



LUTS-Normal Stent VS Carbothene Stent in a Health Center- Retrospective and Prospective Study

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Ureteral stent removal is associated with some post operative symptoms such as changes in the frequency of urine, frequent nocturia, occasional episodes of blood stained urine, pain in the suprapubic region which occurs due to the material composition and the dimensions of the stent as well. Polyurethane stent are regularly used in the operation theatres but in the recent years carbothane stent has showed some efficacy and hence necessitates a comparison.

Objectives: To study the prevalence of symptoms of lower urinary tract symptoms in patients with polyurethane stent and carbothane stents

Materials and Methodology: A prospective study was conducted among patients who had their stent removed to the Department of Urology in a tertiary health care hospital from January 2021 to April 2021. A simple random sampling technique was employed and 40 patients were identified for the study. The relationship between the different stents and the onset of symptoms

Results: It is seen that the onset of lower urinary tract symptoms had an equal incidence among the two genders hence the presence of symptoms plays a crucial role in distinguishing the efficacy

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of the stents. Here in this study only 5% of carbothane stent patients had changes in frequency of micturition where as 65% polyurethane stent patients reported change frequency similarly 60% of polyurethane stent patients had changes in Frequency of nocturia whereas same was reported in 20% of the patients. Loss of urine before reaching the toilet was the primary complaint in 30 % of polyurethane stent patients but only 2% of carbothane stent patients occasionally had this complaint. Apparently the stream of urine was occasionally continuous in 70% of polyurethane stent patients but was always continuous in 85% of carbothane stent patients. A sense of incomplete evacuation was experienced by 40% of polyurethane stent patients but only 1% of carbothane stent patients had such complications Similarly pain in the suprapubic region, straining oneself while micturition and presence of hematuria was experienced by a greater percentage of polyurethane stent patients than that of carbothane stent patients.

Conclusion: It is seen that carbothane stent have a better patient compliance and a low onset of lower urinary tract symptoms when compared to the normal polyurethane stent and hence medical management of the symptoms was required in the postoperative period

Keywords: Prevalence; polyurethane; carbothane; frequency of micturition; nocturia; suprapubic pain; exhaustion; lower urinary tract symptoms.

1. INTRODUCTION

Double J stent has become the keystone in endourological treatment after its introduction in 1978 by Roy.P. Finney [1]. In India stent placement is done almost as a routine for stone surgery especially for ureteroscopy and extracorporeal shockwave lithotripsy [2]. Following stent placement when it is removed a good number of patients have reported of experiencing stent related symptoms such as increased frequency of urination, increased urgency to micturate, pain in the suprapubic symptoms for which affects the quality of life [3,4] of the patient and he has to visit the urology clinic post-operatively. There have been several studies which have compared the quality of the stent placed with the patient compliance and the onset of these post operative symptoms experienced by the patient. Certain characteristic features which are used to compare between the different stents include the length of the stent [5] it's positioning [6] presence of any special coating [7] and post stent removal whether the patient needs alpha1- and choline blockers along with NSAIDs such as mirabegron [8-10], Nowadays urethral stents are primarily composed of polyurethane because it has a low fracture propensity and has a high tensile strength [11]. However newer studies which has been recently conducted shows that carbothane coated ureteral stents have an edge of advantage over the regularly used polyurethane stents in all aspects including the shape, composition, strength, decreasing the frictional force during stent placements, better patient compliance and the postoperative onset of symptoms. This advancements has eventually

led to decrease in the stent related symptoms such as pain, frequency of urination, low incidence of passing blood stained urine post stent removal and thereby improving the patient's quality of life and thus reducing the visit to the urologist clinic post operatively.

2. AIMS AND OBJECTIVES

This study aims to study the prevalence of lower urinary tract symptoms and the patient discomfort and compliance between polyurethane stent and a carbothane stent. This would help in giving a better insight on the type of stents to be used in future thereby increasing the patient comfort and decreasing the symptoms

3. METHODOLOGY

After institutional review board approval (IRB) ,this study was done as a prospective study to assess the incidence of lower urinary tract symptoms in patients after their stent removal in a Tertiary health care hospital from January 2021 to April 2021. The minimum sample size required for the study was estimated to be 40 patients. They were identified for the study using a simple random sampling technique. Inclusion criteria consisted of patients in the Urology Department with a stent placement for pain symptoms and relief whereas any patient with active urinary tract infection and as well as comorbidities such as diabetes, hypertension etc.

