

Management of Forgotten Ureteral Double J Stents: Causes and Management

Muhammad Shahzad Anwar, Muhammad Farooq, Muhammad Ayub, Asad Ali Shah, Syed Hasan Akhter, Abdul Mannan Qureshi

ABSTRACT

Introduction: Double J stent (DJS) is a basic and valuable tool in urological practice. A forgotten DJS is not uncommon and is associated with significant morbidity and mortality. The presenting complaints may range from UTI to renal failure. Therefore, this study has been carried out to assess the clinical spectrum of this entity in our setting. **Objective:** To describe the clinical presentation, complications and management of forgotten DJS. **Methods:** This retrospective descriptive study was done at the Department of Urology, Services Institute of Medical Sciences, Lahore (SIMS) from August 2015 to December 2016. Sixteen patients with forgotten DJS were included. Each patient was studied for age, gender, presenting complaints, indication of DJS, duration of stent insertion and management performed. The data was recorded on a proforma and analyzed using SPSS version 20. **Results:** 16 patients 68.8% (n=11) male and 31.2% (n=5) female patients were included in study. The average age was 46.38 ± 13.58 (23-65 years). The mean indwelling time of DJS was 16.31 ± 32 months. 50% of patient's had obstructive uropathy due to stones. Most patients had UTI (37.5%) at presentation while mild encrustation was the major complication encountered (43.8%). Majority of patients were not compliant to the advice for DJS removal. **Conclusion:** Forgotten DJS leads to multiple complications, if not intervened timely. They can be successfully removed employing least invasive endourologic techniques. Proper counseling of patient/relatives is needed to get it removed in the due time period.

Keywords: Forgotten DJS, causes, management.

Corresponding Author

Dr. Muhammad Shahzad Anwar
Associate Professor, Urology, Khawaja
Muhammad Safdar Medical College, Sialkot
Contact: +92 300-9429169
Email: shahzaduro@gmail.com

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INTRODUCTION

Ureteral stent placement is common procedure performed in daily urologic practice. These were designed to drain the kidney or bypass a renal or ureteric obstruction to drain the kidneys. Double-J stents (DJS) have been a basic part of many urologic procedures when needed, following open or endoscopic ureteral surgery for retroperitoneal tumors or fibrosis, ureteral strictures, utereropelvic junction obstructions or the treatment of obstructing or the treatment of obstructing ureteral stones.¹ DJS may also be inserted following iatrogenic injuries of the ureters or to protect and define the ureter in complex abdomenopelvic procedures in a preoperative period.²

In the last decade, new materials and stents have been designed in the presence of important technological innovations and developments to improve patient tolerance and to overcome stent-related problems.³ With the widespread use of indwelling ureteral stents by urologists, issues related to their use have also increased. DJS are not

complication free. Complications may be mechanical; including stone formation, fragmentation, encrustation and stent migration. Stents may lead to nonfunctioning kidney, urinary tract infection or pyonephrosis as they act as foreign body. Therefore, DJS should be changed frequently as required or removed after it has served its need to reduce stent related complication and morbidity. If not intervened timely, the forgotten DJ stents can cause significant morbidity and mortality.^{4,5} This happens because of poor compliance of the patient or failure of the physician to adequately counsel the patient. The urologist is accountable for the complications and ultimately responsible for the removal of stent, if the patient with stent is lost to follow-up. Morbidity caused by these forgotten stents may be due to fragmentation, upward migration, knot formation or extensive encrustation.^{6,7} Complications like recurrent urinary tract infection, haematuria, obstruction and renal failure are serious problems which are caused by large stone formation due to encrustation on

forgotten DJS.⁸ Management of forgotten DJS is also important for the surgeon's prospect due to its medico legal implications.

The management of forgotten DJS may be sometimes, difficult, complex, risky, and expensive.⁹ Various combinations of endourologic methods have been reported for the management of forgotten DJS in the literature. Open procedures, endourological techniques and lithotripsy are employed for management of forgotten DJS. The stent related complications can be directly lethal for the patient or indirectly can cause death because of complications related to operative intervention.⁸

There are no algorithmic approaches in urology guidelines for forgotten stents in both adults and children, meaning their treatment may be complicated and difficult for urologists.¹⁰ Therefore, the rationale of this study was to assess the causes of forgotten DJS and to devise a management plan for them.

METHODOLOGY

After Hospital ethical committee approval and consent from patients/relative of the patients; this retrospective study was conducted upon 16 patients at Department of Urology, SIMS, Lahore, from August 2015 to December 2016. Patients were selected using non probability purposive sampling technique. All the patients presenting to urology outdoors/emergency mainly with urological complaints and an incidental finding of ureteral stent in situ for more than 3 months were included in study, irrespective of age and gender. Patient who regularly changed their ureteral stent after 3 months, were excluded from the study.

