Section: Urology

Original Research Article

IMPROVING PATIENT SAFETY- A STENT REGISTRY TO PREVENT RETAINED FORGOTTEN DJ STENTS

Prashant Rishi[1], Mihika Sarwate[2]

[1]*Consultant, Department of Urology, Jagjivan Ram Hospital, Mumbai, India.*
[2]*Resident, Department of General Surgery, Jagjivan Ram Hospital, Mumbai, India.*

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Corresponding Author:
Dr.Prashant Rishi,
Senior Consultant & HOD, Department of Urology & Genito-urinary Surgery, Jagjivan Ram Hospital, Mumbai, India
Email: drprishi7@gmail.com

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ABSTRACT

Background: Retained, forgotten DJ Stents are not uncommon and they often result in serious complications like migration, fragmentation, and stone formation. Aim: To assess the feasibility of maintaining a Stent Registry in order to prevent retained and forgotten DJ Stents.**Materials and Methods:** Setting: A tertiary care centre in Mumbai. Patient or Study Population: Patients presenting with urolithiasis and having undergone endourological procedures like PCNL, RIRS and URSL with DJ stenting were recruited for the study. Observation Procedure(s): Prior to post -procedure discharge, a follow-up appointment was scheduled for stent removal. Entry of each patient was done in a DJ Stent Register. To ensure timely stent removal, the urology team reviewed the DJ Stent registry every fortnight to verify that each patient had either had their stent removed or had a scheduled appointment for removal within 3 weeks of surgery. Patient Follow-up If a patient failed to follow up for stent removal, the urology team contacted the patient via telephone. During this call, the patients were asked to confirm whether they have had their stent removed elsewhere or if they will schedule a follow-up appointment in the urology OPD for stent removal. **Results:** A rigorous and systematic follow up with all patients having DJ stent ensured that all of them had their stent removed either at this hospital or elsewhere. **Conclusion:** This proactive approach ensured that patients received necessary care and follow up and thereby minimized potential complications associated with retained stents.

Keywords: Urolithiasis, Retained forgotten DJ stents, PCNL, URSL, RIRS, Stent register.

INTRODUCTION

Zimskind et al reported the use of DJ stents in 1967,[1] A double J Stent is a thin, flexible tube that is placed in the ureter- that connects the renal pelvi-calyceal system to the urinary bladder. DJ stents are one of the most commonly used tools in urology till date , from their introduction – in 1970s.[2]

There are two main types of biocompatible materials- used for making ureteral stents- Polymers and metals. Polyurethane (PU) is biocompatible, has good mechanical properties, and can facilitate good amount of drainage, however is prone to encrustation and has been reported to cause more discomfort to the patient.[3]

In contrast, silicone stents were associated with a significantly lower rate of discomfort,[4] with a lower encrustation rate.[5]

Metallic stents are used for long term drainage purpose (e.g., in malignancy) They're self-expandable (i.e expand on their own once deployed), balloon expandable (expanded using a balloon), thermos-expandable with shape memory (expand on their own on exposure to temperature). They're ductile (i.e., they can be shaped without breaking), malleable (can be molded) and are designed to stay in place without complications for a period of 1-3 years. However, on the negative side, they can facilitate epithelial hyperplasia, and might be difficult to exchange.[6]

It has been observed that the morbidity was minimal if stent indwelling times did not exceed 6 weeks.[5]

The purpose of keeping a DJ Stent is to- a) Relieve obstruction b) Facilitating the urine flow. It helps in keeping the ureter patent, and facilitates clear outflow of urine, by preventing edema, and preventing

ureteric injuries. Hence, they're used in patients with ureteric/renal calculi, ureteric strictures, pelvi-ureteric junction obstruction or any iatrogenic injury.

Complications of DJ Stents, [7,8]

The complications include

Stone encrustation- Ureteral stents are prone to encrustation, which can create a problem at the time of removal. Reports in the literature describe techniques that require several procedures and anesthetic sessions to effect extraction.[8]

Stent encrustation can pose a serious challenge to the endourologist, and indwelling times should be minimized to avoid problems,[12]

It has been observed that serious complications, including migration, fragmentation, and stone formation, still occur, especially when stents have been forgotten for a long time.[9,10]

Although complete stent removal can be anticipated, residual fragments are not uncommon.[11]

Removing of an encrusted, forgotten stent can be challenging.[13]

Forgotten ureteral stents represent a difficult problem for urologists, and a consensus on the best therapeutic approach is lacking. Historically the management of retained calcified ureteral stents has involved several operations to render the patient stone-free and stent-free.[14]