The patients were randomly assigned into two groups, group A(n=20) who were placed with polyurethane stents and another group, group

B(n=20) who were placed with carbothane stents. During operat all the patients were placed with 6 Fr 26cm ureteral stents which was placed via cystoscopy and X Ray guided control under intravenous anaesthesia. Stent was placed for 4 weeks which was followed by stent removal and a follow up assessment was done after 1hr post surgery. The study tool was a detailed structured questionnaire and informed consent was obtained before conducting the study. Data analysis was done using the statistical package SPSS 22 version. The prevalence of lower urinary tract symptoms in patients with polyurethane stent and carbothane stent were compared. The criteria which was used for comparison was increased frequency of urination,presence of urgency of urination,

frequency of nocturia, presence of a continuous stream, presence of a sense of incomplete evacuation of bladder, pain at the flanks as well as the suprapubic region, presence of hematuria. Before the conduct of the study.

4. RESULTS

A total of 40 patients were randomly selected out of which 20 randomly selected patients were placed with polyurethane stents and the remaining 20 patients were placed with carbothane stents in the tertiary health care centre. A comparison of symptom between these stents have been discussed in Table 1.

Table 1. Comparison of LUTS symptoms between polyurethane stent and carbothane stent among patients

SL.no	LUTS SYMPTOMS	Polyurethane stent N(%)	Carbothane stent N(%)
1.	Changes in the frequency of micturition		
	More than once per hour	2(10%)	1(5%)
	Every hour	13(65%)	1(5%)
	Every 2 hours	4(20%)	1(5%)
2.	Urgency for urination		
	Every 3hours or more	1(5%)	17(85%)
	Never	-	17(85%)
	Sometimes	12(60%)	3(15%)
3.	Frequency of nocturia		
	Always	8(40%)	-
	Not once	-	16(80%)
	Once	6(30%)	4(20%)
4.	Loss of urine before reaching the toilet		
	Twice	12(60%)	-
	More	2(10%)	-
	Never	1(5%)	18(90%)
5.	Sharp pain in the Suprapubic region		
	Occasionally	13(65%)	2(10%)
	Always	6(30%)	-
	Never	2(10%)	19(95%)
6.	Any passing of blood stained urine		
	Occasionally	11(55%)	1(5%)
	Always	7(35%)	-
	Never	9(45%)	19(95%)
7.	Feeling exhausted after procedure		
	Slightly stained	8(40%)	1(5%)
	Highly stained	3(15%)	-
	Stained with blood products	-	-
7.	Feeling exhausted after procedure		
	Never	1(5%)	19(95%)
	Occasionally	17(85%)	1(5%)
	Always	2(10%)	-

4.1 Association with Gender

In this present study it was found that both the genders were equally affected by the incidence of lower urinary tract symptoms after insertion of stent irrespective of the type of stent that was placed in them

4.2 Association with Changes in the Frequency of Urination

In the present study it was found that among the 20 patients who were placed with polyurethane stents 13(65%) of them experienced changes in the frequency of urination every hour, 4(20%) of them experienced having changes every 2 hours, and 2(10%) had changes more than once every hour and a mere 1(5%) had changes every 3hours or more Similarly in the 20 patients who were placed with carbothane stents,17(85%)of them experienced changes in the frequency of urination at or more than 3hours and 1(5%) of them had changes every 2hours, 1(5%) had changes every hour and 1(5%) had changes more than once every hour.

4.3 Association with Urgency for Urination

In this study out of 20 patients with polyurethane stents 12(60%) complained of sometimes experiencing an urgency to micturate whereas 8(40%) complained of always experiencing an urgency to micturate In contrast the 20 patients placed with carbothane stent,17(85%) had no complaints of urgency to micturate and 3(15%) complained of sometimes experiencing the urgency of micturition.

4.4 Association with Frequency of Nocturia

In this study out of 20 patients who had polyurethane stent placed 12(60%) had twice the increase in frequency in nocturia,6(30%) complained of once increase in frequency of nocturia and 2(10%) complained of more than twice increase in frequency.

Similarly in the 20 patients with carbothane stents,16(80%) had no increase in frequency of nocturia whereas only 4(20%) had only once increase in the frequency

4.5 Association with Loss of Urine before Reaching the Toilet

In this study out of 20 patients who had polyurethane stent placed 13(65%) complained of occasionally losing urine before reaching the toilet,6(30%) complained of always losing urine and only 1(5%) had no complaints of loss of urine.

Similarly in the 20 patients with carbothane stents,18(90%) had no complaints of loss of urine and only 2(10%) had occasional loss of urine

4.6 Association with Decrease in Stream of Urine

In this study out of 20 patients who had polyurethane stent placed,11(55%) had a little Decrease in their stream of urine and only 9(45%) had a fairly very much loss in their stream of urine.

Similarly in the 20 patients with carbothane stents,17(85%) had no decrease in their stream of urine and only 3(15%) had a little decrease in their stream of urine

4.7 Association with Continuity of the Urine

In this study out of 20 patients who had polyurethane stent placed,14(70%) occasionally had a continuous stream,4(20%) never had a continuous stream after stent removal and 2(10%) always had a continuous stream.

