

Multimodal Management of Urolithiasis for Forgotten Severely Calcified Ureteral JJ Stent: Our Experience at King Hussein Medical Center

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ABSTRACT

Objective: To evaluate the management of forgotten ureteral JJ stent with severe encrustation and stone formation.

Method: This is a retrospective study which was conducted at King Hussein Medical Center during the period January 2005- April 2009, fifteen patients (10 male and 5 female) aged between 25- 60 years, with severe JJ stent encrustations were incorporated in this study. Three with severe encrustation of the whole stent, 5 with severe encrustation of both ends, 5 with ureteric part and bladder end encrustation, and 2 with bladder end encrustation only. The duration of forgotten JJ range from 6 months –12 years. Multimodal therapies were used for the management.

Results: All patients were stents and stone free after 1-4 approach (ureteroscopy, percutaneous nephrolithotomy, cystolitholapaxy and open surgery) in multisessions. All patients were treated by minimally invasive endourological procedure in all sessions except one which required open ureterolithotomy. One major complication was encountered, small bowel injury which was managed without events.

Conclusion: Severe encrustation of the JJ stents requires multimodal therapy for managing this complex problem; each patient may need multiple approaches in one or multiple sessions. Open surgery may be indicated when minimally invasive procedures fail.

Key words: Encrustation, Stent, Ureter

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Introduction

Indwelling ureteral stents placement nowadays is a common procedure in daily urologic practice; it is used to relieve ureteral obstruction, ensuring adequate postoperative drainage, and prevent ureteral injuries during abdominal surgical procedures.⁽¹⁾ According to the recent increase usage of ureteral stents, significant technological innovations and improvement have been made in stents design and material to overcome stents related problems and tolerance.⁽²⁻⁵⁾ Although the stent is demonstrably valuable, it also has serious

complications including migration, fragmentation, encrustation, and stone formation still occur, especially when it is forgotten for a long time.⁽⁶⁻⁹⁾

Forgotten stent encrustation and stone formation are one of the most difficult complications to manage and they can lead to obstruction and renal impairment.⁽⁹⁻¹³⁾ Nowadays, diagnosis of encrusted ureteral stents has been based only on plain abdominal X-Ray (KUB).⁽⁹⁾ The sequels from stents left in side for along period poses a manageable and legal dilemma. Those patients usually require multimodal stone therapy to get both stone and stent

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Fig. 1. KUB shows severely calcified fragmented JJ stent of single functioning kidney.



Fig. 2. KUB shows same patient after removal of stone and stent.



Fig. 3. KUB of patient with transplanted kidney and severely calcified JJ stent

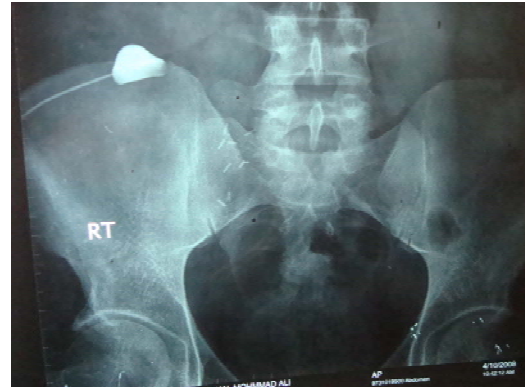


Fig. 4. KUB of the same patient after operation

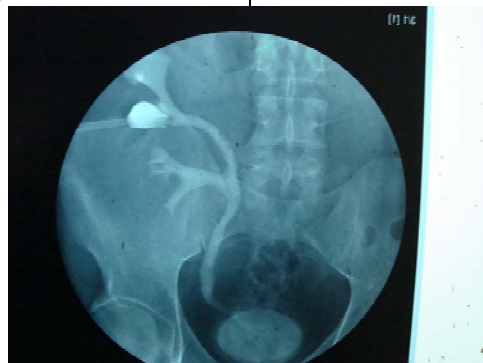


Fig. 5. KUB Anitgrade pyelogram of the same patient after operation

free.⁽¹⁴⁾ In this study we report our experience in surgical treatment of patients with forgotten encrusted ureteral JJ stents.

Methods

This is a retrospective study which was conducted at King Hussein Medical Center during the period between January 2005- April 2009, 15 patients (10 males and 5 females) aged 25-60 years were treated for severely encrusted JJ ureteral stent, two of them with transplanted kidney, and one with single functioning native kidney. All patients were evaluated clinically and were assessed by

investigations including KUB, and renal function profile. The duration of JJ stents left in situ range from 6 months – 12 years. Three patients had severe encrustation on the whole ureteral stent, one with single functioning kidney and fragmented stent as shown in Fig. 1 and 2, and one of them with transplanted kidney as presented in Fig. 3, 4 and 5. Five had severe encrustation at both bladder and renal ends. Five had severe encrustation at ureteric part and bladder end and 2 had severe encrustation at bladder end only. All patients presented with loin pain, haematuria, and irritable urinary symptoms. Multimodal therapies were used for management of

the encrusted JJ stents. Two patients with bladder end encrustation were treated successfully endoscopically with cystolitholapaxy by stone crushing forceps and optical lithotrite using the usual nephroscope and pneumatic lithoclast for fragmentation of the stone.

