MORBIDITY ASSOCIATED WITH URETERAL STENTING: STUDY OF 90 CASES

Chahal Harmandeep Singh¹, Trehan Munish², Sharma Sandeep³, Aulakh Baldev Singh⁴, Garg Ramneesh⁵, Kaur Simran⁶, Singla Sanjeev⁷, Bose Abhishek⁸

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ABSTRACT: The present study was an endeavor to study the incidence of double J stent related morbidity. In this prospective study, 90 patients with various indications for DJ stenting were studied for post-stent complications during the immediate post-operative period and on follow up. Out of total 90 patients 59 were male and 31 were female, mean age of patients was 42.64 years. Most common indication for DJ stenting was ureteric calculus followed by hydronephrosis, pelvi-ureteric junction obstruction and ureteric stricture. Complication occurred in total of 68 patients out of 90 studied, with incidence of complications being 75.5%. Frequency and dysuria were the most common complications observed, occurring in 36.6% and 35.5% of patients respectively.

KEYWORDS: Complications. Infection, ureter.

INTRODUCTION: Ureteral stents represent the most mature application of an indwelling endoluminal splint, having first been described by Zimskind et al¹ in 1967. As originally described, the intent of implantation was for the treatment of ureteral obstruction or fistula. Maturity of the technique paralleled development of extracorporeal shockwave lithotripsy (ESWL) and technical advances that allow endoluminal investigation and treatment of a variety of urinary tract diseases. As a result, the indications for ureteral stent placement have expanded significantly. Ureteral stent placement is now considered a standard and indispensable urologic tool.

As the technique has evolved, so has the design of the implanted device. It should be recognized, however, that no currently available device fulfills all the criteria for the "ideal" stent.² Certain consequences can be anticipated with implantation of a foreign object into the urinary tract. There can also be unexpected complications.³ There is paucity of published literature on the subject of ureteral stent related morbidity in Indian setting. This study proposes to bridge this gap by documenting ureteral stent related morbidity in Indian patients and by evaluating the incidence of various DJ stent related morbidity.

MATERIAL & METHODS: A prospective study was done in the Department of Urology, Dayanand Medical College and Hospital, Ludhiana, in indoors patients in whom DJ stenting was done. Total of 90 patients were studied over the period from March 2012 to February 2013. The patients were selected on the basis of inclusion and exclusion criteria.

Inclusion Criteria:

- All patients undergoing DJ stenting for URS/ ESWL (stone size>2cm)/ Pyeloplasty/ Ureteric anastomosis/ Hydronephrosis.
- All patients giving consent for the procedure and willing to participate in the study.

- Follow up of the patient regarding various complications would be done after 3 weeks of DJ stenting and at the time of stent removal.

Exclusion Criteria:

- Patients with positive urine culture prior to DJ stenting.
- Patients having hematuria.
- Patients having dysuria.

The outcome of intervention was studied in these patients as regard to various complications associated with DJ stenting like:

1. Hematuria.
2. Dysuria.
3. Microscopic examination of crystals if present (encrustation).
4. Stent migration.
5. Frequency.
6. Stent fracture.
7. Ureteral erosion or fistulization.

All eligible indoor patients who were scheduled for DJ stenting were informed in details about this study prior to surgery. Informed consent was obtained from those patients who were willing to participate in the study. These patients underwent unilateral or bilateral DJ stenting using 20 Fr cystoscope. A unilateral or bilateral 5 french Double J stent made of polyurethane from a single manufacturer was inserted at the end of the procedure. All stents were placed under combined fluoroscopic and cystoscopic (20 Fr sheath) guidance. Appropriate length of the stent was estimated according to the patient's height. The black marking of the bladder coil was positioned at the ureteral orifice in every patient. After the completion of procedure further exclusion criteria were applied.

A total of 90 patients fulfilling all eligibility criteria were studied. All patients were asked about various symptoms related to DJ stent immediate period after insertion, after 3 weeks of insertion and at time of stent removal. All the findings were recorded meticulously on a structured proforma.

ANALYSIS OF DATA: Incidence of various stent related complications was calculated from the data obtained at the end of the study period.

RESULTS:

1. Age & Sex: Total of 90 patients were studied, out of which 59 were male and 31 were female patients. Mean age of patients was 42.64 years. Mean age for males was 40.54 years and mean age for females was 46.64 years.
2. Indication for DJ stenting: The most common indication for DJ stenting was ureteric calculus followed by hydronephrosis. (Table 1).
3. Complications: Out of the total 90 patients in study, one or the other complication occurred in 68 patients, i. e., incidence of complications was 75.5%. Out of the various complications frequency and dysuria was the most common complication observed in 36.6 % and 35.5% patients respectively. (Table 2).

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DISCUSSION: Indwelling ureteral double J stents are extensively used to relieve or prevent ureteral obstruction caused by various etiologies. However, they are frequently associated with unpleasant adverse effects. Double J stent associated morbidity is well documented in literature, yet surprisingly few attempts were made to systematically document and address this major clinical problem. Double J stent related morbidities thus remained a neglected area for a long time.

