

Unexpected outcome (positive or negative) including adverse drug reactions

Ureteroscopic removal of forgotten ureteral stent

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A 69-year-old female had a right ureteral stent placed due to ureteral stricture resulting from cervical cancer in March 2008. The ureteral stent migrated to the ureter and was not exchanged. A new ureteral stent was inserted, and was exchanged every 3 months. The patient was referred to our department to remove the forgotten ureteral stent. In January 2012, her old ureteral stent was removed ureteroscopically, and no ureteral stent encrustation was found.

BACKGROUND

Ureteral stents were first reported by Zimskind *et al* in 1967.¹ Since then, ureteral stents have become essential for maintaining ureteral patency during the management of various benign and malignant forms for ureteral obstruction. Serious complications, including migration, fragmentation and stone formation still occur, especially when stents have been left in place or forgotten for a long time.^{2–6} The incidence of encrustation increases with the duration that the stent remains indwelling.⁷ Therefore, every 6 weeks to 6 months, the exchange or removal of the stent is necessary.^{2,3,8–12}

A report by el-Faqih *et al* indicated that the stent encrustation rate increases from 9.2% for an indwelling time of less than 6 weeks to 47.5% at 6 to 12 weeks to 76.3% at more than 12 weeks.⁷ The results of our previous study also support these data.⁶ In the previous reports, forgotten ureteral stents with a duration of stenting over 1 year were heavily encrusted and required additional application of shock wave lithotomy (SWL), ureteroscopy (URS) and

percutaneous nephrolithotomy (PCNL) for both successful removal and treatment.

CASE PRESENTATION

A 69-year-old female had a right ureteral stent placed due to ureteral stricture resulting from cervical cancer in March 2008. The ureteral stent migrated to the ureter and was not exchanged. A new ureteral stent was inserted, and was exchanged every 3 months. The patient was referred to our department to remove the forgotten ureteral stent (figure 1A).

INVESTIGATIONS

We checked the ureteral stent for encrustation, incrustation, colouring and resistance to removal. The definitions of encrustation, incrustation, colouring and resistance to removal were in accordance with our previous report.⁶

DIFFERENTIAL DIAGNOSIS

In the previous reports, forgotten heavily encrusted ureteral stents were sometimes x-ray negative for stones.^{2–6}

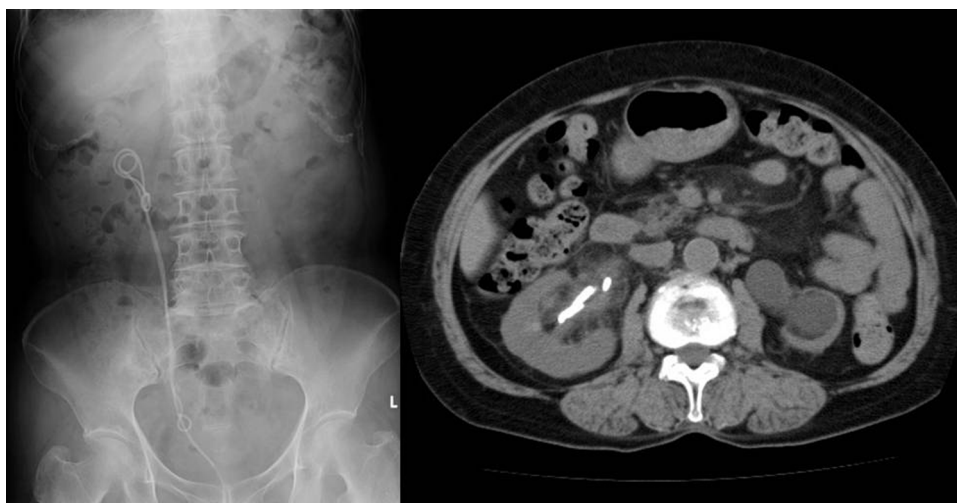


Figure 1 (A) Kidney ureter bladder (KUB) film: forgotten ureteral stent is beside the newly placed stent. (B) CT: no heavy encrustation was observed in the forgotten ureteral stent.

