# A STUDY ON THE ROLE OF DJ STENTING IN URETERIC CALCULI PATIENTS AFTER INTRACORPOREAL LITHOTRIPSY

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**ABSTRACT**

A ureteric stent is a tube that is placed using cystoscopy or ureteroscopy inside the ureter to treat and also to prevent urinary obstruction. DJ stents are the most common stents used, which is available in various lengths. The stent that remains in situ usually causes the symptoms of urinary tract infection, pain in the suprapubic region and flank due to urinary reflux, frequency, urgency, dysuria and hematuria. An attempt has been made in this study to evaluate the stent related symptoms after semi rigid ureteroscopy and intracorporeal lithotripsy for mid, lower and distal vesicoureteric junction calculi and a comparison has been made between stented and non-stented patients.

**KEYWORDS**

Ureteric Stent, Intracorporeal Lithotripsy, DJ Stent.

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## INTRODUCTION

An ureteric stent placed after intracorporeal lithotripsy produces various symptoms like pain, dysuria, hematuria.[1] and the stent, a foreign body.[2,3] prevents urinary obstruction. The stent length ranges from 24 to 30cm in adults. Cystoscopic placement is the common method used for stenting. Stents used in ureter are called double J, double pig-tail, DJ or JJ stents. The term stent was first coined by Charles T Stent (1807–1885), an English dentist. Stents are commonly indicated in urology for draining urine from the kidney to the bladder. Stenting is mostly done in the ureter for stone disease during definitive procedures like ureteroscopy and extracorporeal shock wave lithotripsy.

Advances in instrumentation of ureter have made ureteroscopy less morbid that the stent placed following the procedure remains the main source of concern to the patient. The stent that remains in situ usually causes the symptoms of urinary tract infection, pain in the suprapubic region and flank.[4] due to urinary reflux, frequency, urgency, dysuria and hematuria. An ideal stent material should be biocompatible, radiopaque, must relieve intraluminal and extra-luminal obstructions, must be resistant to encrustation and infection, cause little discomfort to the patient, and has to be widely available at reasonable cost. Up-to-date, no such stent material fits into all these criteria. Various studies describe the length of stents required in children.[5]

An attempt has been made in this study to evaluate the irritative lower urinary tract symptoms.[6] related to stents after semi rigid ureteroscopy and intracorporeal lithotripsy for mid, lower and distal vesicoureteric junction calculi, and a comparison has been made between stented and non-stented patients.

Intraoperative ureteral length.[7] is the best guide to assess the stent length that is required.[7] Various drugs like alpha blockers.[8,9,10], anti-inflammatory agents, drug eluted stents like ketorol.[11,12], siliconised stents.[13,14] studies show that double stents for extrinsic compression by malignancies yield better relief of obstruction.[15,16] Metallic stents prevents complications like encrustation.[17,18] Pazet et al. showed emergency stenting is associated with more complications.[19]

Urinary tract infection by type 1 E. coli.[20] is common in stent related infections. E. coli fimbria exhibits fim-H.[21] protein, which attaches with mannose containing cells to produce infections. Tamm-Horsfall protein contains mannose, which attaches to fimbrial protein thus preventing infection.[22,23,24,25] Triclosan eluted stents.[26] paclitaxel eluted stents.[27] Tachyplesin III eluted stents.[28] were studied in reducing urinary tract symptoms.

## AIM

Urolithiasis is the most common disease of urinary tract.[29] The main aim of the study is to evaluate the efficacy and complications of Double J stenting in ureteric calculi patients, who underwent semi rigid ureteroscopy and pneumatic lithotripsy. There are studies showing that routine stenting is not necessary in all cases.[30]

## MATERIALS AND METHODS

It is a prospective study conducted from October 2013 to February 2015. A total of 70 patients were enrolled in the study.

### Inclusion Criteria

Patients who underwent semirigid ureteroscopy for uncomplicated ureteric calculi. Only uncomplicated vesicoureteric junction calculi, lower ureteric calculi and mid ureteric calculi were included in the study.

### Exclusion Criteria

Patients with upper ureteric calculi.

