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## Retrospective review of retained double J stents: A single centre study

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### Abstract

**Introduction:** Retained Double J stents are associated with significant morbidity and mortality, if not intervened timely. So in the present study, consequences, management and their potential complications of forgotten/retained DJ stents were analysed.

**Material and Methods:** The records of patients presented to the department of urology, Nizam's Institute Of Medical Sciences-Hyderabad with forgotten or long term retention of DJ stents from October 2013 to June 2019 were retrospectively analysed. All cases were reviewed for age, gender, indication for insertion of DJ stent, duration of stent insertion, radiological images and surgical procedures performed.

**Results:** Total 78 patients reported to our department with history of forgotten DJ stents during six years period. Total 78 patient's records were analysed over the period from October 2013 to June 2019. Out of which 49 (63%) were male and 29 (37%) were females. Age ranged from 7 years to 71 years (Mean  $43.5 \pm 10$  years). Duration with stent in situ ranged from 1 year to 9 years (Mean  $3.5 \pm 1.06$  years). Presenting complaints of fever 11%, haematuria 11%, irritative LUTS in 39% and pain in 39% amongst patients were noted. Out of 78 patients, 10 (13%) patient had CLT, 13 (17%) patients had PCNL, 5 (6%) patients underwent URSL, 2 (3%) underwent nephrectomy and 43 (55%) underwent combined procedures. Combined procedures included CLT and URSL in 9(21%), PCNL and CLT in 12 (28%), PCNL and URSL in 9 (21%), PCNL and URSL and CLT in 13 (30%). 64% of patients had preoperative urine C/S positive. Majority of microorganisms were found E. coli. Treated with preoperative antibiotics. The majority of patients had fever postoperatively. 5 patients had septic shock, and managed conservatively. No mortality.

**Conclusion:** Forgotten or retained stent is a source of severe morbidity. DJ stents should be used judiciously. Patient education and awareness plays a vital role in preventing retained stents.

**Keywords:** Retained DJ stent, fragmented DJ stent, encrustations, lithotripsy

### Introduction

Since their introduction into clinical use, double J (DJ) ureteral stents have been widely used in urological practice. Double J stents are used after ureteral surgeries and for managing ureteral obstruction due to intrinsic causes such as stones, strictures and for extrinsic causes like retroperitoneal fibrosis, malignancies and congenital anatomical anomalies<sup>[1]</sup>. They are also placed after iatrogenic injuries to the ureter and before any complex abdominal procedure for identification and protection of the ureters<sup>[1,2]</sup>.

They are prone for complications like stone encrustation, fragmentation, secondary stone formation and recurrent urinary tract infections<sup>[3,4]</sup>. Forgotten/retained Double J stents are associated with significant morbidity and mortality, if not intervened timely<sup>[1,4]</sup>. Retained Double J stent can be treated by combination or by single procedure of extracorporeal shockwave lithotripsy, cystolithotripsy, intra corporeal lithotripsy, percutaneous nephrolithotomy and open surgeries<sup>[1,4,5]</sup>.

Study was done to know the consequences, management and their potential complications of Forgotten/retained DJ stents.

