79 years. The exclusion criteria of this research is a history of malignancy in the urinary tract. Patient history has prostate disease, a history of sexual dysfunction, a history of urinary tract infections, pregnancy, history of the disease (diabetes mellitus, cardiovascular, hypertension), never or undergoing radiation therapy/hormonal therapy and or surgical procedures in the minor pelvic, ureteric reconstruction surgery, Alcoholic history, Stroke history, Alzheimer's, central nervous system trauma, accompanied by stone-abuse disease, there is a urethra Violetta in women and hypersensitivity to the drug tamsulosin compounds or even mirabegron.

The Data is processed using SPSS 24.0 (IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk,

NY: IBM Corp.) to analyze the effectiveness ratio of therapy Mirabegron 50 mg/day with Tamsulosin 0.4 mg/day to complaints LUTS post-installation DJ Stent using the mean, Test Chi-Square, ANOVA test, Friedman Test, Independent T-Test, and Mann Whitey test. **Table 1 Characteristic of Respondents by age, height, weight, and Body Mass Index**

Results

In this study, observations and Retrievals were conducted for four weeks by evaluating the six LUTS, such as urination complaints, pain degrees, general health status, work activities, sexual activities, and accompanying complaints that cause discomfort in the subject. The average age of respondents is 44.86 ± 11.85 years, with vulnerable youngest to oldest ages of 21 – 75 years. The average height of the respondent is 164.24 ± 5.21 cm, with the highest height of 173 cm and the shortest height of 155 cm. Then, the average weight of the respondent is 67.02 ± 7.28 kg, with the largest weight of 85 kg and the smallest weight of 54 kg. The average body mass index (BMI) is 24.73 ± 1.95 , with the highest BMI 29.8 and the lowest BMI 21.0 (table 1).

A total of 32 people (64%) Of the total sample is a male sex subject, while 18 people (36%) are subject to the female gender. Gender distribution is significantly different from therapeutic administration ($p < 0.05$). While age group distribution, the type of DJ Stent mounting action, and the body mass index group do not have a significant difference to the given therapeutic group ($p > 0.05$). In the most age group of samples was the initial elderly group (46-55 years), which amounted to 36%, while the smallest in the elderly group (>65 years) year by 4%. A total of 56% of subjects underwent the installation action of right URS DJ stent. In comparison, the other 44% underwent DJ stent installation action, a group of subjects with an ideal weight of 48% and an overweight group of 52%. (Table 2).

The group with therapy by Tamsulosin 0.4 mg/day was obtained that there was a decline in the score of USSQ (U.S), the Complaint of Pain (N), general complaints (KU), Work activity (AK), and other complaints ($P < 0.001$) before the therapy is seven after surgery until three weeks of therapy or 28 days after surgery. But the sexual activity complaint (S) did not get a significant drop in the LUTS score ($P 0.226$) with the administration of postoperative tamsulosin therapy (table 3). The group with therapeutic treatment Mirabegron 50 mg/day obtained that there is a decline in the score of USSQ (U.S.), pain Complaints (N), general complaints (KU), Work activity (AK), and other complaints ($P < 0.001$) before the therapy is 7 days after surgery up to 3 weeks of therapeutic delivery or 28 days after surgery. But the sexual activity complaint (S) was not found to have significant LUTS score ($P 0.440$) by administering postoperative mirabegron therapy (table 3).

In table 4 below shows that the variables N, KU, AK, and KL indicate a decrease in the score in both groups given the medicinal treatment of Tamsulosin and Mirabegron, but showed no significant difference between the two groups with a P value of 0056; 0256; 0058; 0868. While in the US and S variables, research indicates a significant difference between the two therapeutic preparations; the respective P values are < 0.001 and 0.022. In a patriotic with the administration of Tamsulosin 0.4 mg/day tends to be better in terms of declining USSQ scores on complaints of US, N, and AK. Unlike the complaints of KU, S, and KL, the administration of Mirabegron therapy is better in decreasing the average USSQ score than with the administration of tamsulosin (Figure 1).

Table 1 Characteristic of Respondents by age, height, weight, and Body Mass Index.