The incidence of complications increases with the duration that the stent is in-vivo.[15]

So regular ureteral stent removal or replacement is needed.[16]

Tang VC et al studied the stent card system to track the retained DJ stent and proposed the computerized DJ stent registry.[17]

Lynch M F et al in their study showed the importance of electronic stent register and stent extraction reminder facility to avoid the DJ stent follow up loss and avoid the morbidity associated with it.[18]

If a stent register was required at all, a computerized system would be preferable.[19]

MATERIALS AND METHODS

At Jagjivan Ram Western Railway Hospital, a tertiary care hospital, we have established a comprehensive urology department that provides advanced treatment options for urolithiasis. As a result, we cater to a large number of railway employees who require ongoing care and follow-up. One crucial aspect of this care is the management of patients with DJ stents post-surgery.

To ensure optimal patient outcomes and prevent potential complications, we recognized the need for a systematic approach to tracking patients with DJ stents. Hence, the aim of this study was to assess the feasibility of a stent registry in order to prevent retained DJ Stents This led to the development of a novel patient registry, which currently contains detailed information on approximately 250 patients.

Inclusion Criteria

- All patients presenting to Urology OPD at Jagjivan Ram Hospital, aged 18-80 years both males and females, with a DJ Stent in situ, which could be post-surgery, or inserted in view of non-functioning kidney, or a ureteric stricture.

Exclusion Criteria

- For the study, patients excluded were the following-
- Patients who underwent stent placement in December 2022 and had it removed in January 2023.
- Patients with stents inserted in December 2023 and removed in January 2024.

Registry Details

The registry includes the following information:

- Patient name
- Indication for stent insertion
- Date of stent insertion
- Date of stent removal
- Contact number

The registry is maintained in a dedicated hardbound notebook, exclusively used for this purpose. This ensures that every patient who has undergone DJ stent placement receives timely follow-up care and stent removal, thereby minimizing the risk of catastrophic complications.

Post-Operative Care Protocol

In the Department of Urology at Jagjivan Ram Hospital, patients undergoing URSL, PCNL, or RIRS procedures are typically discharged within 2 days without complications. Prior to discharge, a follow-up appointment is scheduled for stent removal.

DJ Stent Registry Management

To ensure timely stent removal, the urology team reviews the DJ Stent registry every fortnight. This registry tracks patients with stents in situ, verifying that each patient has either had their stent removed or has a scheduled appointment for removal within 3 weeks of surgery

Patient Follow-up

If a patient fails to follow up for stent removal, the urology team initiates contact via telephone. During this call, the patient is asked to confirm whether they have had their stent removed elsewhere or if they will schedule a follow-up appointment in the urology OPD for stent removal. This proactive approach ensures that patients receive necessary care and minimizes potential complications associated with retained stents.

RESULTS

Tabulated statistics of number of stents inserted at JRH vs number of stents removed at JRH or elsewhere

MONTH	STENTS INSERTED AT JRH	STENTS REMOVED AT JRH	STENTS REMOVED ELSEWHERE
JANUARY 2023	14	8	6
FEBRUARY 2023	13	11	2
MARCH 2023	12	12	1
APRIL 2023	8	8	0
MAY 2023	8	7	1
JUNE 2023	15	10	4
JULY 2023	12	7	5
AUGUST 2023	11	10	1
SEPTEMBER 2023	11	7	4
OCTOBER 2023	9	4	5
NOVEMBER 2023	5	4	1
DECEMBER 2023	6	6	0
TOTAL	124	94	30