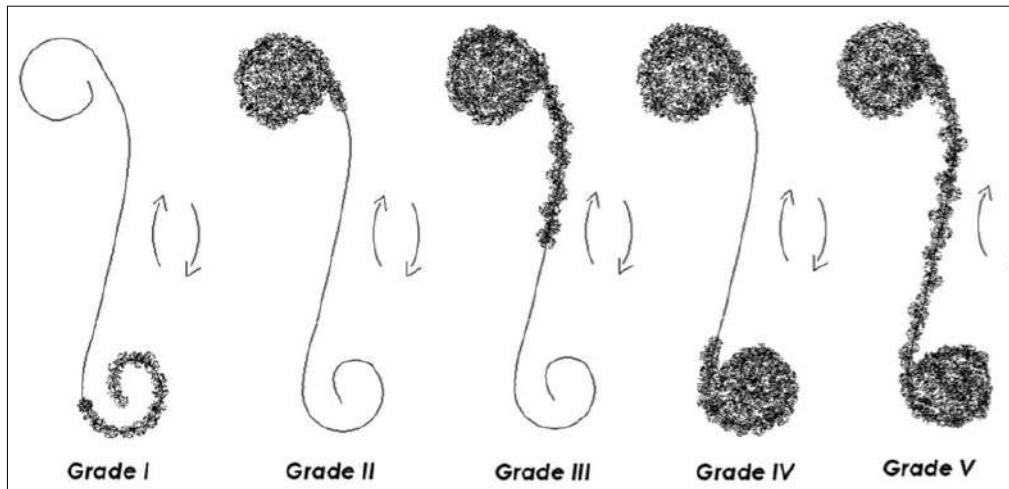
### Material and Methods

#### Study design

A total of seventy eight patients with retained Double J stent with encrustations presented to Department of Urology, Nizam's Institute Of Medical Sciences-Hyderabad between October 2013 and June 2019 were studied. Information was obtained and analysed retrospectively for

duration of Double J stent placed, presenting complaints, type of previous procedure and current procedure were recorded. The mean patient age was 43.5 years and the average indwelling time of the stent was 3.5±1.06 years. All the stents were placed elsewhere. Loss of follow-up and poor compliance were found to be the most common reasons for retained double J stents. All patients underwent thorough evaluation to know about position of stent, encrustation and associated stone by plain radiography. Intravenous Urogram has been advised in patients with

encrustations in body of stent or proximal coil/renal coil of Double J stent and as a functional study in patients with serum creatinine ≤1.5mg/dl. NCCT abdomen was done in patients with raised serum creatinine > 1.5mg/dl. Tc99m diethylene triamine pentaacetic-acid (DTPA) renogram was done for functional assessment in patients with non-visualized kidney or in whom NCCT was done. Patients were classified according to FECal classification and treatment options were customised accordingly.



**Fig 1:** Forgotten encrusted and calcified (FECal) ureteral stent grading system

Treatment decision was taken based on clinical and radiological findings. Modality of intervention used was individualized for all patients depending on radiological findings by treating surgeon. Urine culture is done for all patients. Broad spectrum antibiotic prophylaxis given for all cases. For patients with encrustations noted in body of double J stent with more stone burden at distal coil of double J stent cystolithotripsy done first and additional procedure by means of ureteroscopic lithotripsy was done and attempted to remove the stent gently by placing grasper via ureteroscope by positioning patient in dorsal lithotomy position. On few occasions were the double J stent failed to unclog at proximal coil a ureteric catheter was placed adjacent to encrusted stent under vision by ureteroscopic guidance and radio opaque contrast was injected to delineate pelvic/ureteral system, then the patient was placed in prone position with adequate padding and percutaneous nephrolithotomy was done to fragment the encrustations and any secondary stones if any present during procedure. In present study more than one procedure have been chosen as treatment modality of choice in few occasions depending on location of encrustations and secondary stones. Post operatively, plain-film radiography was done to confirm the stone free and stent free status.

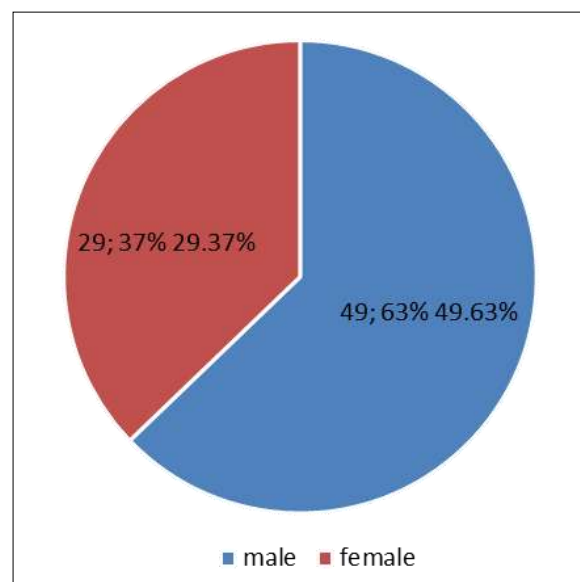
**Statistical analysis**

Throughout the study period data collected was stored in Microsoft excel 2010. The data thus collected was statistically analysed using descriptive statistics using SPSS version 14 at the end of study and presented.