These patients had undergone stent placement from different government and private sector hospitals. Patient's presenting complaints were documented and detailed history of previous illness, surgical intervention was enquired. Detailed clinical examination was carried out along with the questions regarding the patient's/relative's view about the stents, its placement and proposed plan regarding removal. Baseline investigations such as complete blood count, urine analysis, serum urea and creatinine, X-ray KUB and ultrasound KUB were carried out. CT KUB was done when radiolucent stone was suspected along with obstructive uropathy. Position of stent, encrustation, associated stone or other data was recorded.

Treatment decision was based on clinical and lab findings. Modality of intervention was individualized for each patient as directed by investigation and treating surgeon. Cystoscopy under fluoroscopic guidance was employed where minimal

encrustations were noted at distal end of DJS. Where encrustations were noted in body of DJS with stone burden at distal coil of double J stent, lithotripsy was done first and additional procedure by means of cystolitholapaxy, ureteroscopic lithoclast was done and attempted to remove the stent gently by placing grasper via cystoscope/ureteroscope. Plain X-rays were done post procedure to confirm the removal of the stent and stone free status.

Each patient's data was recorded through a specially designed proforma. All the data was analyzed using computer program SPSS version 20. Qualitative variables including gender, clinical features, site of impaction etc were expressed in term of frequencies and percentages while age was expressed as mean and standard deviation.

RESULTS

Among 16 patients 68.8% (n=11) were male and 31.2% (n=5) were female with age range from 23 years to 65 years with a mean age 46.38 ± 13.58 years (Graph 1). The mean indwelling time of DJS was 16.31 ± 32 months.

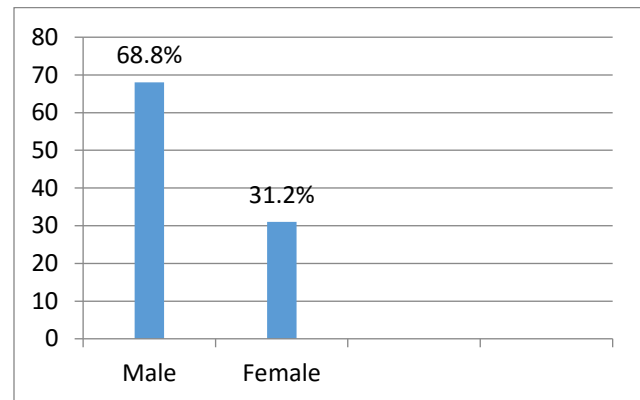


Table 1 indicates the initial indications of stenting; 50% of which had obstructive uropathy due to stones. 13(81.2%) patients had unilateral while 3(18.8%) patients had bilateral involvement as shown in Table 2 and illustrated by Figure I & II.

Table 1: Initial Indication for DJS

Indication	Frequency	%
Obstructive uropathy with stones	8	50.0%
PUJ obstruction	2	12.5%
Obstructive uropathy in pregnancy	1	6.2%
Pyelolithotomy	2	12.5%
Ureterolithotomy	1	6.2%
Laparotomy with ureter injury	1	6.2%
Uretero vesical repair	1	6.2%

Table 2: Site Of DJS

Site	Frequency	Percent	Cumulative Percent
Left ureter	9	56.2	56.2
Right ureter	4	25.0	81.2
Bilateral	3	18.8	100.0
Total	16	100.0	

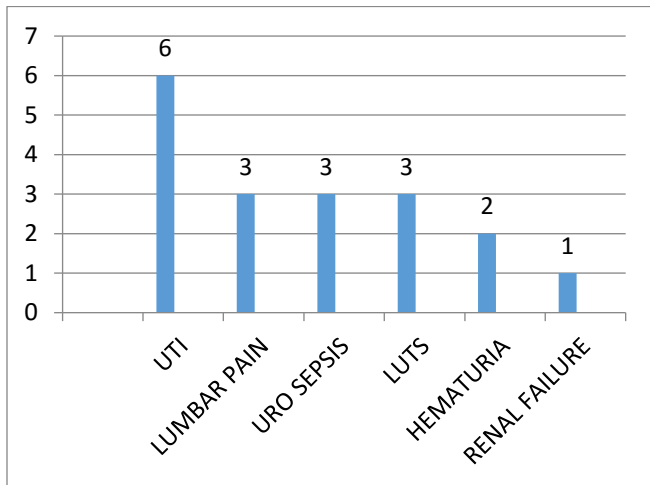


Table 3: Complications of DJS

Complications	Frequency	Percent
Mild Encrustation at upper end	7	43.8%
Moderate Encrustation at upper end	2	12.5%
Encrustation throughout Length	2	12.5%
Huge Encrustation at upper-lower end	4	25.0%
Stone with Pyonephrosis and non functioning kidney	1	6.2%

