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RESEARCH ARTICLE

Single Centre Experience of Endourological Management of Retained Double J Stents in the Covid Era

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Abstract

Introduction - Since their inception in 1967, Double J (DJ) stents have been widely used for the purpose of alleviation extrinsic and intrinsic obstruction. They are used as a modality of maintaining patency as well as drainage of the urinary tract as well as to facilitate the passage of small fragments post intervention. However, delayed removal or failure of follow up may lead to complications in the form of stent encrustation, migration, fracture, stone formation, adjacent organ penetration, urinary tract infections (UTI), ureteral erosion, or fistula formation. Many of these patients remain asymptomatic for months, and such forgotten stents are detected incidentally, resulting in late presentation [2]. In the COVID era however, patients who had either been stented prior to or during the pandemic were unable to get their indwelling stents removed. This was due to either fear of approaching a hospital and risking exposure to COVID or an inability to travel amidst restrictions. Our study takes into account the impact of the pandemic with regards to timely stent removal.

Materials and methods – Retrospective study design, patients enrolled from a tertiary care centre. Data obtained from hospital records. The eligibility criteria included all patients above the age of 18 with a forgotten stent (>6 months in situ). All records included patients from January 2021 – December 2022. Data collection was done in accordance to SCARE 2020 criteria.

Results- Mean age of patients - 49.45 years. 10 patients were females (41.66%) and 14 were males (48.34%). Mean duration of the indwelling stents was 3.68 years (range 6 months to 14 years). 6 patients had formal secondary education, 13 had primary education and 5 were found to be illiterate. 12 patients were from rural India and poor socioeconomic backgrounds.

Out of the total patients 6 patients were unaware of indwelling stents. 14 patients cited covid as a reason for their delay in treatment. The commonest indication is DJ stent insertion for obstructive calculi - 8 patients (33%). 7 patients had undergone PCNL (29%).

5 patients required a combination of 2 endourological procedures. 12 patients required a PCNL (50%). Cystolithotrypsy was required in 7 patients.

Conclusion – 58.3% of study participants cited covid as a cause for retained DJ stents. All participants were managed endourologically.

INTRODUCTION

Since their inception in 1967, Double J (DJ) stents have been widely used for the purpose of alleviation from extrinsic and intrinsic obstruction. Double J stents are used as a modality of maintaining patency as well as drainage of the urinary tract as well as facilitating the passage of small fragments post-urologic intervention. However, delayed removal or failure of follow-up may lead to this results in complications in the form of stent encrustation, migration, fracture, stone formation, adjacent organ penetration, urinary tract infections (UTI), ureteral erosion, or fistula formation. Many of these patients remain asymptomatic for months, and such forgotten stents are detected incidentally, resulting in late presentation[2]. A retained DJ stent however indicates either a system failure or poor patient compliance and understanding. In the covid era, however, an extrinsic factor has increased the incidence of retained DJ stents. Our study examines the occurrence of retained DJ stents considering their placement in the pre-covid as well as covid era. With improvement in bio-materials, stent-related symptoms have reduced greatly and at times may be missed by the patient. In this study, we take into account the impact of COVID as an independent parameter which lead to stent retention as well as other factors such as socio-economic and education status.

MATERIALS AND METHODS

This was a Retrospective observational study conducted at the Department of Urology, Bharati Hospital, Pune, over a period of 24 months (January 2021 to December 2022). Data collection was carried out in accordance to SCARE 2020 criteria[8][9]. Hospital records of all patients who underwent removal of forgotten/retained DJ ureteral stent at our hospital were reviewed for age, gender, indication for insertion of DJ stent, duration of stent insertion, radiological images and surgical procedures performed as well as educational qualifications and area of residence (urban/rural) were reviewed. The patients were also analyzed as to whether their procedure occurred during the covid era or prior to the same or whether covid was a factor for their hesitancy to get their retained stents removed. The patients were evaluated for the most common symptom on presentation. A total of 24 patients' data was collected prospectively, who met the eligibility criteria of forgotten DJ stent (>6 months), and factors such as duration of DJ stent indwelling, presenting complaints, and type of previous procedure were noted. Additionally, current procedures performed for the removal of DJ stent and any associated complication were noted. The patients included in this study were those referred from peripheral hospitals as well as previously operated in our institute. All the patients were evaluated with the medical history, socioeconomic status and literacy. Each patient underwent ultrasonography kidney–ureter–bladder (KUB), X-ray KUB, urine analysis and serum creatinine. Computed tomography (CT) was performed when indicated (mainly for radiolucent calculi and in complex cases like fractured or broken stent). Sterile urine was ensured before intervention. The plan of treatment was decided on the

basis of investigations. Institutional ethics committee approval was taken[4].

Figure 1. Retrieved retained DJ stent with visible encrustation.

Figure 2. Fractured stent

Figure 3. Fractured stent with the calcified lower end (arrow).

RESULTS

A total of 24 patients were selected for the study. Out of the total, 12.5% (n=3) underwent previous surgery at our hospital. In all cases a polyurethane stent was used. Mean age of the patients was 49.45 years. 10 patients were females (41.66%) and 14 were males (48.34%). Mean duration of the indwelling stents was 3.68 years (range 6 months to 14 years). 6 patients had formal secondary education, 13 had primary education and 5 were found to be illiterate. 12 patients were from rural India and from a poor socioeconomic background.

