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Case Reports of Single-Stage Techniques to Manage Heavily Encrusted Retained Ureteric Stents

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Abstract

We report two extreme cases where retained ureteric stents resulted in loss of the affected kidney in one case and concomitant kidney-bladder stone formation in another. The first case was a 45-year-old woman with a non-functioning left kidney due to heavily encrusted retained stent with large bladder calculus at the distal coil. She underwent laparoscopic left simple nephrectomy and vesicolithotomy. The second case was an 83-year-old man with heavily encrusted right stent resulting in partial staghorn calculus and bladder calculus at the proximal and distal coils respectively. He underwent cystolitholapaxy, ureteroscopic laser lithotripsy and percutaneous nephrolithotomy in a single session.

Keywords: Ureteric stent; Encrusted; Retained; Laparoscopic

Case Reports

Case 1

The first case was a 45-years-old woman who presented to the emergency department with one-week history of lower abdominal pain. An X-ray of the kidneys, ureters and bladder (XR-KUB) incidentally showed a left ureteric stent with a large bladder calculus (9 cm × 6 cm) formed at the distal end of the stent (Figure 1).

Computed tomography was subsequently performed, which revealed a large bladder calculus causing obstructive uropathy, with resulting bilateral hydronephrosis. Caesarean section had been performed on the patient 16 years prior, in which the ureteric stent had been inserted following a primary repair of left ureteric injury. She had defaulted follow-up after her discharge.

Figure 1: XR-KUB showed a retained left ureteric double-J stent and a large bladder calculus (arrow).

Right percutaneous nephrostomy tube was inserted to relieve the obstruction of the good functioning kidney prior to definitive elective surgery at a later date.

Diuretic renogram confirmed a non-functioning left kidney (Figure 2). In view of the investigative findings patient was counselled for laparoscopic left simple nephrectomy with removal of the ureteric stent and vesicolithotomy.

The surgery was performed with the patient positioned

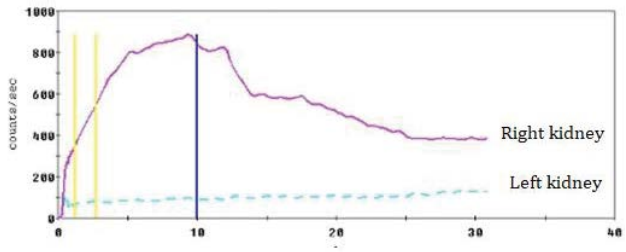

Figure 2: Diuretic renogram showing good right renal function with good excretion after furosemide administration. Left kidney however, showed poor function with minimal tracer excretion.

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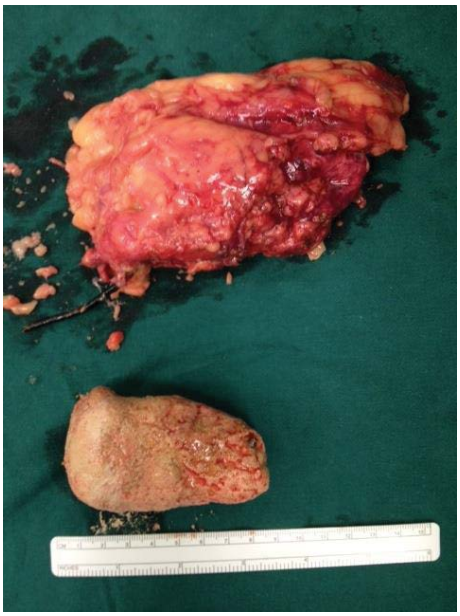

Figure 3: Left nephrectomy specimen (above) and extracted bladder calculus (below).

in a modified right lateral with patient's legs in Lloyd Davies position. Laparoscopic left simple nephrectomy was performed in a routine fashion. The left ureter was dissected to expose the ureteric stent, which was then divided. The left kidney was taken out with the proximal portion of the stent. Following that, the patient was turned supine with 30-degree Trendelenberg position. Laparoscopic vesicolithotomy was performed. The dome of bladder was opened and the calculus was removed in one piece together with the distal end of the stent. The cystostomy was subsequently repaired in two layers. Patient recovered well and was discharged two days later. Right percutaneous nephrostomy tube was removed prior to her discharge (Figure 3).

Case 2

The second case was an 83-year-old gentleman who was seen in outpatient clinic for right flank pain. A year prior, he underwent right ureteroscopy and laser lithotripsy for ureteric calculus, with insertion of a ureteric stent after the procedure. Computed tomography showed a retained right ureteric stent with extensive encrustation throughout its length. This was complicated with formation of a partial staghorn calculus and a large bladder calculus at the proximal and distal end of the ureteric stent respectively (Figure 4).