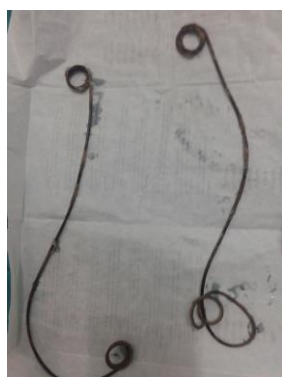


Figure 1: DJS with encrustation



Figure 2: CT KUB showing bilateral DJS with encrustation



Figure 3: X ray KUB showing right DJS with stones



Figure 4: Open surgical removal of DJS

No mortality was attributed to the use of stents in our study. The presenting complaints of retained DJS are illustrated in graph 2. The complications encountered have been enumerated in Table 3.

Table 4: Procedure for removal of DJS

Procedure	Frequency	Percent
Cystoscopy & DJS removal	7	43.8%
ESWL at upper end & Cystoscopic DJS removal	2	12.5%
ESWL at upper end & URS Lithoclast & DJS removal	1	6.2%
ESWL & URS & Lithoclast with cystolithopexy and DJS removal	4	25.0%
Open Surgical stent removal	1	6.2%
Open Surgical stent removal with Nephrectomy	1	6.2%

Table 5: Exploring the Reasons of forgotten DJS

Cause	Frequency	Percent
Initially aware about DJS but forgot about removal at planned time.	9	56.25%
Unaware initially about DJS but gave a vague history of some procedure in the past.	4	25%
Totally Unaware about DJS	3	18.7%

The procedures undertaken for removal of retained stents have been depicted in Table 4. Majority of patients were reluctant about removal of DJS as their symptoms were relieved after its placement. Although most of them were counseled about DJS removal but they themselves did not report back and ended up with complications (Table 5). However, interestingly some patients were not aware of DJS

placement. Three categories of patients were identified.

DISCUSSION

Since its introduction in 1978, DJS is commonly used in urology practice.¹¹ There are multiple indications for it. Commonly they are used as stents and to prevent urinary obstruction and after reconstructive surgeries. However, if DJS is left in situ for longer durations, significant morbidity can arise among which infections and encrustations are more common. DJS must be changed after every 3 to 4 months in order to avoid complications. A bio film is formed on the surface of the stent, which leads to infection and encrustation. Common short term complications (3-9 weeks) related to stent include hematuria, dysuria, pain and frequency. Long term complications include encrustation, fragmentation, up migration, blockage and hydronephrosis.¹²

In our study urolithiasis leading to obstructive uropathy was the most common indication of DJS placement. Similar indication has been narrated by Ali et al and Memon et al.^{13,14} Nawaz et al¹⁵ stated prophylactic stenting followed by relief of obstruction, while Ikram Ullah et al described obstructive uropathy as the commonest indication for DJS.¹⁶ Encrustation of forgotten stents with a massive stone burden lead to recurrent urinary tract infections, hematuria, urinary tract obstructions, and renal failure, and therefore it should be dealt seriously.⁸ Multiple factors are involved in formation of encrustation. Common are prolonged duration of stenting, urinary sepsis, previous history or simultaneous occurrence of stone disease, chemotherapy, chronic renal failure, and metabolic or congenital anomalies.² In our case series with forgotten DJS, the most prominent factor was the previous existence of urolithiasis. Conflicting reports have been published about the effect of stent composition on the severity of encrustation. Tunney et al. observed that the risk of encrustation and fragmentation is dependent on the type of its material. Silicone and polyurethane stents are least prone to encrustation.¹⁷ Wollin et al reported that the type and duration of stenting were not significantly correlated with the amount of encrustation in their observation of removed stents.¹⁸ Because our study was retrospective and some of the stents were placed outside our center, the materials that composed the stents were unknown. Lasaponara et al. reported a forgotten calcific ureteral stent in a transplanted kidney of 8 years' duration, presenting as a pyelonephritis kidney with hydronephrosis.¹⁹ Similarly, Somer reported a forgotten retained stent of 7 years' duration.²⁰ In this study, the oldest

retained ureteral stent was seen in a lady after 116 months (9.6 years).

Prevalence and severity of complications is related to the indwelling time of DJS. Serious complications, even death, may occur because of stenting for longer duration, or following unintentional stenting for longer than six months.²¹ Stents may migrate upwards or fragment causing serious morbidity and mortality.⁷ Combined endourologic interventions or, rarely, an open surgical approach is needed for their management. The most important risk factor for stent encrustation is the duration of time the stent remained in situ.²² El-Faqih et al states that the stent encrustation rate increase from 9.2% in less than 6 weeks to 47.5% between 6 and 12 weeks, and up to 76.3% in later than 12 weeks.²³ Other factors in the series were a previous history of urolithiasis, urinary materials dissolved in high concentrations, the type of stent material, the existence of bacterial colonization, and pregnancy.¹⁷ In our series, the average removal time was 16.31±32 months. Significant morbidity occurred in our patient with a forgotten stenting period of 85 months, leading to a nonfunctioning kidney and nephrectomy.