Variable	Min	Max	Means±SD
Age	21	75	44.86±11.85
Height (cm)*	155	173	164.24±5.21
Weight (kg)**	54	85	67.02±7.28
Body Mass Index	21.0	29.8	24.73±1.95

*centimeter

**kilograms

Discussion

In this research, post-treatment observations focused on the therapeutic effect of improving the symptoms of LUTS perceived by research subjects using the USSQ. This is in line with the research Ray et al. (2015) stating that although the stent installation is short-term, it can still cause high morbidity in patients with stents. Some tools have been described as able to assess stent syndrome (including International Prostatic Symptoms Score (IPSS) and the USSQ).[14]

The results showed that the subjects with male gender dominated the incidence with a total of 64% while the most age groups were in the final adult category (36-45 years) of 28% and the category of early seniors (46-55 years) 36%, with an average age of 44.86 ± 11.85 years. Meanwhile, the URS DJ stent installation action is more dominant in the right anatomical structure of 56%. The results were in line with the research by Pansota (2013), who examined the indications and complications of the installation of DJ Stent in Pakistan that researched as many as 80 patients with a stent. The results showed that the majority of patients (40.0%) aged between 36 and 50 years with male and female ratios is 2.6:1. Of the 80 patients, DJ Stent performed due to the obstructive uropathy of the top in 20 patients, most of the DJ Stent paired after surgery. Besides, it is reported that the most common cause of obstructive uropathy is kidney stone disease, ureteric, or combined (87.5%). Meanwhile, 12.5% of other patients are divided into pelvic ureteric junction (PUJ), carcinoma, and pregnancy.[15]

Definite pathophysiology of symptoms related to stent remains unknown; It could be associated with the contraction of the smooth muscles of the lower ureters and the localized irritation of the trigonal neuron mucosa, which contains the α -1D receptor and the instability of the bladder which gives similar symptoms to benign prostatic hyperplasia.[16] The possible mechanisms to relieve the symptoms associated with a stent can be the relaxation of smooth muscles of ureteric and lower the trigone as well as reduce the motility of the ureters.[17] Relaxation bladder neck/muscle smooth prostate, with a result of decline urination pressure and urinary reflux, is another possible mechanism to control stent-related symptoms, setting the reasoning behind the use of alpha-blockers in addressing the ureters symptoms of the stent.[18]

Pharmacologically, Tamsulosin is a third-generation Alpha-1 adrenergic blocker that is uroselective. The drug effectively provides an effect within 9-13 hours in which the bio visibility approaches the number 100% used in fasting conditions. Selective block on alpha-1A plays a role in increasing bladder emptiness by inhibiting the smooth muscle contractions of the prostate and bladder, which results in increased symptoms of dynamic

urination and maximum urine flow. Blockade of the alpha-1A and alpha-1D adrenergic receptors in the bladder, and the possibility of blockage in the sympathetic nervous system and spinal cord, resulting in inhibition of detrusor muscle contractions and reduction of instability Detrusor muscles and symptoms of storage.[19] The drug is known to be metabolized in the liver, with a negligible first-pass metabolism, mainly by the cytochrome P450 enzyme 2D6 and 3A4; Some glucuronide and the identified metabolites are not significantly active showing linear kinetics. The alpha-adrenergic antagonists are typically used for the initial medical management of LUTS in the BPH case.[20]

Mirabegron is classified in a beta-adrenergic agonist drug group that is indicated as the anti-spasmodic of the urinary tract's organs. The drug acts as a beta-3 selective adrenergic agonist whose function is to increase bladder capacity by relaxation of smooth muscle detrusor during the bladder-filling cycle phase of the bladder.[21] The mirabegron absorbs range between 29-35% through oral pathways. The drug is metabolized extensively, as much as 6% excreted unchanged in the urine (dose 25 mg) and the remainder excreted in the urine and faeces as metabolites. General Administration in adult patients is 25 mg once a day, which is usually effective in 8 weeks, and maybe increased to 50 mg one time a day based on need or tolerance. In various studies, Mirabegron is known to have side effects on some organ systems such as dizziness, headache, nasopharyngitis, increased blood pressure, tachycardia, constipation, diarrhoea, nausea, and the ureteral infections.[22]

