Pediatrics

Fragmentation of Severely Encrusted Ureteral Stent Indwelled for 4 Years in a Boy

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ARTICLE INFO

Article history:
Received 27 October 2016
Accepted 10 November 2016

Keywords:
Pediatric urolithiasis
The forgotten double J stent
Percutaneous nephrolithotomy
Vesical calculus

Abstract

Four years ago, a 9-year-old boy received percutaneous nephrolithotomy (PCNL) and a 5F DJS was placed thereafter. The DJS was neglected until it caused serious complications including encrustation involving the whole stent, a 5-cm-diameter vesical stone, fragmentation of DJS, and serious urinary tract infection. For this rare and complex case of pediatric lithotomy, we combined PCNL with the suprapubic cystolithotomy for complete removal of the encrusted stent and associated stones without any complications and the patient was rendered stone- and stent-free safely.

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Case report

A 13-year-old boy was treated at our center in December 2014. In December 2010, the boy received PCNL for right kidney multiple lithiasis and placed a 5F DJS thereafter. For his parent’s carelessness, the DJS was neglected. The next year, the boy suffered from right flank pain, frequency, urgency, urodynia and hematuria. Gradually, these symptoms were worsen, even concomitantly with dysuria, and abdominal swelling, anus bulge. Unfortunately, the boy received no effective treatment and dropped out of school at last. Through physical examination, the boy was found flank pain over two sides and tenderness of bladder region. In addition, his penis was not well developed.

There were a large number of erythrocytes, leukocytes and bacteria, protein in urine tests. Serum creatinine and urea nitrogen levels were normal. From ultrasonic examination, CT scan and KUB, the encrusted DJS was shown to have fractured and the lower coil was enclosed by a 5-cm-diameter vesical stone, the upper section of stent was left in the right kidney and upper ureter (Fig. 1).

Under the general anesthesia, PCNL combined with suprapubic cystolithotomy were performed. The patient was placed in a prone position. The calyx was punctured using a free-hand technique to enable minor adjustments to the position of the needle. A J-shaped guidewire was inserted into the collecting system through the needle, and its position was confirmed by ultrasonography. Dilated using serial fascial dilators over the guidewire, and a 16 Fr peel-away sheath was left in place to facilitate observation using an 8/9.8 Fr rigid ureteroscope. A holmium (Ho:YAG) laser with a 365 micron fiber was used to disintegrate the encrustation that had formed over the stent. The stent with upper coil and remaining stones were removed with a grasper. Subsequently, the patient was placed in a supine position. A 4 cm incision was made 2 cm above the pubic symphysis. Suprapubic cystolithotomy was performed to remove the lower part of the fractured stent, which was wrapped with calculus, formed a 5-cm-diameter vesical stone (Fig. 2). The operation lasted for 2 hours and 45 minutes. Postoperative KUB (Fig. 3) showed that there was no residual stone and the new DJS was in good position. Five days after operation, the nephrostomy tube was removed. The DJS was removed 2 weeks post-operation. Calculus analysis showed calcium oxalate monohydrate and calcium phosphate in this case.

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http://dx.doi.org/10.1016/j.eucr.2016.11.016
Discussion

Encrustation of forgotten stents associated with large stone burden is a serious problem due to complications such as recurrent urinary tract infection, hematuria, urinary tract obstruction and renal failure. Known risk factors for stent encrustation include long indwelling time, urinary sepsis, urolithiasis, chemotherapy, metabolic or congenital abnormalities. Multiple studies indicate that stent indwelling time is highly related to the incidence of encrustation. The maximum recommended dwell time of stent was 6–12 months. Keane declared that these stents were demonstrated to often become colony by bacteria in addition to the development of encrustations. El-Faqih indicated that the stent encrustation rate increases from 9.2% for an indwelling time of less than 6 weeks to 47.5% for 6 to 12 weeks and 76.3% for more than 12 weeks. If the indwelling time exceeds 1 year, the DJS is often partially dissolved in urine and that could lead to spontaneous rupture. In our report, the overall indwelling time of forgotten ureteral stent is 48 months. Meanwhile, when the proximal and distal coils form calculi and could not move anymore, the child’s rapid growth will produce the force of stretching and break the DJS.

Management of heavily encrusted stents remains challenging situation for urologists. However, there are no guidelines for the most effective treatment modalities, especially for pediatric age group. The small collecting system, mobility of the pediatric ureter, the friable and narrow ureteral orifice present challenges for stent implantation. In addition, especially in boy, the urethra is brittle and extremely vulnerable to trauma,
leading to dire consequences. Various methods of treatment combinations of extracorporeal shock wave lithotripsy, cystolithotripsy, retrograde ureteroscopy with intracorporeal lithotripsy, PCNL and open surgery have been used for retrieval of these encrusted stents. In the present study, Upon pre-operative investigation, including KUB, ultrasound, CT scan and IVU, it important to decide the treatment strategy, the forgotten stent was noted with significant calculus formation at both ends. For severe encrustation or calcification of the proximal stent in this case, PCNL in conjunction with antegrade ureteroscopy was used.

Endoscopic lithotripsy tends to be safer, with less bleeding, higher success rate and earlier recovery, compared to open surgery. However, suprapubic cystolithotomy takes advantage in removing large bladder stones in pediatric cases. Open surgery for large bladder stone in this case avoided injury in the child’s premature urethral and reduced operation duration and residual calculi rate. During the operation, all efforts were made to protect the vulnerable urethral and ureter of the boy.

In our case, we combined minimally invasive surgery with traditional open surgery to remove the severely encrusted and fractured stent, based on the characteristics of child’s physiological structure and imaging evaluation. Successfully, the patient has been followed up for 22 months without any complications.

Conflicts of interest
None declared.

Acknowledgment
This work was supported by the research grants from the National Natural Science Foundation of China (No. 30801142/81371615/81270844), and from the Shaanxi Technology Research and Development Program (No. S2016YFSF0503/No. 2013K12-05-11).

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