

Forgotten but not Forgiven: Managing a Calcified Double-J Stent and Bladder Stone

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Abstract: We present the case of a 29-year-old woman with a history of obstructive pyelonephritis who developed a calcified ureteral stent. This rare complication emphasizes the critical need for regular follow-up in patients with indwelling ureteral stents to prevent severe outcomes. The patient's condition was effectively managed using a combination of endoscopic and surgical techniques, demonstrating a multidisciplinary approach to addressing such complex clinical scenarios. This case not only sheds light on the potential complications associated with ureteral stents but also underscores the importance of early detection and timely intervention to optimize patient outcomes.

Keywords: Calcified ureteral stent, encrustation, laser lithotripsy, vesical calculus, minimally invasive surgery.

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INTRODUCTION

Ureteral stents are indispensable tools in modern urology, commonly employed to ensure proper urinary drainage and prevent obstruction. However, the quest for an ideal stent remains ongoing. The perfect stent would seamlessly balance ease of placement and removal, patient comfort, effective drainage, and resistance to both infection and encrustation, while also being biodegradable if left in place for extended periods (Brotherhood *et al.*, 2014).

Despite their benefits, double-J stents require timely removal to avoid complications associated with prolonged use. These complications include encrustation, urinary tract infections (UTIs), hematuria, and irritative bladder symptoms. Furthermore, stents can sometimes present additional challenges, such as malposition, migration, or even fragmentation, complicating both the patient's experience and the management approach (Huang *et al.*, 2024).

In this report, we present the case of a young woman who developed a heavily calcified ureteral stent. This rare and complex scenario was successfully addressed through a combination of endoscopic and surgical interventions, demonstrating the challenges and solutions in managing such cases.

CASE PRESENTATION

A 29-year-old married woman, a mother of two, presented with intermittent right-sided flank pain and macroscopic hematuria without clots. She also experienced irritative lower urinary tract symptoms, including increased frequency of urination both during the day and at night, as well as painful urination. These symptoms had been gradually worsening over the past few weeks, yet she remained afebrile and in generally good health.

Her medical history included two cesarean sections and a diagnosis of obstructive acute pyelonephritis six years prior, caused by a right-sided pelvic kidney stone. At that time, a double-J stent was

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placed to address the obstruction. Unfortunately, she did not return for follow-up to monitor or remove the stent.

On examination, she had mild tenderness in the right flank, but no abdominal masses were palpable.

Laboratory tests revealed normal renal function, and her urine culture was sterile.

A plain abdominal X-ray showed a calcified double-J stent affecting both its proximal and distal segments (Figure 1).



Figure 1: Plain abdominal X-ray demonstrating a calcified double-J stent, with visible calcification affecting both the proximal and distal segments

Further imaging with CT confirmed heavy calcification of the proximal ureteral stent and significant

calcification of the distal segment, accompanied by a large bladder stone (Figure 2).

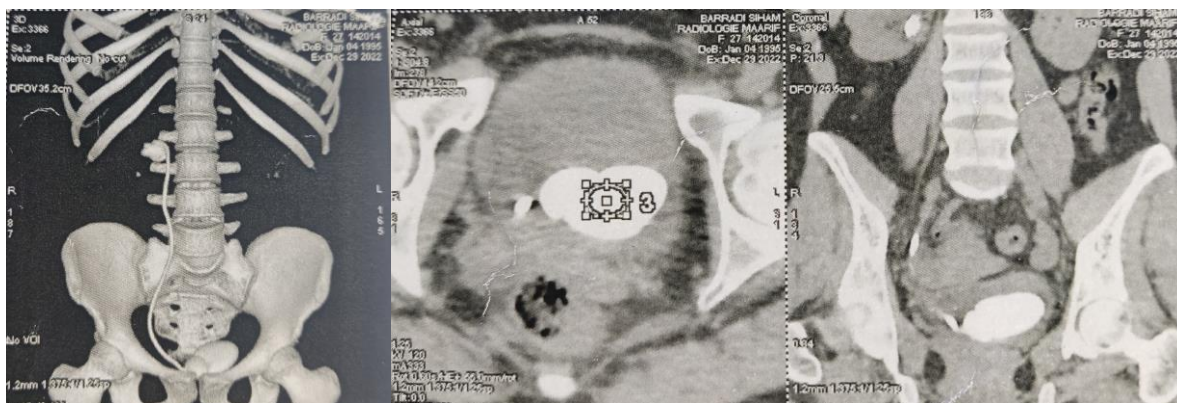


Figure 2: CT imaging revealing extensive calcification of the proximal ureteral stent and significant calcification in the distal segment, along with the presence of a large bladder stone

The patient underwent a single-session procedure combining endoscopic and surgical approaches. Ureteroscopy with laser lithotripsy was used

to fragment the calcifications on the stent's proximal segment, as well as the large bladder stone (Figure 3).