The results showed that the score in the variables examined in this study showed a significant decrease in the number ($p < 0.05$) from week to week both with the therapeutic use of Tamsulosin 0.4 mg/day as well as with therapy mirabegron 50 mg/day that is a condition of urination/Urinary mine (US), pain in the body (N), General marital status (KU), Work activity (AK), and another discomfort (KL). Except for complaints of sexual problems (S) This does not indicate a significant decrease in the number ($p > 0.05$). This can be influenced by age variation in subjects examined Where there is a young age subject that does not have a spouse so that it is not active in sexual. There is a subject of elderly who have no sexual activity, other than that there are patients from a distant place separated from the partner, so it is not possible to have sexual intercourse. These results are in line with the study conducted by the Panama et al. (2019) related to the therapeutic efficacy of tamsulosin against LUTS after installation of the DJ stent that showed significant results ($p > 0.05$) against the reduction in the number on the condition of urination/urinary symptoms, pain, the general condition, and another discomfort, but not significant ($p > 0.05$) against work activity and sexual problems.[23]

Table 2 Characteristics of patients based on gender, age, and URS DJ Stent treatment, and Body Mass Index.

Variable	Tamsulosin		Mirabegron		Total		P-Value*
	n	%	n	%	n	%	
Gender							
Male	12	48.0	20	80.0	32	64.0	0.039
Female	13	52.0	5	20.0	18	36.0	
Age Group (years)							
Late Teen (17 – 25)	1	25.0	3	75.0	4	8.0	0.238
Early Adult (26 – 35)	5	71.4	2	28.6	7	14.0	
Adult (36 – 45)	8	57.1	6	42.9	14	28.0	
Early Elderly (46 – 55)	6	33.3	12	66.7	18	36.0	
Late Elderly (56-65)	3	60.0	2	40.0	5	10.0	
Oldest (>65 years)	2	100	0	0.0	2	4.0	
Treatment							
Right URS DJ Stent	13	52.0	15	60.0	28	56.0	0.776
Left URS DJ Stent	12	48.0	10	40.0	22	44.0	
Body Mass Index							
Normal Weight	11	44.0	13	52.0	24	48.0	0.777
Over Weight	14	56.0	12	48.0	26	52.0	

*Chi-Square test

Table 3 Comparison of USSQ reduction score in a patient after DJ stent installation.

Variable	Therapy	Mean Score±SD				P-Value
		Week 1	Week 2	Week 3	Week 4	
Urination Complaint (US)	Tamsulosin	20.60±4.65	14.28±4.93	11.52±4.31	8.60±5.00	<0.001*
	Mirabegron	14.00±5.87	9.52±3.04	7.68±1.93	6.08±2.43	<0.001*
Pain Complaint (N)	Tamsulosin	15.36±4.19	10.76±4.07	8.36±3.49	5.08±4.04	<0.001**
	Mirabegron	12.48±2.12	8.52±2.29	5.72±2.57	4.52±2.43	<0.001*
General Condition (KU)	Tamsulosin	6.24±2.50	4.24±2.38	3.04±2.44	1.88±2.10	<0.001*
	Mirabegron	6.56±2.0	4.68±2.84	3.76±2.72	3.20±2.56	<0.001*
Work Activity (AK)	Tamsulosin	6.40±3.20	4.96±3.27	3.36±2.89	2.44±2.97	<0.001*
	Mirabegron	5.32±2.03	3.12±1.78	2.48±1.73	2.04±1.27	<0.001*
Sexual Activity (S)	Tamsulosin	0.72±1.48	0.72±1.17	0.52±0.96	0.40±0.76	0.226*
	Mirabegron	1.48±1.87	1.48±1.75	1.56±1.63	1.32±1.37	0.440*
Other Complaint (KL)	Tamsulosin	7.04±1.30	4.32±1.54	3.84±1.10	3.56±1.44	<0.001*
	Mirabegron	5.92±1.41	4.64±1.07	4.40±1.22	4.00±1.19	<0.001*

*Friedman test, **annova test

Table 4 The average decrease value of USSQ in a patient after DJ stent installations.

