Forgotten double-J stent: Experience of a tertiary care center

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Abstract

Introduction: We share our experience of managing 15 cases of forgotten double-J (DJ) stent in our tertiary care center.

Methods: This is a retrospective analysis of cases with forgotten DJ stent for a period of 2 years spanning from January 2017 to January 2019. The details included sex, age, literacy, socioeconomic status, stenting indication, duration of indwelling stent, presenting complaints, type of encrustations, various treatments given, intraoperative complications, and their management and eventual outcome.

Results: The male-to-female ratio was 2:1, and the mean age was 39.5 years (17–65). The mean indwelling time was 31.7 months. The majority of patients had an education score of 1 out of 7 and belonged to lower socioeconomic class according to the modified Kuppuswamy scale. The most common presentation was irritative voiding symptom. The complicated and heavily encrusted stents were managed by combination of endourological procedures, and procedures were staged whenever deemed necessary. Majority of the stents were removed with simple retrograde cystoscopic removal. There was no mortality in our study.

Conclusions: A forgotten DJ stent affects population having low education score and belonging to the lower end of the socioeconomic class. Endourological procedures are quite successful in managing a forgotten DJ stent, provided the treatment options are selected judiciously and meticulously. We also suggest some protocols to be followed in our study in order to prevent a forgotten DJ stent.

Keywords: Double J, percutaneous nephrolithotomy, ureteroscopic removal of stone

INTRODUCTION

A retrospective study was conducted from January 2017 to January 2019. We evaluated factors such as sex, age, literacy rate, and socioeconomic status to identify the predisposed population and assessed treatment outcome.

Complications of a forgotten double-J (DJ) stent are stent discomfort, encrustation, migration, stone formation, renal failure, and mortality. Treatment modalities include extracorporeal shock wave lithotripsy (ESWL) and endourological procedures. The incidence of forgotten stent is related to poor patient compliance, lack of proper counseling, and follow-up.

Aim

In this study, we present our experience of 15 patients with forgotten DJ stent and their management and eventual outcome.
METHODS

We retrospectively reviewed the records of 15 patients with forgotten DJ stent in our tertiary care institute for a period of 2 years from January 2017 to January 2019. Twelve of the presenting cases were referred from outside and three cases were of our center.

The detail of cases included sex, age, education status (as per Kuppuswamy scale), stenting indication, record of stenting on discharge paper, patient’s knowledge regarding stent pre- and post procedure, duration of indwelling stent, patient presentation, routine blood, urine, radiological investigation, management of the forgotten stent, intraoperative complications and eventual complications.

The education and socioeconomic status of the patients was calculated by the modified Kuppuswamy scale. The education status ranged from score 1 to score 7. The patients were classified under Class 1 – upper, Class 2 – upper middle, Class 3 – lower middle, Class 4 – upper lower, and Class 5 – lower according to socioeconomic status.

Patients having acute kidney injury preoperatively were managed conservatively for few days prior to definitive treatment.

Patients underwent noncontrast computed tomography (NCCT) of the kidney and urinary bladder region to look for encrustation, stone formation along the ureter, stent fragmentation, and migration. Computed tomography (CT) urography was done if serum creatinine was within normal limits.

The presence of encrustations and fragmentations was detected by kidney, urinary, and bladder (KUB) film and categorized on CT scan. Encrustations <5 mm in diameter on CT were considered mild, more than 5 mm and <10 mm in diameter were considered moderate, and more than 10 mm were considered severe [Figure 1].

Stents with mild encrustations in the ureter or along the coil of the ureter and normal ipsilateral renal unit were considered as uncomplicated forgotten DJ stents.

Preoperative antibiotics were given according to urine culture sensitivity, which were continued postoperatively.

Patients with uncomplicated DJ stent had their stents removed under local anesthesia, using 20 French cystoscopes. In an event of resistance during retrograde extraction, the procedure was abandoned.

The patients with complicated forgotten DJ stent and those with difficult retrograde extraction underwent procedures such as transurethral cystolithotripsy (TUCLT), ureteroscopy using 8 or 6 French semi-rigid ureteroscope, and percutaneous nephrolithotomy (PCNL) using a rigid 20 French nephroscope and an Amplatz sheath. Restenting was done in all complicated forgotten DJ stents. Pneumatic lithotripter was used in all the patients wherever deemed necessary.

