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Endourology
Case Report

The first report of 3 forgotten encrusted double J stents in the same ureter: An endourology nightmare!☆

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Double J stent (JJ stent)

Abstract
Introduction: The 'encrusted and forgotten double J ureteric stent (JJ) phenomenon has always proven to be a challenging dilemma facing the attending urologist.
Observation: Herein, we describe the first reported case of 3 encrusted stents within the same ureter, with an overall KUB score of 14 (K = 5, U = 4, B = 5). Complete (stent and stone) clearance was achieved using multiple combined, endo-urological procedures (sequentially) including; bladder stone laser lithotripsy, distal JJ stent coil resections, PCNL and prograde (flexible) ureteroscopy, followed by rigid and flexible retrograde ureteroscopy. The resulting reno-gram confirmed a 45% functioning ipsilateral system.

☆ This case was an operational display during the **Helen Joseph Hospital Stone Week 2016**, and this abstract was presented at the 34th World Congress of Endo-urology (WCE 2016), in November, Cape Town, South Africa.

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Conclusion: The first report of 3 encrusted stents within the same ureter is presented. The prevention of JJ stent encrustation is crucial via adequate and appropriate patient counselling. In most patients with forgotten encrusted stents who qualify for endoscopic management, a multi-modality approach is required.

Introduction

The 'encrusted and forgotten JJ ureteric stent' phenomenon may prove to be a challenging dilemma facing the urologist. Herein, we describe the first reported case of 3 encrusted JJ stents within the same ureter.

Case presentation

A 40 year old foreign national presented to the Emergency Department with a history of macroscopic haematuria and right-sided flank pain. He also reported having multiple interventions performed for 'some' ureteric calculi over a year ago. He had not been compliant for any of his follow-up admission dates during his therapy. He cited the urgent reason to return 'home' as his reason for defaulting treatment on his admission dates.

Imaging of three encrusted JJ stents was visualized within the same right ureter on the abdominal X-ray (Fig. 1a), with an overall KUB (kidney, ureter and bladder) score of 14 (K = 5, U = 4, B = 5) [1].

Complete (stent and stone) clearance was achieved using multiple combined, endo-urological procedures (sequentially) including; bladder stone laser lithotripsy, distal JJ stent coil resections, PCNL and prograde (flexible) ureteroscopy, followed by rigid and flexible retrograde ureteroscopy, (Fig. 2). Laser lithotripsy was performed using a Holmium Laser at various power, frequencies, and fibre sizes based on the imminent situation encountered during the various segments of the procedure.

At PCNL, multiple calyceal access points were used to assist with irrigation, injection of contrast during flouroscopy and maintain low intra renal pressures during the PCNL stone clearance procedure. It was also placed to allow the eventual possibility of multiple access points to allow for better stone clearance. Both access points were used for PCNL clearance at various settings. This was required to assist with the complete clearance of the stone burden within the renal pelvis.

After over 19 h of cumulative operative time, with 6 operative sessions, and a complete hospital stay of 21 days, total clearance was achieved via exclusive use of the endo-urological route.

Due to the history of poor patient compliance, in-patient management was performed to ensure that a complete stent and stone free state was attained, prior to discharge from hospital. This was done to avoid the possibility of a repeat defaulting admission episode.

Due to the friability of the JJ stents, fracturing occurred during the endoscopic removal (Fig. 1b). After complete (stent and stone) removal, the resulting renogram confirmed a 45% functioning ipsilateral system.

Discussion

The clinical presentation 'triad' of flank pain, haematuria and the possibility of a patient who defaulted follow up for previous endourological intervention, should alert the clinician to the possibility of a retained or encrusted JJ stent [2].

Ureteral JJ stents are a common part of urological practice, and are used for the management of upper urinary tract obstruction or to assist with the management of ureteric injuries and ureteric surgery [3].

Early complications are common but less serious, and include pain, frequency and haematuria [4]. With longer indwelling times, an additional factor that complicates stent removal is fragmentation. This occurs as a result of the inherent loss of tensile strength of the stent. This ensues secondary to degeneration of the stent polymers, found in combination with stent elasticity loss (hardening) [5]. The risk of fragmentation is dependent on the duration and material of the JJ stent utilised. The pores on the JJ stents are focal areas of inherent weakness that are prone to fragmentation, during stent removal or manipulation [6].

Stent retention is another major cause of morbidity and a significant healthcare burden [7]. Depending on the presentation, the average number of procedures needed to render these patients' stone and stent free may vary from two to six [7].

Another more sinister consideration, with encrusted and forgotten JJ stents, is the role it plays in medicolegal liability. Since, the surgeon who has inserted any medical implantable device is often considered responsible for the care and removal of such a device. This particular surgeon may also be held responsible for any complications that may arise from the stent itself [8].

Risk factors for stent encrustation are multifactorial, but include; urinary sepsis, known presence of stone disease, chronic renal impairment, metabolic disturbances, concurrent use of chemotherapy and pregnancy [6].

The indwelling time is of immense importance, as this preventable factor may be due to poor patient compliance or poor patient counselling [9].