Variable	Mean Score±SD		P-Value
	Tamsulosin	Mirabegron	
Average decline of USSQ Urinary Complaint (US) Pre - H+21	13.75±3.83	9.32±2.45	<0.001**
Average decline of USSQ Pain (N) Pre - H+21	9.89±3.29	7.81±1.75	0.056**
Average decline of USSQ General Condition (KU) Pre - H+21	3.85±1.96	4.55±2.32	0.256*
Average decline of USSQ Work Activity (AK) Pre - H+21	4.29±2.39	3.24±1.25	0.058*
Average decline of USSQ Sexual Activity (S) Pre - H+21	0.62±0.91	1.49±1.45	0.022**
Average decline of USSQ Other complains (KL) Pre - H+21	4.69±1.07	4.74±0.82	0.868**

*Independent t-test; **Mann Whitney test.

In this study, Tamsulosin and Mirabegron equally were able to lower the complaints of LUTS in patients. However, the administration of Tamsulosin gave an average rate difference of a more significant decrease than Mirabegron in complaints urinary symptoms, pain in the body, and activity work. However, it only gave significant results to complaints urinary symptoms. The administration of Mirabegron therapy has a more substantial effect on the difference in the general state score, complaints of sexual problems, and scores of other complaints expressed by the subject than the group of Tamsulosin, while in the variable the complaints of sexual problems only obtained a significant difference. The results obtained in this research can be influenced because both therapeutic preparations have the same workspace that is an inhibitor of M3 receptors, where the similarities of this function will indicate the similarity of the effects anyway. For the meaninglessness of the urinary state variables and complaints of sexual problems are very likely to be influenced by the characteristics of respondents who received the drug in the group Mirabegron, the oldest age group involved only in the number 56-65 years during the group of Tamsulosin in the group > 65 years. The high age difference is very likely to affect the external therapeutic outcome. These results are in line with research by Maharajh (2015), stating that the age is definitively stated to be associated with LUTS, due to the hormonal differences and the mitogenesis differences that have a connection with the risk of urological diseases.[24]

Conclusion

Tamsulosin Therapy 5 mg/day compared with Mirabegron 50 mg/day can effectively cure complaints of post-installation LUTS DJ Stent. However, they don't have a significant difference, except on Urinary Symptoms and sexual activity.

Conflict of interest

There are no conflicts of interest to declare by any of the authors of this study.

Ethics

Ethics committee approval was received for this study from the ethics committee of Faculty of Medicine, Universitas Hasanudin number: 1113/UN4.6.4.5.31/PP36/2019.

References

1. Finney RP. Experience with New Double J Ureteral Catheter Stent. *J Urol.* 1978;120(6):678-681. doi:10.1016/S0022-5347(17)57326-7
2. Fischer KM, Louie M, Mucksavage P. Ureteral Stent Discomfort and Its Management. *Curr Urol Rep.* 2018;19(8):64. doi:10.1007/s11934-018-0818-8
3. Joshi HB, Stainthorpe A, MacDonagh RP, Keeley FX, Timoney AG, Barry MJ. Indwelling ureteral stents: evaluation of symptoms, quality of life and utility. *J Urol.* 2003;169(3):1065-1069; discussion 1069. doi:10.1097/01.ju.0000048980.33855.90
4. Lee S-W, Hsiao P-J, Chang C-H, Chou E-L. Lower urinary tract symptoms associated with double-J stent. *Urol Sci.* 2018. doi:10.4103/UROS.UROS_56_18
5. Bhattar R, Tomar V, Yadav SS, Dhakad DS. Comparison of safety and efficacy of silodosin, solifenacin, tadalafil and their combinations in the treatment of double-J stent-related lower urinary system symptoms: A prospective randomized trial. *Turkish J Urol.* 2018;44(3):228-238. doi:10.5152/tud.2018.50328
6. Joshi HB, Okeke A, Newns N, Keeley FX, Timoney AG. Characterization of urinary symptoms in patients with ureteral stents. *Urology.* 2002;59(4):511-516. doi:10.1016/s0090-4295(01)01644-2
7. Aggarwal SP, Priyadarshi S, Tomar V, et al. A Randomized Controlled Trial to Compare the Safety and Efficacy of Tadalafil and Tamsulosin in Relieving Double J Stent Related Symptoms. *Adv Urol.* 2015;2015:1-6. doi:10.1155/2015/592175
8. De Grazia A, Somani BK, Soria F, Carugo D, Mosayyebi A. Latest advancements in ureteral stent technology. *Transl Androl Urol.* 2019;8(S4):S436-S441. doi:10.21037/tau.2019.08.16
9. Mosayyebi A, Manes C, Carugo D, Somani BK. Advances in Ureteral Stent Design and Materials. *Curr Urol Rep.* 2018;19(5):35. doi:10.1007/s11934-018-0779-y