Coordinated use of medical therapy, lithotripsy, endourological techniques and open surgery are employed for forgotten DJS. DJS related complications are primarily managed by endoscopy which has high success rate. Percutaneous nephrolithotomy (PCNL) and Uretero renoscopy (URS) are often necessary in cases of encrusted stent or stone formation over DJS. Open procedure is only required after failure of endoscopy. Nephrectomy is performed for non-functioning kidney. 87.5% of our cases were managed endoscopically with 43.8% success rate by single procedure and requiring multiple procedures in rest of the cases (43.6%). Open procedure (Figure IV) was required in 2 cases following failed attempted URS. Rabani has shown similar result.²⁴

Inadequate communication between surgeon and patient and poor compliance are main factors that are associated with DJS retention. DJS cause little irritation so the patients thought to forget them. Patients should be counseled properly and made aware of importance of stent presence, complications and removal. In this study non-compliance was a major reason seen in 13 (81.3%) patients. Patients who were operated in emergencies were not informed at all about the stent insertion and its removal, which was responsible for 3 (18.7%) of retained DJS (Table 5). Economic issue is also a major concern in developing countries like ours. Despite low hospital charges, patient's transportation to the tertiary health care centers for

stent removal, was a major issue as these facilities are not readily available at many centers and large volume of patients in government hospital increases the waiting period and cost of stent removal. However Jhanwar et al reported poor patient's counseling on part of surgeon (38.16%) to be the most common reason for retained DJS.¹²

Many approaches have been recommended to solve this important health problem. However, this issue remains unsolved. Programs for close follow-up of patients with stents, including computerized monitoring programs, stent removal software, and follow-up by e-mail, have been recommended.^{25,26}

Currently, the most advised method is to send a reminder SMS (short message service, or text message) to the cell phone number of the patient and the physician in cases where the stent replacement/ withdrawal time has passed. This method attempted to eliminate the possibility of neglect by the physician.²⁷

Owing to morbidity of retained DJS, a system should be formulated for documentation of DJS and a plan for their removal. Development of digital technology has enabled developing countries to devise an executable plan and follow up for DJS, in order to prevent severe complications.

Certain precautions and guidelines must be ensured prior to double J insertion.

1. Placement and proposed DJS removal time should be clearly written on discharge slip and countersigned by Senior Registrar or Assistant Professor.
2. Patients and attendant should be counseled in detail about the procedure carried out, the stent placement and its proposed removal time along with the DJS related immediate and late complications.
3. Patients details like age, name, telephone no. and address along with the procedure carried out, proposed date of stent removal should be documented in the hospital record register as well as database computer software.
4. Post procedure X ray and relevant investigations should be given to the patients or attendants and a copy should also be kept in the hospital record.
5. Patient should be reminded about the proposed date of DJS removal by telephonic contact a week before.
6. The SOPs of DJS placement and removal explained above should also be shared with other departments especially Gynaecology and Emergency Surgical units, as in our study, 3 patients operated by emergency team units were found to be totally unaware of DJ stenting.

CONCLUSION



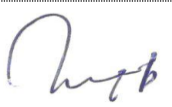

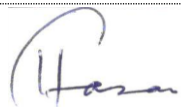
Serious complications of DJS are related to indwelling time and commonly seen in forgotten stent or in patients with poor compliance. Endourological procedures are commonly employed but the goal is to prevent patient from the complications. Compliance with the SOPs of placement and DJS removal may avoid possible complications resulting from forgotten DJS.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

AUTHORS	Contribution to The Paper	Signatures
Dr. Muhammad Shahzad Anwar Associate Professor, Urology, Khawaja Muhammad Safdar Medical College, Sialkot	Principal Author/ Data Collection, Article writing and results preparation, Technical Review	
Dr. Muhammad Farooq Assistant Professor, Urology SIMS / Services Hospital, Lahore	Co-Author/Reference writing, statistical analysis, Lab test evaluation, Technical review	
Dr. Muhammad Ayub Assistant Professor, Urology SIMS / Services Hospital, Lahore	Co-Author / Data collection & Result interpretation, statistical evaluation	
Dr. Asad Ali Shah Assistant Professor, Urology SIMS / Services Hospital, Lahore	Co-Author / Data collection, Result and Technical Review	
Dr. Syed Hasan Akhter Assistant Professor, Urology, Khawaja Muhammad Safdar Medical College, Sialkot	Co-Author / Data collection and writing	
Dr. Abdul Mannan Qureshi Professor of Urology SIMS / Services Hospital, Lahore	Co-Author / Data collection and writing	