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Calculi associated with impaction and edema made out during ureteroscopy.

Calculi associated with difficult entry of ureteroscope into the ureteric orifice. Patients who underwent balloon dilatation of the ureteric orifice, patients with residual stone fragments in the ureter post procedure. The preoperative workup of patients included general physical examination of the patient, ultrasound KUB (Kidney, Ureter, Bladder) to make out the site, size of calculus and proximal pelvicalyceal and ureteric dilatation, plain X-ray KUB (Kidney, Ureter Bladder) also to make out the size and location of stone and intravenous urogram to make out the degree of obstruction caused by the calculus and excretion status of the renal units. CT scan KUB (Kidney, Ureter and bladder) plain was done in cases of suspected radiolucent calculi that could not be visualised in plain x-ray.

Under spinal anesthesia, patient was placed in the lithotomy position with the ipsilateral leg lower and straighter to facilitate easy ureteroscope entry. Cystoscopy was done using 20-F sheath, 30-degree scope. The entire urethra assessed and bladder visualised for any associated pathology. Both the ureteric orifices were visualised and 0.032-inch guidewire passed into the ipsilateral ureter containing the calculus. Then the cystoscope was removed and 8-F infant feeding tube passed into the bladder; 8/9.8 F semirigid ureteroscope was passed into the ureter under normal saline irrigation and passed proximally until the calculus was visualised. Patients with intraoperative findings of difficult ureteroscope entry, dense stone impaction, edema and bleeding were excluded from the study. Patients who underwent balloon dilatation of the ureteric orifice were also excluded from the study. Then pneumatic lithotripsy was done and stone fragmentation completed.

Patients with residual stone fragments in the ureter, post procedure were excluded from the study. Patients who underwent ureteroscopy and lithotripsy for uncomplicated ureteric calculi were stratified into two groups. Among the total of 70 patients, 35 patients were stented with a 5-F, one end closed, 26cm double J stent and 35 patients were not stented and were followed up in the post-operative period and observed for flank pain, urinary frequency, hematuria and fever. All patients were discharged on the second post-operative day. All patients were again reviewed two weeks later. Those patients who were stented were advised an x-ray KUB (kidney, ureter, bladder), their stent position was confirmed and stent removal was done after two week cystoscopically as an outpatient procedure. This study comprised of 27 vesicoureteric junction and 38 lower ureteric calculi. It comprises of only 5 mid ureteric calculi patients, as most of the patients who underwent ureteroscopy could not be included in the study owing to the presence of associated edema and stone impaction. Patients with residual stone fragments that were detected on postoperative plain x-ray KUB (Kidney, Ureter and Bladder) were excluded from the study.

## RESULTS AND DISCUSSION

### Age and Size of the Calculus

The average age of the patients in stented and non-stented groups were 36.1 and 38.5 years respectively with the age range varying from 13 to 63 years comprising of both groups. The size of the calculus varied from 6 to 14mm comprising of both groups with an average size of 8.9mm in the stented group and 8.5mm in the non-stented group of patients.

### Sex Distribution

The composition of each group stented and non-stented according to sex was as follows: Of the 70 patients enrolled in the study in the stented group, there were 22 males and 13 females. In the non-stented group, there were 18 male and 17 females.

### Side of the Ureteric Calculus

When the side of the ureter dealt with by ureteroscopy was taken into account, among 70 patients enrolled in the study the stented group had 19 right sided and left sided ureteric calculi. In the non-stented group, there were 18 patients with right sided calculi and 17 patients with left sided calculi.

### Site of the Calculus

With regard to location of the calculus, most of the patients comprised of lower ureteric (38) and vesicoureteric junction calculi (27) and few (5) mid ureteric calculi. The number of patients with mid ureteric calculi was low compared to lower and vesicoureteric junction calculi in the study as the cases with mid ureteric calculi were complicated in most of the instances.

### Age Distribution in Regard to Side of the Calculus

All the enrolled 70 patients with regard to distribution according to age, stone size, stone location, side of the stone and sex were stratified into non-stented and stented groups. The operative procedure and associated complications were explained to the patient and formal informed written consent was obtained.