Out of the total patients who were taken in the study, 6 patients were unaware of their stent placement due to inadequate counselling provided to them post procedure. 14 patients (58.3%) cited covid as a reason for their delay in seeking treatment. The commonest indication was DJ stent insertion for obstructive calculi noted in 8 patients (33%). 7 patients had undergone PCNL (29%). Rest summarized as per Table 1.

Table 1 – Indications for DJ Stent Insertion.

Indication for stent insertion	No. of cases
PCNL	7
URSL	3
DJ STENTING for obstructive calculi	10
Pyeloplasty	1
Pyelonephritis in pregnancy	1
Open surgery for ovarian mass	1
Open Pyelolithotomy	1

Table 2 – Procedures performed for DJ stent removal.

Procedures performed	No. of cases
PCNL	8
URSL	4
PCNL + CYSTOLITHOTRYPSY (CLT)	3
CYSTOLITHOTRYPSY (alone)	3
PCNL + CLT + URSL	1
PCNL + URSL	2
C-ARM GUIDED STENT REMOVAL	3

15 patients presented with flank pain as a presenting symptom. 3 patients presented with lower urinary tract symptoms, the commonest being dysuria. Hematuria was a presenting symptom in 2 patients. 4 patients were asymptomatic (Table 3). Of the total, 5

patients required a combination of 2 endourological procedures. 12 patients required a PCNL (50%). Cystolithotrypsy was required in 6 patients. Of the 24 patients, 1 patient had been stented prior to pregnancy in view of pyelonephritis. However, she failed to return within the stipulated time post procedure and required a PCNL, wherein an encrusted upper portion of the stent was noted in addition to an existing renal calculus. No patient of the given set was converted to open surgery and endourological management was sufficient. 2 patients required blood transfusion. Fever was noted in one patient post-operatively. All patients were followed up one week after discharge and repeated X-ray KUB was carried out to rule out any remnant fragment or stent displacement. Stent removal was then done on the second follow up i.e., 2 weeks after discharge. 22 patients were rendered stone free with only 2 presenting with radiologically insignificant remnant stones. The patients who had fractured stents were found to have brittle spots at the site of encrustation. No patients required re-look or staged procedures.

Table 3 – Presenting indications.

Presenting complaints	No. of cases
Flank pain	14
LUTS	2
LUTS + haematuria	1
LUTS + flank pain	2
Asymptomatic	4
Fever	1

DISCUSSION

Over the last few years, we have ensured prompt stent removal as we maintain a directory of patient's details. However, it was noted that patients were shy of visiting the hospital during the covid era. We also take the patient's or relative's signature on discharge card making sure that they are actively involved in necessary follow-ups. Every effort is made to help patients to follow up on time. The Double J stent has been a useful tool since its invention by Zimskind et al in 1967 [3]. However, the stents themselves are not without complications if not removed within 6 weeks, certain studies however, claim 2 to 4 months as a safe period[10]. Patients requiring stents beyond this period should be kept on prophylactic antibiotics and have their stents frequently changed. Stent material may contribute to encrustation: silicone containing stents tend to be more resistant to encrustation, followed by polyurethane, silitek, percuflex and hydrogel coated polyurethane[15]. Our study included the socioeconomic status of a patient along with their education and awareness. Most patients included in the study were of a poorer section of society. Most were aware of the presence

of indwelling stents, however covid added to the list of factors which already delayed stent removal. The mass horrors of the covid waves struck fear into most patients who shied away from hospitals.

The exact mechanism of encrustation, however several factors are believed to be causative for the same[11] [12] [13] [14]. UTI is a factor for encrustation. Urease produced by bacteria hydrolyses urea in the urine to produce ammonia causing elevated urinary pH and favoring the precipitation of magnesium and calcium as struvite and hydroxyapatite onto the stent surface[16]. Most studies showed a predominance of encrustation at the upper coil of the stent. This may be because more effective peristalsis at the lower part of the stent sweeps any deposits off the stent, thus minimizing encrustation at the lower end[18], however, in our experience 7 patients required cystolithotrypsy either alone or in combination with other procedures (29% of participants). In a study by Divakaruni[5], nearly 12% of all DJ stents are forgotten by the patient. Mulay et al.[7] provided insights into electronic monitoring of the patient via the use of a mobile phone application to prevent such stent retention. In a study by Nawaz et al.[6], the common complications reported were stent encrustation (10.5%), stent migration (3.5%) and stent breakage (4.5%); similarly, in another study, stent encrustation (24.5%), stent migration (9.5%) and stent breakage (1.3%) were reported as common complications. Stent breakage is sometimes associated with encrustation in forgotten stents. Stents may fracture spontaneously after being in situ for a long time, due to hardening and loss of tensile strength[17]. Newer efforts should involve a more comprehensive counselling of the patient as well as a responsible relative along with maintaining a database with stent removal dates included in it to ensure minimizing the occurrences of forgotten stents. Each patient is aware of the consequences of a retained stent along with pictorial depiction of the complications so as to make the patient as well as the relative aware of the burden both emotionally as well as financially which could occur if timely stent removal is not done.

CONCLUSION:

Forgotten DJ stents are a common occurrence seen up to 12% [6] of cases undergoing urological surgeries in the developing world. Poor counselling, patients educational as well as socioeconomic status are contributing factors to delay in stent removal as poorer sections of society are still hesitant to visit hospitals. The above was worsened by the onset of the pandemic which led to patients deferring their follow up either due to being in remote locations for isolation or due to the fear of contracting infection during their hospital visit. It is the responsibility of the patient as well as the operating surgeon to ensure timely removal of DJ stents.

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