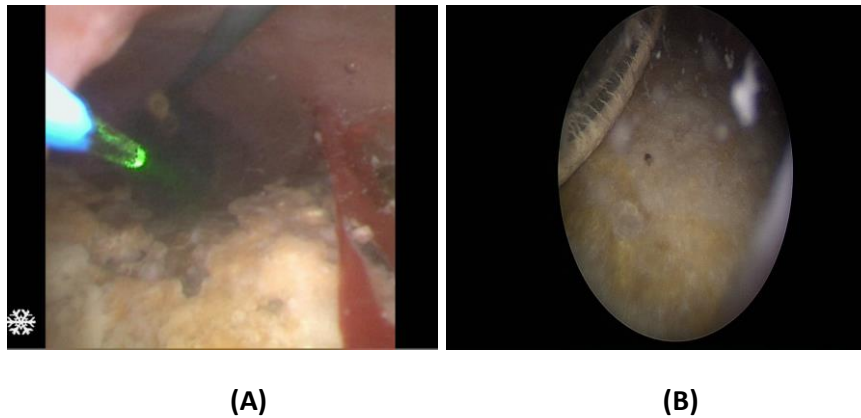


Figure 3: (A): Ureteroscopy with laser lithotripsy, used to fragment the calcifications on the proximal segment of the double-J stent. (B) Cystoscopy image showing the large bladder stone and calcifications in the bladder

The distal calcifications and bladder stone fragments were removed through a mini-Pfannenstiel cystostomy using her cesarean scar (Figure 4).

A new right-sided double-J stent was inserted and subsequently removed one month later.



Figure 4: The calcified double-J stent and bladder stone fragments after extraction through a mini-Pfannenstiel cystostomy, utilizing the patient's previous cesarean scar

Postoperative recovery was smooth. The patient's surgical wound healed well, her urine output normalized, and her flank pain completely resolved.

DISCUSSION

Double-J stent encrustation is a largely preventable complication when timely intervention and regular follow-up are prioritized. Prolonged retention of stents, especially when coupled with factors like urinary infections or metabolic disorders, significantly heightens the risk of encrustation and calcification. These issues can lead to severe renal damage and complicate stent

removal, underscoring the importance of strict adherence to stent management protocols.

Huang *et al.*, observed that treatment strategies for bladder stones associated with forgotten double-J stents depend on the stone burden and accompanying complications.

In most cases, lithotripsy is employed to fragment the stones into pieces that can be retrieved endoscopically. However, more severe cases involving larger stones or additional complexities often necessitate open surgical intervention (Huang *et al.*, 2024).

Managing an encrusted double-J stent is particularly challenging due to the absence of standardized guidelines for surgical removal. Nevertheless, treatment algorithms have been developed based on the extent and location of encrustation (Ulker & Celik, 2019).

The FEcal System classifies stent encrustation into five grades, from grade I (minimal encrustation of the distal stent pigtail) to grade V (complete circumferential encrustation of the entire stent). Treatment options range from cystoscopic stent removal for minor cases to more invasive procedures such as extracorporeal shock wave lithotripsy (ESWL), percutaneous nephrolithotomy (PCNL), cystolitholapaxy, ureteroscopy, or multimodal approaches for severe cases. In patients with renal function below 20%, nephrectomy may be necessary. (*The FEcal Double-J: A Simplified Approach in the Management of Encrusted and Retained Ureteral Stents* / *Journal of Endourology*, n.d.)

The KUB System provides another approach for evaluating encrustation severity by grading three specific areas: the proximal renal coil (“K”), the ureteral shaft (“U”), and the distal bladder coil (“B”). Grades range from 1 (minor encrustation) to 5 (severe encrustation), with a maximum total score of 15 (Johnson *et al.*, 2023).

Both systems serve as reliable tools for predicting the challenges associated with managing encrusted ureteral stents. The FEcal score, in particular, excels in determining when multimodal surgical approaches may be required (Saadi *et al.*, 2023)

The key to preventing ureteral stent complications lies in educating both the patient and their family. It is crucial to clearly explain the importance of timely removal or replacement of the DJ stent, obtain written informed consent, and ensure the patient is closely monitored until the stent is removed. Preventing complications is the most effective approach. To help ensure stents are removed or replaced at the appropriate time, some authors have recommended using a computer tracking system (Kandemir & Sönmez, 2019)

Surgeons have proposed establishing a hospital stent registration system to monitor all DJ stent implantations (Fauzi *et al.*, 2024) To prevent prolonged retention of these devices beyond their recommended duration and reduce calcification risks, computerized systems could be developed to automatically list patients with DJ stents once the procedure is documented in the electronic medical record.

This system would generate a list and issue alerts to the medical team when these patients approach the expiration date of their stents (Arruda *et al.*, 2024).

CONCLUSION

This case highlights the critical importance of regular follow-up for patients with ureteral stents to prevent complications such as encrustation and calcification. Timely monitoring and removal are essential to safeguard renal function and simplify management.

For complex cases involving calcified stents, a multidisciplinary approach is crucial, ensuring effective treatment through combined expertise and advanced techniques. Strengthening patient education and implementing tracking systems can further minimize the risk of forgotten stents and associated complications.

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