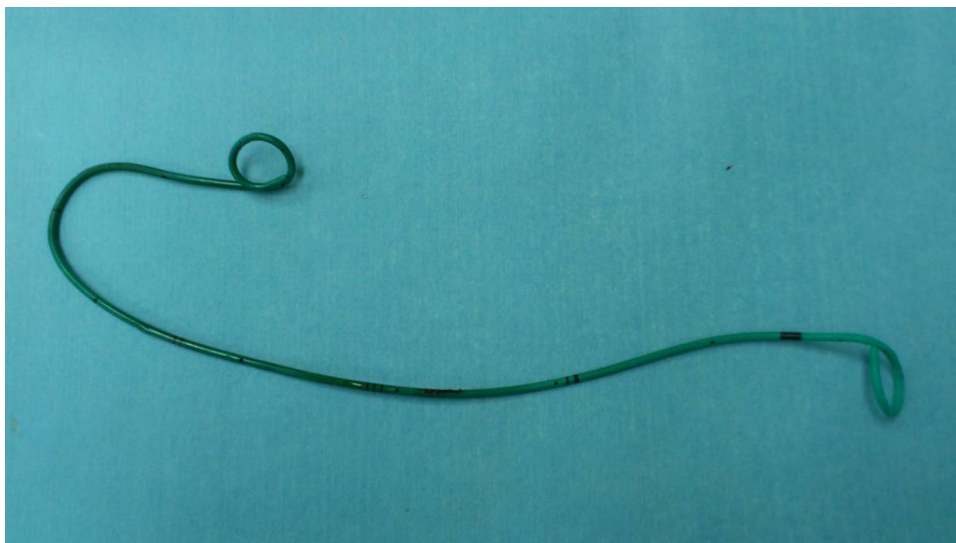


Figure 2 Migrated ureteral stents more than 3 years.

So, before URS, we perform CT to examine the presence of heavy encrustation around the ureteral stent. CT revealed no heavy encrustation, however, detailed ureteral stent encrustation is difficult to be examined by CT (figure 1B).

TREATMENT

In January 2012, the new ureteral stent was removed under general anaesthesia, and a rigid URS was inserted into the ureter to observe the old ureteral stent. The old ureteral stent was not encrusted in the distal body or end, so we grasped it and removed it under fluoroscopic observation. The old stent was easily removed, and no ureteral stent encrustation, incrustation, abnormal colouring or resistance to removal was found (figure 2).

OUTCOME AND FOLLOW-UP

To decrease ureteral stent-related symptoms, we inserted a loop type ureteral stent (Polaris Loop, BostonScientific, Massachusetts, Natick, USA) based on the patient's measured ureteral length.¹³ Her measured ureteral length was 23 cm, so an 8 Fr 22 cm ureteral stent was inserted. We will continue to exchange ureteral stent every 3 months.

DISCUSSION

Ureteral stents were first developed in 1967.¹ Various materials and coatings have been investigated in an effort to avoid ureteral stent complications such as encrustation, incrustation and infections.¹ The incidence of encrustation increases with the duration that the stent remains indwelling.^{6 7} Therefore, periodic ureteral stent removal or exchange is needed.¹²

In a previous study, el-Faqih *et al* indicated that the stent encrustation rate increases from 9.2% for an indwelling time of less than 6 weeks to 47.5% at 6 to 12 weeks, to 76.3% at more than 12 weeks.⁷ In our previous reports, 26.8% of stents were encrusted at less than 6 weeks, 56.9% at 6 to 12 weeks and 75.9% at more than 12 weeks.⁶ Ureteral stent encrustation is related to the indwelling time, but heavily encrusted ureteral stents neces-

sitating additional procedures for removal also occurred at an indwelling time of 3 months.⁶

Bultitude *et al* reported that 42.8% of the stents in their patients became difficult to remove cystoscopically within 4 months, and 14.3% at 2 months.^{2 11} Okuda *et al* reported on 15 irremovable ureteral stents in Japanese patients. The mean indwelling times of these stents was 20 months.¹⁴

In this case, although the indwelling time was 46 months, no encrustation, incrustation, abnormal colouring or resistance to removal was found. We speculated that the ureteral stent encrustation varies based on the patient's background. Other than the stent indwelling time, there are various other factors that affect encrustation, such as stone disease, urinary sepsis, chemotherapy, pregnancy, chronic renal failure, and metabolic or congenital abnormalities.¹¹ Therefore, ureteral stents should be exchanged periodically based on the stent's condition.

Learning points

- Despite its long indwelling time, the present forgotten ureteral stent was smoothly removed by ureteroscopy.
- In the previous reports, forgotten ureteral stents were usually heavily encrusted and required additional procedures, including SWL, URS and PCNL. However, we speculate that there are likely many non-encrusted cases where the stent is successfully removed that are not reported.
- However, we recommend that ureteral stents should be exchanged around every 3 to 4 months. And in the cases in which resistance to removal is found, ureteral stents should be exchanged in each patient in accordance with the ureteral stent condition.
- Ureteral stent register might be helpful for avoiding forgotten ureteral stent.^{15 16}

Competing interests None.

Patient consent Obtained.

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Please cite this article as follows (you will need to access the article online to obtain the date of publication).

Kawahara T, Ishida H, Kubota Y, Matsuzaki J. Ureteroscopic removal of forgotten ureteral stent. *BMJ Case Reports* 2012; 10.1136/bcr.02.2012.5736, Published XXX

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