RESULTS

The male-to-female ratio in our series was 2:1. The mean age was 39.5 years (17–65). The mean indwelling time was 31.7 months (1–13 years). Of the 15 patients, majority of the patients were illiterate (score 1) and only two patients were graduate (score 6) [Table 1]. The majority of patients belonged to Class 5 lower socioeconomic status with socioeconomic score <5 [Table 2] as per the modified Kuppuswamy scale.

The most common indication for stenting in our case series was PCNL, followed by ureteroscopy.

Thirteen patients reported forgetting the indwelling DJ stent and two patients reported inadequate counseling about the presence of stent and its timely removal by the treating doctor. The maximum indwelling time in our study for the DJ stent was 13 years (1–13 years).

The most common presentation was irritative voiding symptom, followed by loin pain and recurrent urinary tract infection, and one case reported a protruding foreign body per urethra [Table 3]. The number of patients with complicated DJ stent was seven and patients with uncomplicated stents were eight.

| Table 1: Education of patients |
|------------------------------|
| Education              | Number of patients |
| Illiterate               | 8                |
| Primary school certificate | 2               |
| Middle school certificate    | 0               |
| High school certificate          | 2               |
| Intermediate or posthigh school diploma | 1           |
| Graduate or postgraduate     | 2               |
| Profession or honors        | 1               |

| Table 2: Socioeconomic class of patients |
|-----------------------------------------|
| Socioeconomic class | Number of patients |
| Upper                     | 2                |
| Upper middle              | 3                |
| Lower middle              | 4                |
| Upper lower               | 6                |
| Lower                     | 6                |
In our study of 15 patients, eight were having mild encrustations and were removed through cystoscopic retrograde extraction, without any intraoperative complications. Out of the 15 patients, seven were having moderate-to-severe encrustations with stones at the upper, lower, or both ends. Two patients had spontaneous stent fragmentation, and in one of them, the stent had migrated distally and was protruding from the urethra.

One patient in our study underwent single-stage TUCLT and DJ stenting without any intraoperative complications and residual stones. Three patients underwent TUCLT and PCNL with DJ stenting, out of which one patient had raised counts and acute kidney injury as reflected by raised creatinine levels. There was no intraoperative complication.

One patient had a residual stone in the kidney and underwent ESWL. One patient underwent single-stage TUCLT, ureteroscopy, and stent removal, and no intraoperative complication was encountered. Two patients underwent staged procedure, one patient had a stent migration (protrusion per urethra) [Figures 2 and 3], the patient underwent TUCLT in one stage, and PCNL was done in the second stage. Other patients underwent TUCLT in one stage and ureteroscopic stone removal and PCNL in the second sitting [Table 4, Figures 4 and 5].

Patients with mild encrustations (uncomplicated stent) underwent cystoscopic retrograde stent extraction, and no restenting was done in these patients. All patients, except one with moderate encrustations and stone, were restented.

**DISCUSSION**

A forgotten DJ stent with encrustations and stone burden is a serious urological problem for the patient and treating doctor. A stent can be termed as a forgotten if indwelling time period is more than 3–6 months if not intended by the treating doctor.[9] We considered stents with an indwelling period more than 6 months as a forgotten stent.

The reasons behind a forgotten or retained stent can be attributed to inadequate counseling by the treating doctor and poor compliance on the part patient and his or her family.[10] In our scenario, literacy rate and socioeconomic status of the patients were also looked into and it suggested patient literacy rate, and the socioeconomic status can be an important patient-related factor for a forgotten DJ stent. The majority of patients in our study were illiterate. The majority of patients belonged to Classes 5 and 4 (lower and upper lower) according to the modified Kuppuswamy scale. The importance of proper counseling of the patient regarding placement of stent, associated complications, morbidity and financial implications due to its overstay cannot be understated. In a study, the cost of treatment was estimated to be 6.9 fold (1.8–21 fold) higher than an average timely stent extraction. Financial burden of the treatments increased in parallel with the duration of the stent retention.[7]

