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Original Article

Study of Silodosin, Darifenacin, and Combination Therapy for the Treatment of Ureteral Stent-Related Discomfort

G. Latha

Assistant professor, Department of Urology, Government medical college and Hospital, Pudukottai, Tamilnadu

Abstract

Objective: To compare the safety and efficacy of silodosin and Darifenacin in treating ureteral stent-related symptoms in patients with Double-J ureteral stents.

Materials and Methods: This is an observational study with a prospective design. After retrograde ureteroscopy for urinary stones, a single surgeon conducted retrograde double-J stenting on 75 patients (48 males and 27 women). Group 1 – Silodosin – 4 mg once daily, Group 2 – Darifenacin - 7.5 mg once daily, Group 3 – Silodosin (4mg) and Darifenacin (7.5 mg) once daily. The patient completed written International Prostate Symptom Score questionnaires the day before surgery, on a post-operative day 1, and on the day of stent removal. All groups received drugs for 14 days.

Results: After the stent was removed, the IPSS total score for group one was 12.62, 11.03 for group two, and 7.82 for group three. These differences were substantial (p=0002), and there were no differences in pre-and post-operative circumstances. Similarly, after stent removal, the IPSS irritative and obstructive symptom scores showed significant differences (p=0.004, p=0.025), with group one scoring 8.31, group two 6.18, and group three 4.82. The IPPS irritative and obstructive ratings for groups one and two were 4.99, 5.28, and 3.25, respectively.

Conclusion: Combination of silodosin and darifenacin was sufficient for obstructive symptoms following stent removal, the combination of these two was more effective than either medication alone.

Key words: Double-J ureteral stents, IPSS, Stent-related symptoms

INTRODUCTION

In 1967, Zimskind *et al*. introduced ureteral stents, which are now widely used in urinary tract disease.[1] The double J stent is the most commonly used type of ureteral stent, and it is used to treat ureteral edema, obstructive pyelonephritis, ureter perforation, renal colic, and Stein Strasse.[2,3] Even though stents are extremely beneficial, patients still experience a variety of issues, such as pain and inflammation, which negatively impact their health.[4] The known causes of these symptoms are unknown. According to Thomas' report, the main cause of stein-related symptoms is the pressure transferred to the renal pelvis by the stent's intravesical portion during trigonal irritation and urination.[5] Many studies have recently been published to reduce these stent symptoms. Pharmacological management, such as prescribing selective alpha-1-blockers and antimuscarinic agents, is one example of such efforts to reduce stein symptoms.[6]

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Pharmacologic management is thought to be simpler to implement than other management methods. Silodosin is a highly selective alpha-1 adrenergic receptor antagonist that is used to treat lower urinary tract symptoms (LUTS) in men who have a suspected bladder outlet obstruction due to benign prostatic hyperplasia (BPH). Darifenacin is a medication used to treat overactive bladder-related urinary incontinence. Darifenacin is an antimuscarinic medication. It prevents frequent, urgent, or uncontrolled urination by relaxing the muscles of the urinary bladder. The goal of this study was to examine and compare the efficacy of Silodosin and Darifenacin alone and in combination

Corresponding Author: Dr. G. Latha, Assistant professor, Department of Urology, Government medical college and Hospital, Pudukottai, Tamilnadu

in treating lower urinary tract symptoms in patients with indwelling double-J ureteral stents.

MATERIALS AND METHODS

This is a prospective observational study. A single surgeon performed retrograde double-J stenting on 75 patients (48 men and 27 women) after retrograde ureteroscopy for urinary stones. A retrospective chart review was used to obtain patient data. Patients with benign prostatic hyperplasia or overactive bladder who had previously been prescribed a selective alpha-1-blocker or antimuscarinic agent were excluded from this study. Patients who were taking analgesics prior to surgery were also excluded. The ureteral stent was made of polyurethane and had a diameter of 6 Fr as well as lengths of 24 cm and 26 cm. The ureteral stent's length was determined by the patient's height.

The procedure was carried out under general anesthesia, and the stent's position was confirmed by plain X-ray. Fourteen days after surgery, the stents were removed. Three groups of patients were formed. Group 1 (n = 25) received Silodosin 4 mg once daily. Darifenacin 7.5 mg was given to Group 2 (n = 25) once a day, every day. Group 3 (n = 25) was given Silodosin 4 mg and Darifenacin 7.5 mg on a daily basis. Each patient completed written International Prostate Symptom Score/Quality of Life (IPSS/QoL) questionnaires the day before surgery, on post-operative day 1, and on the day of stent removal. The IPSS was divided into three parts: total score, obstructive symptom score, and irritative symptom score. The Chi-square test, one-way ANOVA, and one-way repeated measures ANOVA were used for comparisons between each of the three groups. Values of $p<0.05$ were considered statistically significant. Statistical analyses were performed with SPSS ver. 18.0 (SPSS Inc., Chicago, IL, USA).