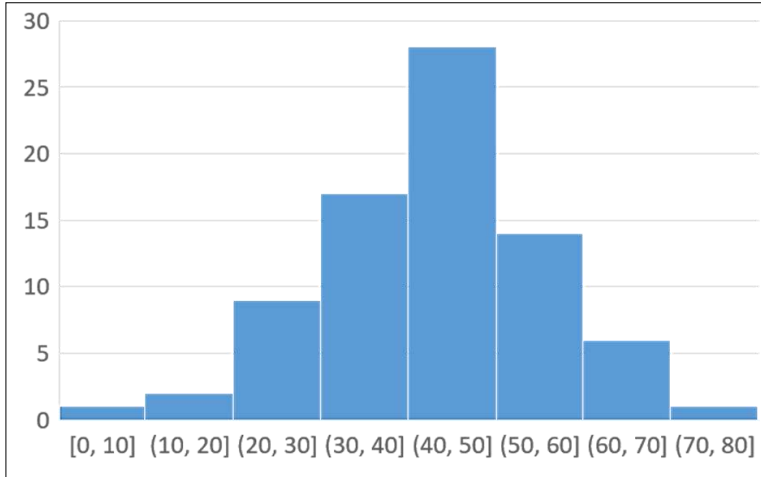
**Results**

Total 78 patients reported to our department with history of forgotten DJ stents during six years period. Total 78 patient’s records were analysed over the period from October 2013 to June 2019. Out of which 49 (63%) were male and 29 (37%) were females. Age ranged from 7years to 71 years (Mean

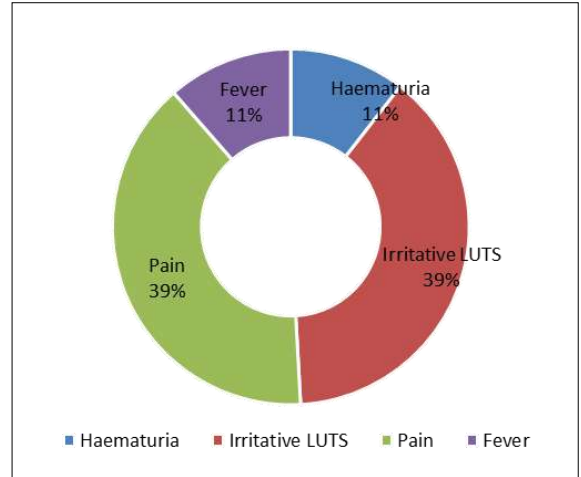
43.5±10 years). Duration with stent in situ ranged from 1 year to 9 years (Mean 3.5 ± 1.06 years). Presenting complaints of fever in 11%, haematuria in 11% irritative LUTS in 39% and pain in 39% amongst patients were noted. Out of 78 patients, 10 (13%) patient had CLT, 13 (17%) patients had PCNL, 5 (6%) patients underwent URSL, 2 (3%) underwent nephrectomy and 43 (55%) underwent combined procedures. Combined procedures included CLT and URSL in 9 (21%), PCNL and CLT in 12 (28%), PCNL and URSL in 9(21%), PCNL and URSL and CLT in 13 (30%). 64% of patients had preoperative urine C/S positive. Majority of microorganisms were found E.coli. Treated with preoperative antibiotics. The majority of patients had fever postoperatively. 5 patients had septic shock, and managed conservatively. No mortality.