Fig. 1 (A) Plain abdominal X-ray (KUB) illustrating the stone burden, 3 encrusted stents, with an overall KUB Score of 14 (K = 5, U = 4, B = 5). (B) The end result, depicting the 3 encrusted, fractured stents removed.

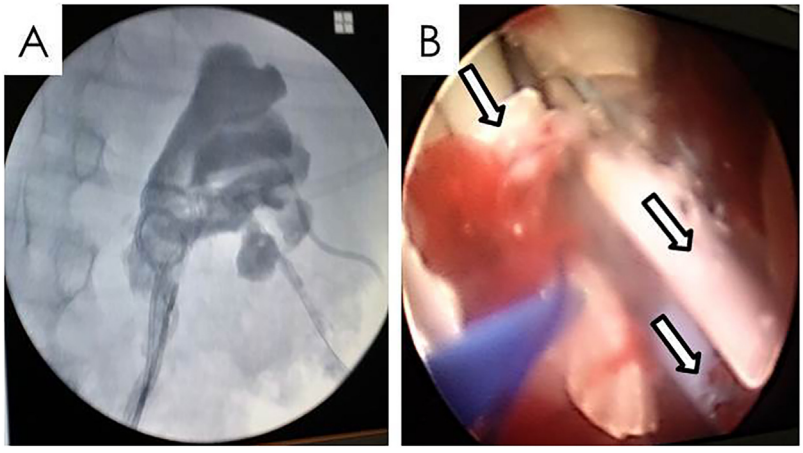

Fig. 2 (A) Multiple access punctures performed at PCNL. The 'hazy' contrast outline within the renal pelvis depicting the pelvicalyceal stone burden. (B) Endoscopic view of the PUJ during PCNL, the 3 encrusted stents are visualised [arrows depicting the individual JJ stents].

Patients who experience very little stent related symptoms or have a poor understanding that the stent is the origin of their symptoms are less likely to follow up and thus less likely to request removal [10].

Despite repeated counselling though, a recent review reported that 10% of patients with retained stents still did not attend planned surgical removal and were lost to follow up [11]. This factor underscores the need for an adequate translation service at the major centralized hospitals.

The endo-urological approach in this case was complex and prolonged as predicted by the underlying calculated **KUB Score of 14** (K = 5, U = 4, B = 5). This finding is further supported by published data, which revealed that a KUB score greater than 9 was associated with an operative time longer than 180 min, multiple surgeries and a lower stone free rate [1]. The laser endo-urological procedures were very time consuming, as this was needed for clearance of the extensive ureteric stone burden. Further, the positioning, draping, cleaning times were all included within the 'operative theatre time' collated. Three to four days were also allowed for recuperation during subsequent operations during the index case management.

Newer methods utilized in the prevention of the "forgotten stent phenomenon" include computerized programs that alert the attending physicians to allow for timeous removal [12]. Another innovative idea is the use of the "Stent Tracker", a smart phone application, which has successfully been proven to decrease the retained stent incidence in a recent pilot study reviewing 194 patients [13].

Scoring systems and Algorithms have been developed for the management and predictability of clearance of retained JJ stents. This may include an initial assessment of the KUB X-ray or assessment for renal dysfunction and sepsis [1,9].

Depending on the location of the encrustation and degree of stone burden the patient may require any combination of endoscopic procedures, open surgery or chemolysis [6].

Further, we have shown the benefit of a second outflow tract at PCNL, in patients with severely obstructed PUJ segments. This is used to facilitate multiple calyceal access points if needed and used mainly to assist with irrigation, injection of contrast during flouroscopy and maintain low intra renal pressures during the PCNL stone clearance procedure (as described in this index case). This technique can be helpful in cases where there is a large stone burden or an acquired renal pelvi-ureteric junction obstruction that does not allow for an adequate outflow of irrigation during the PCNL procedure, while using a Mini-Perc or during certain cases utilizing the standard sheath. This outflow tract also allows for better endoscopic visibility, less bleeding and is less time consuming as the suctioning requirements are significantly lessened. The limitation of this additional tract, may result in more bleeding if not correctly accessed, and the resulting pain may be more since another tract is present.

Although outflow obstruction is not a contra-indication to PCNL, in cases where clearance of the outflow obstruction at the PUJ is not possible, or visualization and bleeding is excessive, a separate channel at PCNL can assist to achieve upper tract clearance.

Until the reality of reliable biodegradable JJ stents become available for use in everyday clinical practice, adequate and appropriate patient counselling remains crucial to prevent the 'encrusted and forgotten stent' phenomenon.

Newer scores and modalities have proven beneficial in the management of this debilitating condition [1,12,13]. Most patients with forgotten encrusted stents who qualify for endoscopic management, may warrant multiple procedures, with a combined, multi-modality approach.

Ethical committee approval/clearance

Certified at the Human Research Ethics Committee—18 April 2016.

University of the Witwatersrand, Johannesburg, South Africa.

Clearance certificate number: M160395.

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Chairman (HREC Medical): Professor Peter Cleaton-Jones.

Authors' contributions

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Consent from the patient

Attained.

Conflict of interest

None.

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