### Complications

The parameters that were studied in the patients were urinary frequency (Irritative lower urinary tract symptom), loin pain, fever and hematuria. The patients were evaluated for the above parameters in the post-operative period and again after two weeks when they were reviewed.

The number of patients who were symptomatic with respect to the parameters mentioned were entered in the study in both stented and non-stented group and were compared. Their statistical significance was calculated by the Chi square test. The overall incidence of the symptoms mentioned (urinary frequency, pain, hematuria and fever) among both the group of patients who were enrolled in the study was as follows.

### Frequency

The symptom of urinary frequency was noted in 18 out of 35 stented patients (51.4%) and 5 out of 35 (14.2%) non-stented patients. It is generally said that presence of a stent coiled inside the bladder causes irritative lower urinary tract symptom of urinary frequency. This symptom is more pronounced in patients were the intravesical portion of the stent is longer and particularly if the stent crosses the midline of the bladder and irritates the trigone.

The statistical analysis for urinary frequency in comparing both groups revealed statistical significance ($p<0.005$) as calculated by Chi square test.

### Pain

The symptom of pain, particularly ipsilateral loin and suprapubic pain was noted in 17 out of 35(48.5%) stented patients and 6 out of 35(17.1%) non-stented patients. The incidence of pain could be attributed to both procedural pain and stent related pain. But it was noted that the incidence of pain in the stented group was substantially higher (48.5%) compared to the non-stented (17.1%) group. All 23 patients (17 stented and 6 non-stented patients) were treated with oral dicyclomine 10mg given twice daily and oral paracetamol 500mg given twice daily for control of pain.

The results showed that the incidence of pain was statistically significant ($p<0.005$).

| | STENTED GROUP | NON-STENTED GROUP |
|---|---|---|
| MALES | 22(62.8%) | 18(51.4%) |
| FEMALES | 13(37.1%) | 17(48.5%) |

***Table 2: Sex Distribution***

| | STENTED GROUP | NON-STENTED GROUP |
|---|---|---|
| RIGHT SIDE | 19 (54.2%) | 18 (51.4%) |
| LEFT SIDE | 16 (45.7%) | 17 (48.5%) |

***Table 3: Side of calculi***

| | STENTED GROUP | NON-STENTED GROUP |
|---|---|---|
| LOWER URETERIC | 20(57.1%) | 18(51.4%)) |
| VESICOURETERIC JUNCTION CALCULI | 12(34.2%) | 15(42.8%) |
| MID URETERIC | 3(8.5%) | 2(5.7%) |

***Table 4: Site of Calculus***

| | STENTED | NON-STENTED |
|---|---|---|
| FREQUENCY | 18(51.4%) | 5(14.2%) |
| PAIN | 17(48.5%) | 6(17.1%) |
| FEVER | 10(28.5%) | 4(11.4%) |
| HEMATURIA | 7(20%) | 2(5.7%) |

***Table 5: Study Parameters***

| STENT STATUS | FREQUENCY ABSENT | FREQUENCY PRESENT | TOTAL |
|---|---|---|---|
| Non-Stented | 30 | 5 | 35 |
| Stented | 17 | 18 | 35 |
| **Total** | **47** | **23** | **70** |

***Table 6: Urinary Frequency Comparison***

**p=0.001**

| Stent Status | Pain Absent | Pain Present | Total |
|---|---|---|---|
| Non-Stented | 29 | 6 | 35 |
| Stented | 18 | 17 | 35 |
| **Total** | **47** | **23** | **70** |

***Table 7: Pain Comparison***

| Stent Status | No Fever | Fever Present | Total |
|---|---|---|---|
| Non-Stented | 31 | 4 | 35 |
| Stented | 25 | 10 | 35 |
| **Total** | **56** | **14** | **70** |

***Table 8: Fever Comparison***

| Stent Status | No Hematuria | Hematuria Present | Total |
|---|---|---|---|
| Non-Stented | 33 | 2 | 35 |
| Stented | 28 | 7 | 35 |
| **Total** | **61** | **9** | **70** |

***Table 9: Hematuria Comparison***

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