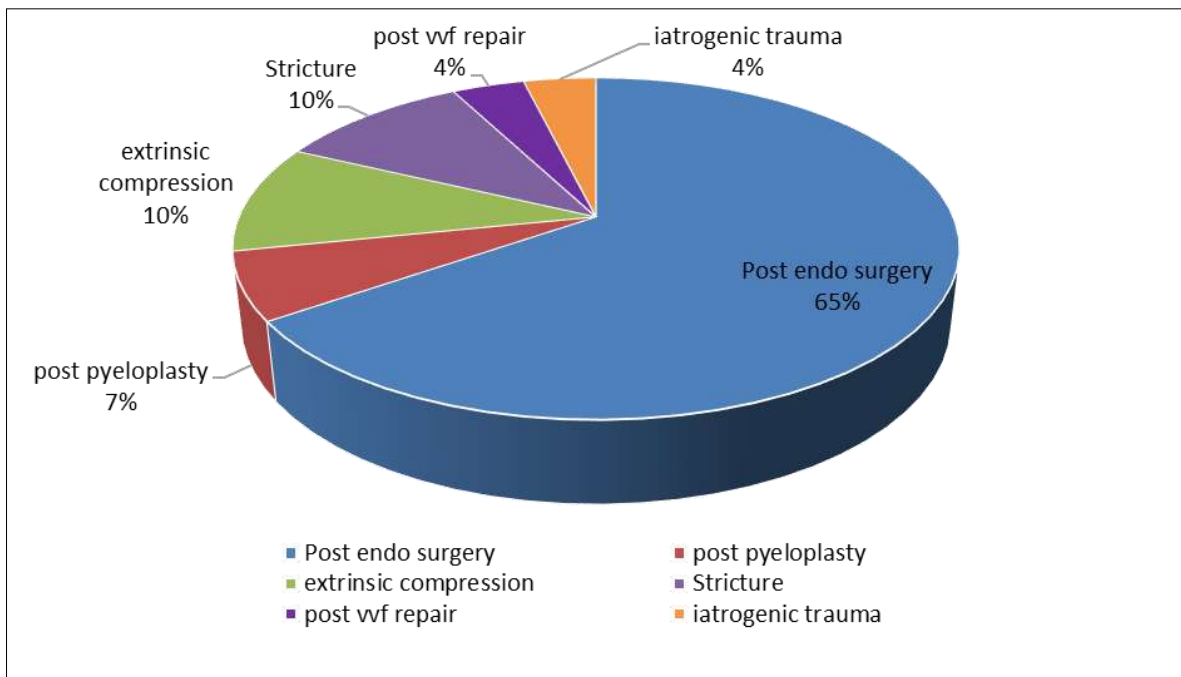
**Fig 2:** Sex distribution



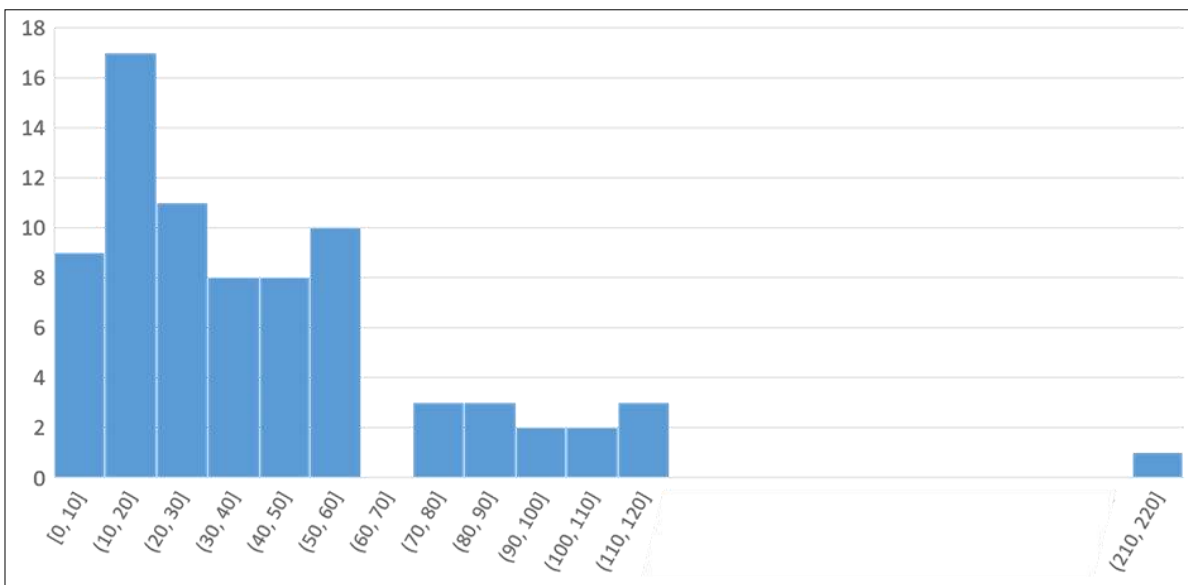
**Fig 3:** Age distribution



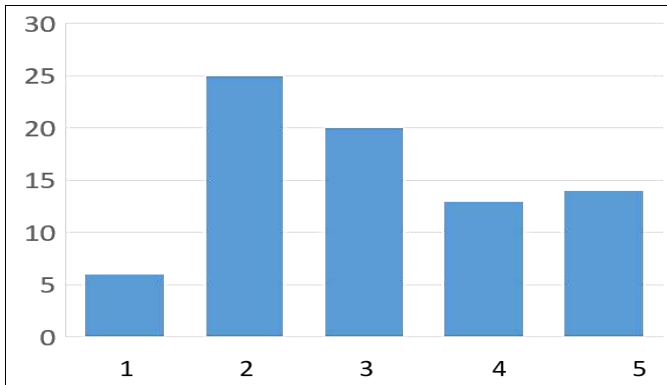
**Fig 4:** Clinical presentation



**Fig 5:** Reason for stent replacement



**Fig 6:** Duration of retained stent



**Fig 7:** FECal grading

## Discussion

Zimskind<sup>[1]</sup> first reported the use of DJ ureteral catheter and since then has become one of the most commonly used treatment modalities for internal drainage after endourological/reconstructive procedures. Although the use of DJ stents has been a proven and effective method in a number of clinical situations, one should always keep in mind the associated complications of an indwelling DJ stent. Complications include retrograde migration, breakage, encrustations, stone formation and occlusion. Double-J ureteral stents are commonly placed for duration of 4-12 weeks in an intend to prevent or relieve upper urinary tract obstruction and following reconstructive surgeries.<sup>1</sup> Since then efforts have been made to avoid ureteric stent complications like encrustations and recurrent infections<sup>[1]</sup>.

Similar with Nawaz *et al.*<sup>[13]</sup> most common reason for stent placement is post endourologic procedure. Mean duration of retained stent is 42 months, which is higher than that of prior studies. El faqih *et al.* (1991)<sup>[14]</sup> - rate of encrustation increases as the indwelling duration is prolonged. As with Rajendra Prasad *et al.*, who showed 42% required multiple procedures, in our study around 55% underwent multiple procedures.

Lack of follow up with long term placement of double J stent and poor compliance has been proposed the common reasons for double J stent retainment. Recurrent Infections/struvite stones are the usual cause of encrustation and this mandates usage of broad spectrum antibiotics prophylactically. Encrustations in distal coil/bladder coil of double J stent, however big can be better treated with cystoscopic lithotripsy and double J stent can be fragmented to stone free using pneumatic, ultrasonic or electrohydraulic energy. Fragments can be washed out and stent can be removed by gentle attempt under fluoroscopy<sup>[6-8]</sup>. Encrustations over body of double J stent are rare and may require