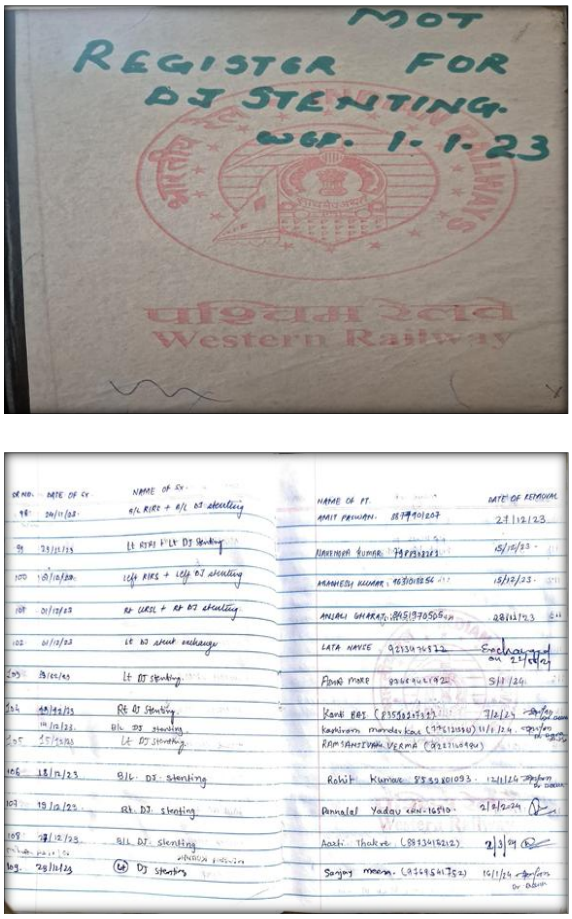

Figure 1: snapshot of the DJ stent register

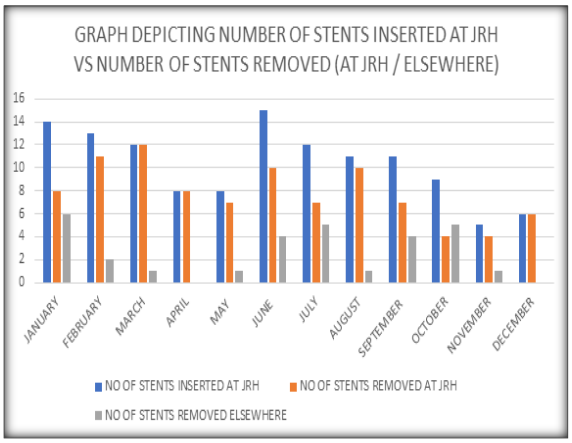

Figure 2: Graph showing number of stents inserted vs. no of stents removed.

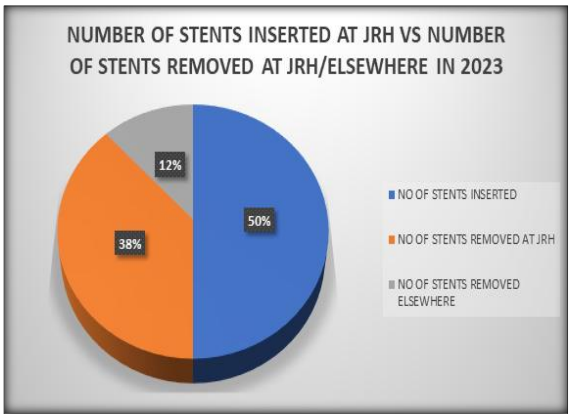

Figure 3: Pie chart representing number of stents inserted and removed.

A rigorous and systematic follow up with all patients having DJ stent ensured that all of them had their stent removed either at this hospital or elsewhere.
In our study of 1 year duration from January 2023 to December 2023, a total of 133 dj stents were inserted. 94 stents were removed at our institute while 30 stents were removed elsewhere. Hence the total stent removed was 124

DISCUSSION

Our patient registry has become an essential tool in ensuring the optimal management of patients with DJ stents. By providing a centralized and organized system for tracking patient information, we can improve patient outcomes and reduce the risk of complications associated with retained stents.

Registry Implementation

We established a registry to track patients with DJ stents, which includes their names, contact numbers, and dates of stent insertion. This registry allows us to monitor patients with DJ stents and ensure timely removal, thereby preventing potential complications.

DJ **Stent Retention**

DJ Stent retention is a potentially catastrophic complication associated with stent insertion. In literature, the ideal time for stent removal ranges between 3 weeks- 6 weeks of surgery.

Causes for stent retention

The literature identifies two primary factors contributing to stent retention: patient-related and doctor-related factors. Patient-related factors include lack of knowledge, loss to follow-up, asymptomatic cases leading to oversight, and failure to schedule appointments. Doctor-related factors comprise inadequate patient education on stent removal and potential complications, as well as the absence of effective tracking systems to monitor stent removal.[7]

Preventing DJ Stent Retention

Effective strategies include

- Clear communication between the healthcare provider and the patient.
- Patient education – including proper counselling regarding potential complications, and when to seek healthcare
- Stent Tracking Systems- A stent registry, can effectively track patients with stents in situ. This approach has been explored in studies, such as Patil et al., which demonstrated the feasibility of a computerized tracking system in a tertiary care center. Such a registry can help ensure timely stent removal and reduce retention risks.

CONCLUSION

This proactive approach of tracking each and every patient who has undergone insertion of DJ Stents, by periodically reviewing the stent register and calling them, ensured that the patients received necessary care and follow up and thereby minimized potential complications associated with retained and forgotten stents.