10. Taguchi M, Yoshida K, Sugi M, Matsuda T, Kinoshita H. A ureteral stent crossing the bladder midline leads to worse urinary symptoms. *Cent Eur J Urol.* 2017;70(4):412-417. doi:10.5173/cej.2017.1533
11. Betschart P, Zumstein V, Piller A, Schmid H-P, Abt D. Prevention and treatment of symptoms associated with indwelling ureteral stents: A systematic review. *Int J Urol.* 2017;24(4):250-259. doi:10.1111/iju.13311
12. Méndez-Probst CE, Razvi H, Denstedt JD. Fundamentals of Instrumentation and Urinary Tract Drainage. In: *Campbell-Walsh Urology.* Elsevier; 2012:177-191.e4. doi:10.1016/B978-1-4160-6911-9.00007-4
13. Hohenfellner R, Stolzenburg JU. *Manual Endourology;* 2005. doi:10.1007/3-540-28854-6
14. Ray RP, Mahapatra RS, Mondal PP, Pal DK. Long-term complications of JJ stent and its management: A 5 years review. *Urol Ann.* 7(1):41-45. doi:10.4103/0974-7796.148599
15. Pansota MS, Rasool M, Saleem MS, Tabassum SA, Hussain A. Indications and complications of double J ureteral stenting: our experience. *Gomal J Med Sci.* 2013;11.
16. Wein AJ. Re: Efficacy and Safety of Combinations of Mirabegron and Solifenacin Compared with Monotherapy and Placebo in Patients with Overactive Bladder (SYNERGY Study). *J Urol.* 2018;200(3):502-505. doi:10.1016/j.juro.2018.05.139
17. Ahallal Y, Khallouk A, El Fassi MJ, Farih MH. Risk factor analysis and management of ureteral double-j stent complications. *Rev Urol.* 2010;12(2-3):e147-e151.
18. Wang RC, Smith-Bindman R, Whitaker E, et al. Effect of Tamsulosin on Stone Passage for Ureteral Stones: A Systematic Review and Meta-analysis. *Ann Emerg Med.* 2017;69(3):353-361.e3. doi:10.1016/j.annemergmed.2016.06.044
19. Michel MC. Tamsulosin. In: *Reference Module in Biomedical Sciences.* Elsevier; 2017. doi:10.1016/B978-0-12-801238-3.96546-2
20. Piascik MT, Abel PW. Adrenergic Antagonists. In: *Pharmacology and Therapeutics for Dentistry.* Elsevier; 2017:122-132. doi:10.1016/B978-0-323-39307-2.00009-6
21. Sharaf A, Hashim H. Profile of mirabegron in the treatment of overactive bladder: place in therapy. *Drug Des Devel Ther.* 2017;11:463-467. doi:10.2147/DDDT.S101630
22. Bragg R, Hebel D, Vouri SM, Pitlick JM. Mirabegron: a Beta-3 agonist for overactive bladder. *Consult Pharm.* 2014;29(12):823-837. doi:10.4140/TCP.n.2014.823
23. Pramana IBP, Rizaldi F, Djojodimedjo T. THE EFFECTIVENESS OF TAMSULOSIN, SOLIFENACIN, AND COMBINATIONS THERAPY TAMSULOSIN ADDED SOLIFENACIN ON LOWER URINARY TRACT SYMPTOMS AFTER DOUBLE J STENT INSERTION. *Indones J Urol.* 2019;26(2). doi:10.32421/juri.v26i2.503
24. Maharajh S, Abdel Goad EH, Ramklass SS, Conradie MC. Lower urinary tract symptoms (LUTS) in males: a review of pathophysiology. *South African Fam Pract.* 2015;57(2):88-92. doi:10.1080/20786190.2014.983307

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