The factors determining the formation of encrustations and stone on a stent are multifactorial, and the causes include long indwelling time, urinary sepsis, history of stone disease, chemotherapy, pregnancy, chronic renal failure, and metabolic and congenital abnormalities.[8] In our study, the maximum indwelling time of a DJ stent was 13 years, whereas the maximum indwelling time recorded for a DJ stent was 23 years.[9]

In a study by Robert et al.[10] it was observed that biochemical optical analysis of encrustations mainly revealed calcium oxalate, calcium phosphate, and ammonium magnesium phosphate. Calcium oxalate was the main crystalline phase, mainly in the absence of urinary infection.[11]

The forgotten DJ stent has a variable presentation, which includes irritative voiding symptoms, flank pain, hematuria, pyrexia, stent fragmentation, and migration. In our study, irritative voiding symptoms were the most common presentation. In a study by Hao et al.,[12] hematuria was the most common presentation, followed by pain and bladder irritation.

The patients of a forgotten DJ stent should be managed with investigations including routine blood, urine culture, KUB film, ultrasonography of KUB region. We conducted NCCT KUB and CT urography in patients to look for severity of encrustations and stone formation.
In a study, CT was considered and proved to be superior to ultrasonography and KUB film (roentgenogram) in detecting the burden of stent encrustations and stones.[13]

The management and intervention depend on the patients’ preoperative status, severity of encrustations, location and size of stone, and encrustations. Stent migration and fragmentation was an important factor in determining the course of intervention. In our series, patients with mild encrustations underwent cystoscopic retrograde removal of the DJ stent. In patients with moderate-to-severe encrustations and stone presence, modalities such as TUCLT, ureteroscopy, and PCNL were used. Several studies have reported the role of ESWL in the management of mild encrustations, followed by retrograde extraction of the DJ stent.[14,15] In our study, ESWL was performed in one patient on outpatient department basis. Patients with moderate-to-severe encrustations and stone presence required multiple procedures either in single stage or double stage. TUCLT was the most commonly performed procedure along with PCNL, the distal part of the stent was removed first, followed by the proximal end, and ureteroscopy was done wherever there was evidence of encrustations and stone along the length of the ureter. It has been proposed in numerous studies that the distal part of the stent should be removed first, followed by the proximal end.[16,17]

The staged procedure should be done whenever deemed necessary; in our series, two cases out of seven cases of complicated forgotten DJ stent were staged, as the patients had spontaneous stone fragmentation. Many studies have shown complicated DJ stent removal in single stage, but majority suggest staging removal of the complicated DJ stent, hence overenthusiastic single-stage procedure should be avoided.[18,20]

In our case series, the outcome was satisfactory, there was no mortality, and patients were discharged within due course of time.
How to avoid a catastrophe like a forgotten stent? A question that still eludes a perfect answer. It is a problem in which the underprivileged sections of society, and people belonging to the lowest strata bear maximum amount of morbidity and economic burden as shown in our study, hence these sections of society can be termed as high-risk cases.7

The importance of patient counseling regarding DJ stent is paramount, and it is a responsibility of the treating medical personnel; patient compliance is equally important and dependent on counseling by the treating urologist. Maintaining a simple stent registry can achieve almost 98% of DJ stent removal at due date, which reduced morbidity associated with encrusted stent removal and anesthetic drugs.

Lynch et al. proposed a novel method of electronic stent register and stent extraction reminder, to avoid stent follow-up loss.23 Sabharwal et al. reported a computer-based stent registry with patient-directed automated information system, and it sends automated SMS initially, followed by letters in case they fail to respond; however, a long-term prospective trial is needed for its efficacy.22

CONCLUSIONS

A forgotten stent is a financial burden on the society, affecting predominantly, those belonging to the lowest class of the socioeconomic status. Ignorance on patients’ part inadequate counseling and lack of follow-up by the health professional play an important role in this situation.

Various endourological procedures and ESWL have a role in the management of forgotten DJ stent.

A stent once inserted has to be removed, only then should the patient be considered as treated in the age of endourology. “An ounce of prevention is worth a pound of cure” correctly summarizes the current scenario.

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Conflicts of interest

There are no conflicts of interest.

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