fragmentation under ureteroscopy<sup>[6]</sup>. Plain radiograph form the primary investigation to make out encrustations, if no obvious encrustations noted on plain radiograph then double Jstent should be removed by gentle attempt under fluoroscopy<sup>[8]</sup>. In, most of the cases even when no encrustations visible on plain radiograph the lumen of double J stents are filled with calcified material that prevents uncoiling of proximal coil of double J stent and difficult to remove<sup>[10-12]</sup>. During removal of stone if patient complains of flank pain or if Double Jstent is not moving one should terminate the procedure. Forcible attempt of removal of retained double J stent may sometimes cause fracture of the stent.

A forgotten or retained ureteric stent is a preventable event, and literature is abundant with reports of forgotten DJ stents. The reason for the forgotten ureteral stents is due to failure on the part of treating surgeon to counsel the patient or the parents. To

overcome the issues of forgotten stents, maintenance of stent registry has been suggested. Such a registry would help in maintaining data relating to the insertion and lifespan of ureteric stents.

Incidence of complications raised with increase in duration of indwelling double J stent. So, timely intervention is needed. If indwelling time exceeds more than three months there may be invariable chances of need of additional procedure<sup>[8-12]</sup>.

In present study we have noticed that retained double J stent adds a significant morbidity like flank pain, dysuria, hematuria and recurrent urinary tract infections.

## Conclusion

DJ stents should be used judiciously Patient education and awareness plays a vital role in preventing retained stents. Preoperative urine cultures are mandatory. Appropriate antibiotic cover and timely management of sepsis are crucial. Multiple endoscopic procedures to be performed instead of single sitting. Stent register to be maintained and Automated information system - Mobile SMS reminders/E-mail reminders- can be helpful.

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## Conflict of interest: None

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Ethical clearance obtained from the institutional ethics committee

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