RESULTS

The patients' mean age was 50.24±12.90 years, and there were no significant differences between groups (n=25). There are three groups in this study, each with 25 participants. This study included a total of 26 females and 48 males. Table 1 shows that of the 75 patients studied, 22 (29.4%) had percutaneous nephrolithotomy (PCNL) and 53 (70.6%) had ureteroscopic lithotomy (URSL) for stone treatment (Table 1). ANOVA with repeated measures revealed a significant difference (p.0002) after stent removal. The IPPS total score for group one was 12.62, 11.03 for group two, and 7.82 for group three. In pre-and post-operative conditions, there was no significant difference in IPPS total score between groups [Table 2]. Similarly, IPSS irritative and obstructive symptom scores showed significant differences ($p = 0.004$, $p = 0.025$) after stent removal, with group one having 8.31, group two having 6.18, and group three having 4.82. The IPPS irritative and obstructive scores were 4.99 for group one, 5.28 for group two, and 3.25 for group three. In pre- and post-operative conditions, there was no significant difference in IPSS irritative and obstructive subscores between groups (Table 3 and Table 4).

DISCUSSION

Significant pain and discomfort are associated with ureteral stents.[7] According to Joshi *et al.*, 80% of patients experienced stent-related pain.[8] Numerous studies have been conducted to reduce stent-related discomfort and pain through the use of drugs such as alpha-blockers, anticholinergics, phosphodiesterase inhibitors, and others, as well as new stent designs, stent materials, and stent

Table 1: shows the age, gender, and procedure used in all of the patients who took part in the study.

	Group 1	Group 2	Group 3
Age	52.48±17.24	54.85±16.17	51.66±15.37
Gender			
Male	17	16	16
Female	8	9	9
Procedure			
PCNL	7	8	7
URSL	18	17	18

Table 2: Compares the three groups' IPSS total scores.

IPSS total score	Group 1	Group 2	Group 3	P value
Pre-op	8.14	8.99	8.24	0.725
Post-op	12.34	11.19	10.98	0.538
Stent removal	12.62	11.03	7.82	0.002

Table 3: Compares the three groups' IPSS irritative subscore.

IPSS irritative subscore	Group 1	Group 2	Group 3	P value
Pre-op	4.64	4.79	5.14	0.821
Post-op	8.03	6.75	7.59	0.474
Stent removal	8.31	6.18	4.82	0.004

Table 4: Compares the three groups' IPSS obstructive subscore

IPSS obstructive subscore	Group 1	Group 2	Group 3	P value
Pre-op	4.71	4.68	4.19	0.774
Post-op	5.01	4.92	4.58	0.841
Stent removal	4.99	5.28	3.25	0.025

dimensions.[9-12] The majority of the available literature focuses on stent-related morbidity while the stent is in place. However, it is not uncommon for any urologist to see patients complaining of renal colic-like pain after stent removal, which frequently necessitates additional analgesics and admission due to the severity of the pain. Pain during stent removal is most likely caused by nociceptors being activated, friction between the stent and the mucosa causing ureteral smooth muscle irritability, trigonal irritation, and pressure-induced changes in the pelvi-calyceal system.[10,13] However, pain after stent removal is frequently unreported or ignored for an extended period of time. There are several approaches to optimise the compatibility of this stent using preventive and pharmacological techniques. Stent length should be adjusted according to the patient's height, stent use should be limited, different stent designs such as drug-releasing or biodegradable stents should be considered, hydrophilic material coated stents with tapering ends should be considered, and proper counseling of patients for their pain and discomfort should be provided. These strategies come under the category of preventive techniques. In pharmacological strategies drugs such as alpha-blockers and anticholinergics reduced the pressure transmitted toward the renal pelvis during micturition, reduce the peak contraction pressure leading to ureteral dilation and decrease bladder irritation with the intravesical portion of the stent that will lead to less discomfort related to stents.[10,11] Alpha-blockers, anticholinergics, and their combinations have shown to be effective in the treatment of stent-related symptoms.[14] PDE5Is have recently been linked to stent-related symptoms in some trials.[15] However, for the assessment of stent-related symptoms, the majority of these studies haven't employed the most validated score with better quality of life. The combination of silodosin and darifenacin alleviated stent-related symptoms and increased quality of life in our observational study. Silodosin has also been demonstrated to be beneficial in patients with stent-related symptoms by Tsai *et al.* and Kim *et al.* stent-related symptoms is usually treated with alpha-blockers, and other studies have demonstrated that these medicines are useful in lowering stent-related symptoms.[14,16] Anticholinergics, both alone and in conjunction with alpha-blockers, were found to be useful in treating stent-related symptoms in patients, but combination therapy was found to be more effective than monotherapy. Bhattar et al. discovered that combination therapy with silodosin and solifenacin (group E) was helpful for treating stent-related symptoms, with better quality of life and less analgesic need than any other group.[17] Similarly, in our study, Silodosin 4 mg and Darifenacin 7.5 mg daily groups had statistically significant differences in the IPSS total score, irritative and obstructive subscore. The other scores were not significantly different. The following are the study's limitations. There was a lack of receiving valuable and totally credible information because this was a prospective and observational study. On a preoperative day or after stent removal, some patients did not submit their complete IPSS score questionnaire. As a result, we were unable to use this questionnaire. The statistical significance of each scale was difficult to evaluate due to very small groups. As a result, further sizable, prospective studies are needed to provide more precise data.

CONCLUSION

Combination therapy with silodosin and darifenacin improved both irritative and obstructive symptoms more than in the other groups. Combination therapy should be strongly considered for patients who complain of stent-related symptoms.

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