The researchers have focused their attention on engineering solutions to alleviate the stent associated discomfort novel stent materials, designs, sizes and shapes were reported and tested in clinical trials.^{4,5} These engineering improvisations and improvements included softer stents (POLARIS™, Sof-curl™), stents with tapering distal end (Tail stent™), stents with innovative coating (Heparin, triclosan, pentosan sulphate, Paclitaxel) and stent of shorter length/ diameter. Dellis et al.⁵ in a review article noted that great efforts have been made to design and test stents of varying sizes, shapes and materials. While there are mixed results with materials, there are negative results with shape. Decreased diameter has not been shown to help but appropriate length appears to be important. Even with the best material and length, however, patients still have significant stent related symptoms.⁵

Out of the 90 patients studied 32 patients (35.5%) complained of dysuria and 33 patients complained of frequency (36.6%), during the time the stent was in situ. The incidence matches closely with that reported in study by Radecka et al,⁶ irritative voiding symptoms were found in 37% patients in their study. Rane A et al⁷ stated that dysuria, which was reported by 36.7% patients in their study is usually experienced at the end of voiding, and is secondary to trigonal irritation by the distal end of the stent when it crosses the midline or forms an incomplete loop.⁷ Joshi et al⁸ in their study stated that frequency is attributed to a mechanical stimulus that comes from the bladder coil. Along with urgency, it affected 60% of patients in their study. Shao Y et al⁹ and Memon NA et al¹⁰ have come across this rate as 10.0% and 9.0% respectively while Arshad M et al¹¹ had found bladder irritation in 27.27% in their study. Leibovici and colleagues¹² suggested that use of double-J stents could lead to several side effects and cause negative effects on quality of life. These authors found common symptoms such as urgency, frequency and dysuria occurred respectively in, 55%, 50% and 40% of patients. Damiano and colleagues¹³ showed that discomfort due to stent (37.6%) and irritative urinary symptoms (18.8%) were the most common complications in cases with a ureteral stent. The most interesting point in this study was that the frequency and severity of the complications increased in accordance with the duration of the stent use.

Hematuria was seen in 15 out of total 90 patients, incidence of 16.7%. Pansota et al¹⁴ in their study reported hematuria in 11.0% patients. Incidence of 9.3% has been reported by Radecka et al.⁶ Memon et al¹⁰ have reported the incidence of gross hematuria as 2.5%.

Encrustation was noticed in 3 patients (Incidence of 3.3%) on stent removal at 12 weeks. Migration occurred in 7 patients with incidence calculated to be 7.7%. Radecka et al⁶ have reported incidence of encrustation and migration as 2.8% and 3.7% respectively. Pansota et al¹⁴ have reported encrustation in 5% patients who had been lost to follow up and all had been presented either with loin pain or haematuria after more than 3 months. Memon NA et al¹⁰ observed stent encrustation in 17.5%, but only 4.2% at 12 weeks, and stent migration in 11.7% of patients in their study. Nawaz H et al¹⁵ reported stent encrustation and stent migration in 10.5% and 3.5% cases respectively. Arshad M et al¹¹ observed stent encrustation in 2% and stent migration in 16.3% patients in their study. El Faquih et al¹⁶ have reviewed 299 stents in 290 stone patients and reported encrustation in 9.2% of

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stents retrieved in six-week time. Stents that had been in the ureter for 6 to 12 weeks or more were encrusted in 47.5% and 76.3%, respectively. It was found that associated morbidity was minimal if indwelling time did not exceed six weeks.

Stent culture was found positive in 20 out of 90 patients (incidence of 22.2%). Urosepsis was found in 25% in study by Radecka et al.⁶ Richter S et al¹⁷ reported 19.0% incidence in their study whereas incidence of post DJ stenting septicemia in their study was 8.0%. Elmalik K et al¹⁸ reported its incidence 5.2% and Arshad M et al 10.2%.

No patient in our study had ureteral erosion. Memon et al¹⁰ have reported a ureteral perforation incidence of 5% in their study.

None of patient had spontaneous stent fracture. Memon et al¹⁰ have reported 8.3% incidence of stent fracture.

Trigonal oedema on cystoscopy at the stent removal was seen in 16. 7% patients.

SUMMARY & CONCLUSIONS: Despite advancements in stent quality, the incidence of stent related complications still exist and majority of the times, they are not avoidable.

INDICATION FOR DJ STENTING	NUMBER OF PATIENTS (n= 90)
Ureteric Calculus	38
PUJ Obstruction	20
Hydronephrosis	25
Nephrolithiasis	4
Bifid Ureter	1
Ureteric Stricture	2

Table 1: Indications for D J Stenting

COMPLICATION	NUMBER OF PATIENT (n=90)
Frequency	33
Dysuria	32
Hematuria	15
Migration	7
Urinary tract infection	20
Encrustation	3
Fracture	0
Erosion of Ureter	0
Trigonal Oedema	15

Table 2: Complications

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AUTHORS:

1. Chahal Harmandeep Singh
2. Trehan Munish
3. Sharma Sandeep
4. Aulakh Baldev Singh
5. Garg Ramneesh
6. Kaur Simran
7. Singla Sanjeev
8. Bose Abhishek

PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of Urology, Dayanand Medical College & Hospital, Ludhiana, Punjab, India.
2. Assistant Professor, Department of General Surgery, Dayanand Medical College & Hospital, Ludhiana, Punjab, India.
3. Professor & HOD, Department of Urology, Dayanand Medical College & Hospital, Ludhiana, Punjab, India.
4. Professor, Department of Urology, Dayanand Medical College & Hospital, Ludhiana, Punjab, India.

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5. Associate Professor, Department of Plastic Surgery, Dayanand Medical College & Hospital, Ludhiana, Punjab, India.
6. Senior Resident, Department of Nephrology, Dayanand Medical College & Hospital, Ludhiana, Punjab, India.
7. Professor, Department of General Surgery, Dayanand Medical College & Hospital, Ludhiana, Punjab, India.
8. Senior Resident, Department of Urology, Dayanand Medical College & Hospital, Ludhiana, Punjab, India.

NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Garg Ramneesh,
House no 183-A,
Sarabha Nagar,
Ludhiana- 141001,
Punjab, India.
E-mail: ramneeshgarg@yahoo.com

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