A novel approach for removing an intra-renal migrated Memokath™ stent

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ABSTRACT

INTRODUCTION: The use of metallic stents in managing benign and malignant ureteric strictures is gaining increasing popularity in urology and has been shown to be a safe and effective alternative to the commonly used double J stents.

PRESENTATION OF CASE: We present here the case of a 54 year old female with a symptomatic benign ureteric narrowing at the pelvi-ureteric junction of her left kidney who was successfully managed with a metallic Memokath™ stent inserted at the site of the stricture. She went on to develop a rare complication of proximal migration of the stent into the kidney necessitating removal.

DISCUSSION: Our study systematically reviews the published evidence for the clinical effectiveness of metallic ureteric stents in stricture management and details a novel and safe approach that was successfully used to remove the intra-renal migrated stent in an antegrade percutaneous fashion.

CONCLUSION: Our report highlights a rare complication of metallic ureteric stents and a novel approach to their removal. This has significant importance for the urologist managing an awkwardly positioned stent lying within the kidney and hence difficult to manipulate via the previously published retrograde approaches.

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1. Introduction

Ureteric stents have been commonly used in the management of ureteric strictures due to benign or malignant disease. Novel long-term indwelling metallic ureteric stents, such as the Memokath™ could potentially revolutionise stricture management and have been shown to be a safe and effective minimally invasive alternative to the routinely used double J stents.1–3 The Memokath™ stent is a thermo-expandable nickel-titanium stent, formed into a tight spiral to enable easy adaption to the natural ureteric curvature whilst limiting urothelial ingrowth and outward pressure. This enables preservation of ureteric peristalsis (commonly affected by double J stents) and reduces risks of ischaemic damage.2 The Memokath™ is also better tolerated by patients.3 Given that the use of these stents are in their relative infancy in urology, knowledge of the potential complications and methods of addressing these are of paramount importance to practising urologists considering using them in their clinical practice. This case highlights a rare complication of these metallic stents and details a novel approach to dealing with this.

2. Presentation of case

A 54 year old caucasian female with a longstanding history of recurrent urinary tract infections and left upper abdominal pain had a CT performed which suggested a 2 mm lower pole left renal calculus. A subsequent flexible ureteroscopy showed no evidence of a stone or lesion. Her symptoms of severe left loin pain, associated with renal angle “pressure”, persisted and a left retrograde contrast study confirmed slow drainage of contrast at the pelvi-ureteric junction (PUJ). A repeat flexible ureteroscopy suggested the possibility of a ureteric narrowing at this level. As her renal function remained stable and a MAG3 renogram demonstrated reasonable excretion with a split function of 53% (left) and 47% (right), her condition was not critical enough to warrant any surgical repair such as a pyeloplasty. She herself was also not keen to undergo any surgical repair and preferred a more conservative approach to dealing with her symptoms. She was therefore managed with indwelling ureteric stents which successfully controlled her symptoms and repeated infections. Given the long-term desire to avoid the need for repeated stent changes under general anaesthetic, as well as the significant stent morbidity this patient encountered due to irritative bladder symptoms, a metal ureteric Memokath™ stent was inserted in the position of the ureteric narrowing at the left PUJ, confirmed intra-operatively by fluoroscopy (Fig. 1). She initially

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responded well, however, she re-presented 3 months later with severe pain and an abdominal X-ray confirmed proximal migration of the Memokath™ up the ureter into the middle calyx of the left kidney (Fig. 2) which would require removal.

At the time of operative removal, a left retrograde contrast study confirmed Memokath™ migration, however the position within the kidney had altered with the stent now lying obliquely in the lower calyx of the left kidney. Retrograde removal of the stent via ureteroscopic approaches, especially directly through the narrowed ureteric portion, was felt unlikely to be successful with a high risk of ureteric/renal trauma as stent manipulation could result in thermo-expansion and, given the awkward position of the stent, would further exacerbate the difficulty in stent retrieval. The

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**Fig. 1.** Image intensifier showing the correct placement of the Memokath at the left PUJ narrowing.

**Fig. 2.** Abdominal X-ray showing migration of the Memokath™ stent into the middle calyx of the left kidney.

**Fig. 3.** (A) Needle puncture into the lower calyx of the left kidney to directly access the migrated Memokath™ stent. (B) Image post stent removal and insertion of an antegrade ureteric stent via the access sheath inserted into the lower calyx. (C) Image of the removed Memokath™ stent.
patient was then repositioned into a semi-prone position and a needle was inserted directly into the lower pole calyx of the left kidney under X-ray guidance (Fig. 3A). A guidewire was inserted through the needle and a percutaneous tract was created directly onto the migrated Memokath® with balloon dilatation and insertion of an Amplatz sheath. The Memokath® was removed under direct vision, with graspers, through the sheath and an antegrade 6 Fr 24 cm ureteric stent was inserted to prevent ureteric obstruction and a temporary Malecot nephrostomy replaced the percutaneous sheath (Fig. 3B and C). Post operatively, the patient progressed well and the nephrostomy was successfully removed and the patient went home without complication.

3. Discussion

A number of studies have published institutional experiences of the Memokath® in managing ureteric strictures, however these were often in small cohorts.6–8 Stent migration was a recognised complication and generally occurred distal to the stricture. Agrawal et al. found that PUJ strictures had a higher migration rate (2/3) when compared to strictures overall (18/74) but the sample size was too small to draw statistically significant conclusions regarding possible predictive factors for migration.9 Proximal migration is an unusual complication however, as this would result in movement of the stent against the natural peristalsis of the ureter. Papadopoulos et al. reported one intra-renal migration in their 13 patient case series1 and Papatsoris et al. found only 2 retrograde migrations in their experience of inserting 55 Memokaths, with the single intra-renal migrated stent removed by flexible ureteroscopy.10 Intra-renal migration poses a dilemma for the operating surgeon as manipulation of the stent can be difficult and result in thermo-expansion leading to potential ureteric and renal damage. Siddique et al. provided the only detailed description to date of a technique to successfully remove an intra-renal migrated Memokath® stent.10 They performed this in a retrograde fashion, via a flexible ureteroscope, using a guidewire and a balloon catheter which were manipulated within the stent, inflating the balloon to secure the stent for withdrawal and using cold water through the catheter to avoid stent expansion.

We present here a novel and safe approach to remove an intra-renal migrated stent in an antegrade percutaneous fashion, which would have significant importance for the urologist managing an awkwardly positioned stent lying within the kidney and hence difficult to manipulate via the previously published retrograde approaches.

4. Conclusion

This case report highlights:

- The potential for metallic stents in the successful long-term management of ureteric strictures
- The need for further larger scale studies to be conducted to assess the long term efficacy of metallic ureteric stents and identify potential predictive factors for stent migration to enable optimal patient selection
- A rare complication of proximal migration of a metallic ureteric stent
- A novel and safe technique to remove an intra-renal migrated ureteric stent

Conflict of interest

The authors have no conflicts of interest to disclose.

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None.

Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Authors’ contributions

N.K. and A.D.S. were involved in the case described. N.K. was responsible for obtaining patient consent, image collection, literature review and drafting of the manuscript. A.D.S. was responsible for the supervision and revision of the manuscript.

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