In a single sitting, the patient underwent cystholitholapaxy, right ureteroscopy laser lithotripsy, and percutaneous nephrolithotomy (PCNL). The operation started with the patient in lithotomy position and lithotrite was used to fragment the bladder calculus. Using semi-rigid ureteroscope and Holmium laser, encrustation along the retained stent in the right ureter was fragmented. The stent was then cut using the Holmium laser and retrieved, leaving the proximal

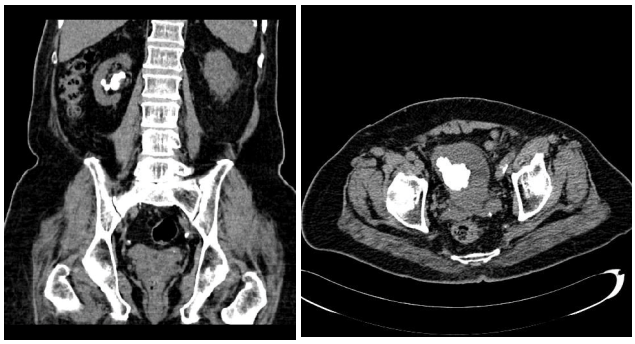

Figure 4: Partial staghorn calculus at the proximal end of the ureteric stent (left) and large bladder calculus at the distal end of the ureteric stent (right).

portion of the stent which was embedded in the staghorn calculus. The patient was then turned prone and proceeded with PCNL in a routine fashion. Lithotripsy was performed using cyberwand, and the stone fragments with the proximal coil of the ureteric stent were removed using a grasper. Patient's post-operative recovery was unremarkable and he was discharged three days later.

Discussion

Management of encrusted retained ureteric stent can be challenging. It usually involves several procedures and multiple anesthetic sessions to remove the stent and render the patient stone free [1]. Previous reports described various procedures to treat retained ureteric stent [2,3]. These include percutaneous nephrolithotomy, cystoscopic electrohydraulic lithotripsy, extracorporeal shockwave lithotripsy and simple nephrectomy. Barboroglu and Kane [4] stated that 50% of retained stent cases required more than one session for successful treatment to remove the stent. Mohan-Pillai et al. [5] described an average of 2.5 procedures were necessary to render the patients stone-free.

In a study by Lam and Gupta [6], various endourological approaches were described in managing their series of 26 retained ureteric stents. On an average, the patients in the study required 2.7 endourologic procedures, which were performed in one or more sessions to remove the retained stent and the associated stone burden. The use of ureteroscopy laser lithotripsy was advocated to fragment encrustations along the retained stent. However, if the ureter cannot accommodate semi-rigid ureteroscope next to the retained stent, placing a parallel 4.7F ureteric stent was recommended to allow passive ureteric dilatation. For large proximal encrustation, percutaneous nephrolithotomy in a prone position was suggested.

The two cases of retained ureteric stent that we described involved large stone burden due to prolonged encrustations. We managed to remove the retained stent and rendered the patient stone-free in one session. In the first case, prolonged obstruction from the large stone at the distal coil of the stent

resulted in non-functioning left kidney. In such a case, it was prudent to perform laparoscopic simple left nephrectomy. Using the same ports, laparoscopic vesicolithotomy was done to remove the distal portion of the retained stent with a large stone attached to it. For the second case, stone encrustation existed throughout the retained stent. Using a combination of cystolitholapaxy, retrograde ureteroscopy, Holmium laser lithotripsy, and percutaneous nephrolithotomy, we managed to remove the stones and the retained stent in one setting.

The pathophysiology of encrustation on ureteric stent can occur in either sterile or infected urine [7]. In infected urine, the mechanism of encrustation is similar to struvite stone formation. This involves alkalinization of urine as a result of hydrolysis of urea by urease-producing microorganisms. In sterile urine, the mechanism of encrustation is less clear. One theory described organic biofilm layer that develops on ureteric stents induces crystal precipitation and aggregation on its surface.

The most common cause of retained ureteric stent is poor compliance. In our unit, an electronic recall system was started five years ago to track patients that have ureteric stent inserted. Entry into the electronic system is made at the time of stent insertion. When the scheduled time for removal of ureteric stent elapsed and the patient defaulted follow-up, a system-generated e-mail will be sent to prompt the attending urologist. Corrective action will be taken to bring the patient back for stent removal. This safety mechanism has worked effectively in our unit in preventing retained stent. Ather et al. [8] described a similar computerized tracking program, which significantly lowered the incidence of overdue double-J stents from 12.5% to 1.2% over one-year period. The use and removal of ureteric stents should be clearly documented in patients' records to ensure clear communication amongst healthcare professionals.

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