Similarly in the 20 patients with carbothane stents,17(85%) had a continuous stream of urine and only 3(15%) occasionally had a continuous stream of urine

4.8 Association with Sense of Incomplete Evacuation

In this study out of 20 patients who had polyurethane stent placed,11(55%) occasionally had a sense of incomplete evacuation,8(40%) always had a sense of incomplete evacuation and 1(5%) had no such complaints.

Similarly in the 20 patients with carbothane stents,19(95%) had no such complaints and only 1(5%) had a sense of incomplete evacuation.

4.9 Association with Straining Onself While Micturating

In this study out of 20 patients who had polyurethane stent placed,14(70%) complained of occasionally straining themselves while urinating,5(25%) never had to strain during micturation and 1(5%) always had to strain themselves during micturation.

Similarly in the 20 patients with carbothane stents,19(95%) did not have to strain while micturition and only 1(5%) had such complaints

4.10 Association with Sharp Pain in the Supra Pubic Region

In this study out of 20 patients who had polyurethane stent placed,11(55%) occasionally had a feeling of sharp pain in their suprapubic region,7(35%) patients always had pain and only 2(10%) had no such complaints.

Similarly in the 20 patients with carbothane stents,19(95%) did not have any such pain and only 1(5%) had pain in their supra pubic region

4.11 Association with Presence of Blood While Micturition

In this study out of 20 patients who had polyurethane stent placed,9(45%)did not have any complaints of passing blood stained urine, 8(40%) complained of occasionally passing such blood stained urine and only 3(15%) passed a highly blood stained urine.

Similarly in the 20 patients with carbothane stents,19(95%) did not have complaints of passing blood stained and only 1(5%) had complained of a slightly blood stained urine

4.12 Association with Feeling of Exhaustion after Stent Removal

In this study out of 20 patients who had polyurethane stent placed,17(85%) occasionally felt exhausted post operatively, 2(10%) felt exhausted all the time and 1(5%) had no such complaints.

Similarly in the 20 patients with carbothane stents,19(95%) had no complaints of being exhausted after stent removal and only 1(5%) had complained of occasionally being exhausted.

5. DISCUSSION

Changes in frequency of urination, urgency to micturate, increase in frequency of nocturia, pain in the suprapubic region, sense of incomplete evacuation after micturition are essential complaints after stent removal procedures and there by necessitates the study to find a better composition of stent which would decrease the aforementioned symptoms in patients. In this study 40 patients were selected randomly and based on their symptoms a comparison was made between polyurethane stent and carbothane stents. Here the incidence of lower urinary tract symptoms was equally prevalent among both the genders.With regard to the changes in the frequency of micturition 65% of polyurethane stent patients experienced changes every hour whereas 85%of carbothane stent patients experienced a change in more than 3hours therapy showing better compliance. As far as urgency for micturition is concerned, the majority of polyurethane stent patients i.e 60% of them complained of occasional urgency whereas carbothane stent patients around 85% had no such complaints regarding urgency.

With regard to frequency of nocturia,60% of polyurethane stent patients experienced twice the increase in frequency of nocturia whereas 80%of the carbothane stent patients reported no increase in frequency of nocturia. Loss of urine before reaching the toilet is one of the important symptoms which was occasionally seen in 65% of polyurethane stent patients and almost 90% of carbothane stent patients had no such complaints.

Similarly any decrease in the stream of urine is an important prognostic factor in the postoperative period,55% of polyurethane stent patients experienced a little decrease in the stream whereas the majority of carbothane stent patients i.e 85% patients had no such complaints. Again with regard to the continuity of urine,70% of the polyurethane stent patients occasionally experienced a continuous stream but no such complaints were reported by 85% of the carbothane stent patients.

A sense of incomplete evacuation was occasionally experienced by 55% of patients with polyurethane stent whereas 95% of carbothane stent patients had no such sense of incomplete evacuation. Again 70% of patients with polyurethane stent complained of straining themselves while micturition but only 5% of

patients with carbothane stent had the similar complaint.

In this study about 55% of patients with polyurethane stent experienced pain in their suprapubic region but 95% of patients with carbothane stent had no such pain. Again with respect to presence of blood in the urine 40% of polyurethane stent patients complained of occasionally passing blood stained urine whereas on 5% of carbothane stent patients had such symptoms

Among the 20 polyurethane stent patients almost 85% of them felt exhausted after stent removal but in stark contrast 95% of the carbothane stent patients had no such complaints

6. CONCLUSION

In this study the incidents of symptoms and increased frequency of urination, nocturia etc plays an immensely important parameter for differentiating between polyurethane and carbothane stents. From this study it has been changes established that carbothane stent has an advantage over the normal stent as it decreases the symptoms and better patient compliance but this will pave the way for further studies in this topic

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

Ethical clearance was obtained from the institutional Ethics Committee.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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