REFERENCES

1. Zimskind PD, Fetter TR, Wilkerson JL. Clinical use of long term indwelling silicone rubber ureteral splints inserted cystoscopically. J Urol. 1967; 97(5):840-4
2. Finney RP. Experience with new double J ureteral catheter stent. J Urol. 1978 Dec;120(6):678-81.
3. Venkatesan N, Shroff S, Jayachandran K, Doble M. Polymers as ureteral stents. J Endourol. 2010 Feb;24(2):191-8.
4. Wiseman O, Ventimiglia E, Doizi S, Kleinclauss F, Letendre J, Cloutier J, Traxer O. Effects of Silicone Hydrocoated Double Loop Ureteral Stent on Symptoms and Quality of Life in Patients Undergoing Flexible Ureteroscopy for Kidney Stone: A Randomized Multicenter Clinical Study. J Urol. 2020 Oct;204(4):769-777.
5. El-Faqih SR, Shamsuddin AB, Chakrabarti A, Atassi R, Kardar AH, Osman MK, et al. Polyurethane internal ureteral stents in treatment of stone patients: morbidity related to indwelling times. J Urol. 1991; 146(6):1487-91.
6. Kulkarni R. Metallic stents in the management of ureteric strictures. Indian J Urol. 2014 Jan;30(1):65-72 Singh I, Gupta NP, Hemal AK, Aron M, Seth A, Dogra PN. Severely encrusted polyurethane ureteral stents: management and analysis of potential risk factors. Urology. 2001; 58(4):526-31.
7. Geavlete P, Georgescu D, Mulțescu R, Stanescu F, Cozma C, Geavlete B. Ureteral stent complications - experience on 50,000 procedures. J Med Life. 2021 Nov-Dec;14(6):769-775.
8. Bukkapatnam R, Seigne J, Helal M. 1-step removal of encrusted retained ureteral stents. J Urol. 2003; 170:1111-4.
9. Kawahara T, Ito H, Terao H, Yoshida M, Matsuzaki J. Ureteral stent encrustation, incrustation, and coloring: morbidity related to indwelling times. J Endourol. 2012; 26(2):178-82.
10. Lai D, He Y, Dai Y, Li T, Chen M, Li X. A long-forgotten indwelling single-J stent in a transplant kidney. J Coll Physicians Surg Pak. 2014 May;24 Suppl 2:S152-4. PMID: 24906274.
11. Pais VM Jr, Chew B, Shaw O, Hyams ES, Matlaga B, Venkatesh R, Page J, Paterson RF, Arsovska O, Kurtz M, Eisner BH. Percutaneous nephrolithotomy for removal of encrusted ureteral stents: a multicenter study. J Endourol. 2014 Oct;28(10):1188-91. doi: 10.1089/end.2014.0004. Epub 2014 Jun 5. PMID: 24745371.
12. Ulker V, Celik O. Endoscopic, Single-Session Management of Encrusted, Forgotten Ureteral Stents. Medicina (Kaunas). 2019 Feb 26;55(3):58. doi: 10.3390/medicina55030058. PMID: 30813602; PMCID: PMC6473799.
13. Bultitude MF, Tiptaft RC, Glass JM, Dasgupta P. Management of encrusted ureteral stents impacted in upper tract. Urology. 2003 Oct;62(4):622-6. doi: 10.1016/s0090-4295(03)00506-5. PMID: 14550429.
14. Xu C, Tang H, Gao X, Gao X, Yang B, Sun Y. Management of forgotten ureteral stents with holmium laser. Lasers Med Sci. 2009; 24(2):140-3.
15. Kawahara T, Ito H, Terao H, Yoshida M, Matsuzaki J. Ureteral stent encrustation, incrustation, and coloring: morbidity related to indwelling times. J Endourol. 2012; 26(2):178-82.
16. Kawahara T, Ito H, Terao H, Yamagishi T, Ogawa T, Uemura H, et al. Ureteral stent retrieval using the crochet hook technique in females. PLoS One. 2012;7(1):e29292.
17. Tang VC, Gillooly J, Lee EW, Charig CR. Ureteric stent card register- a 5-year retrospective analysis. Ann R Coll Surg Engl. 2008; 90(2):156-9
18. .Lynch MF, Ghani KR, Frost I, Anson KM. Preventing the forgotten ureteric stent: results from the implementation of an electronic stent register. BJU Int. 2007;99(2):245-6.
19. Tang VC, Gillooly J, Lee EW, Charig CR. Ureteric stent card register- a 5-year retrospective analysis. Ann R Coll Surg Engl. 2008; 90(2):156-9.