Three cases with encrustation of the whole stent were treated in sessions, two required cystolitholapaxy by the optical lithotrite, ureteroscopy and percutaneous nephrolithotomy (PCNL) and one required cystolitholapaxy by the optical lithotrite, percutaneous nephrolithotomy, but failed ureteroscopy twice for ureteral part, and then were managed by ureterolithotomy. The 5 patients with both end encrustations were treated by cystolitholapaxy using stone crushing forceps and optical lithotrite, then percutaneous nephrolithotomy. Those 5 patients with ureteric part and bladder end were treated by cystolitholapaxy, and ureteroscopy in the same session. All our patients were given prophylactic antibiotics on induction and for 5 days after treatment.

Result

The average duration of stent remain in the urinary system was 30 months (range 6 months – 12 years). All patients were stents and stone free after 1-4 approach (ureteroscopy, percutaneous nephrolithotomy, cystolitholapaxy and open surgery) in multi sessions. Those 2 patients with bladder end encrustation required one session of cystolitholapaxy. Three patients with whole stent encrustation, two of them required one session for cystolitholapaxy and ureteroscopy then one session for PCNL, the other patient required 2 sessions for cystolitholapaxy and failed trial of ureteroscopy, session for PCNL, and then one session for ureterolithotomy. Five patients with both end encrustations required two sessions, one for cystolitholapaxy and one PCNL. In those 5 patients with ureteric part and bladder end encrustation, 3 of them were treated by one session cystolitholapaxy and ureteroscopy, the other two patients required two sessions one for cystolitholapaxy and one for ureteroscopy.

One major complication was encountered, which is small bowel loop injury through and through by PCNL tract in one of the transplanted kidney patient, because the approach was abdominal through the upper pole of the kidney and managed by immediate laparotomy and repair of bowel injury. Residual small stone in lower group calyx in

one patient, persistent urine leak from PCNL tract in 2 patients managed by JJ stent placement for 4 weeks. No impairment of renal function was recorded. All patients were stone and stents free at the end of treatment.

Discussion

JJ stents has become an important armamentarium and valuable tools in the hands of urologists. It prevents ureteral obstruction and provides direct drainage of upper urinary tract without the need for external drainage.^(15,16) However, its placement is not without any complications, stent migration, blockage, fragmentation, encrustation, knotting, renal failure and stone formation.⁽¹⁷⁻²¹⁾

The stents encrustation etiology is multifactorial, resulting from recurrent urinary tract infections, alkaline urine, calcium phosphate and struvite accumulation.⁽²³⁻²⁷⁾ chronic stone formers.^(27,28) duration of the stents and pregnancy.^(29,30) The rate of encrustation is significantly related to the duration of stenting or dwelling time.

El-Faqih and colleagues⁽³¹⁾ noted a 9.6% encrustation rate for stents remain in less than 6 weeks duration, which increased to 47.5% for those remain for 6 to 12 weeks and 76.3% for those remain more than 12 weeks of duration; therefore, many authors recommended early removal of the stents.^(7,30,31)

Successful management means achieving a stent and stone free status, with preservation of normal renal function

Encrustation of forgotten stents is the most serious complication; its management represents a challenge for urologist, and necessitates a multimodal approach.^(21,22) Few studies have introduced algorithms for management of retained indwelling ureteral stents.^(24,32,33)

Recently, endourological surgery has become the first choice in the management of severely encrusted ureteral stent. However, it should be managed only by those well trained and sufficiently advanced in endourology. Open surgery has a role when multimodal endourology fails or when such facility is not available.⁽³⁴⁻³⁷⁾ Also in the last 4 years one sitting laparoscopic and percutaneous management of a heavily encrusted DJ stent has been reported with minimal morbidity and short hospitalization.^(37,38)

In our study our plan is to use endourological procedure for extraction of the whole stents and encrustation around it, which is the case in all our

patients except one whose ureteric part of the stent and encrustation around it is filling the whole ureter, so, we were unable to advance ureteroscope up in the ureter, that is why ureterolithotomy done for him. Although surgical intervention can provide all necessary solution to deal with forgotten indwelling stents, the best treatment remains prevention. It has been reported that a period between 2 and 4 months can be considered optimal.^(10,32,39)

In our study we reported one major complication which is small bowel injury by PCNL tract in a lady with transplanted kidney, abdominal approach have been used, urgent laparotomy and simple bowel repair were done immediately.^(40,41)

In our study, diagnosis of encrustation of ureteral stents has been based only on unenhanced radiograph of the abdomen. Ultrasonography is indicated in situation where radiograph is contraindicated or fails to visualize the stents.^(8, 41-43)

Conclusion

Severe encrustation of the JJ stents requires multimodal therapy for managing this complex problem; the choice of endourological treatment depends on the location of the encrustation and burden of the encrustation. Each patient may need multiple approaches in one or multiple sessions. Open surgery may be indicated when minimally invasive procedures fail.

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