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## Case Report

# Early encrustation of a ureteric metallic stent managed by robotic assisted extraction and pyeloplasty ☆,☆☆

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## ABSTRACT

Ureteral obstruction is a commonly encountered condition during daily practice. The mainstay of treatment for ureteral obstruction is drainage and relief of the obstruction, regardless of the etiology. Drainage using the traditional ureteral Double J stent has been recently challenged with new ureteric stent that proposed to have better durability and patient quality of life, particularly in cases that require prolonged insertion. One of these options are the ureteric metallic stents, such as Memokath, although uncommon, encrustation of Memkath can occur, leading to early removal. Here we present a case of 28-year-old gentleman with recurrent right pelviureteric junction obstruction, who had undergone pyeloplasty in childhood, The patient was hesitant to undergo redo pyeloplasty and opted for balloon dilatation with Memokath insertion. however early encrustation occurred leading to worsening of the condition and pain, and he was subsequently managed with robotic assisted laparoscopic Memokath extraction and dismembered pyeloplasty.

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## Introduction

A ureteric stricture refers to a narrowing of the ureteric lumen, this narrowing can lead to obstruction of the urine flow. The etiology of ureteric stricture encompasses both internal

and external causes [1]. The critical determinants affecting the management of strictures are their type, severity, duration, and location. Dealing with recurrent strictures following prior surgical intervention is exceptionally challenging [2]. Reoperating on a previously operated ureter is highly demanding due to the disturbed anatomy, which significantly

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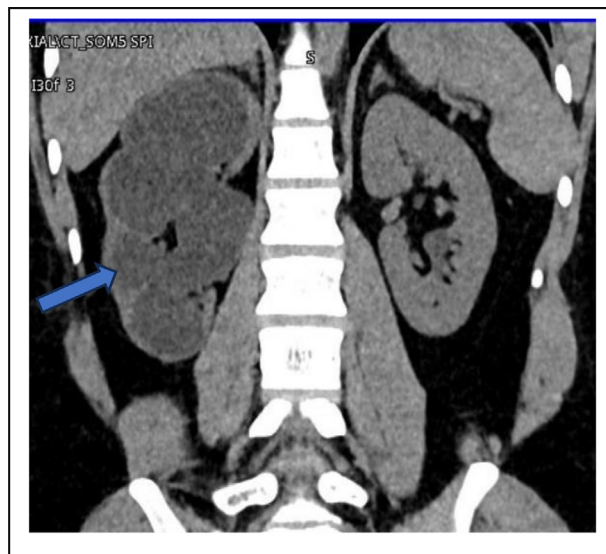
increases the risk of complications [3]. Even though these operations are now the most effective ways to relieve strictures, recurrent ureteral strictures will always be a problem [4]. Furthermore, surgical ureteroplasty for recurring ureteral strictures may be technically challenging and carry a significant risk of complication. Percutaneous nephrostomy tubes or double-J stents are widely used to drain the kidney and bypass the stricture. However, too many complications are associated with these 2 modalities, furthermore, they need to be replaced regularly [5]. hence metallic stents like Memokath merged to overcome the limitation of the regular double J stent and the associated complications of stricture surgical management. To treat benign and malignant ureteric strictures that are not intended for a definitive surgical intervention or those unwilling to have invasive procedures, the Memokath technology is a viable option. The superior long-term results and increased comfort with the ability to stand for extended periods up to years, without the common side effects of the standard double J stent, such as migration, irritation, and encrustation make Memokath ureteral stents a better alternative to traditional double J ureteral stents [6–8]. Here we present a case of an early encrustation of Memokath in a 28-year-old gentleman with recurrent ureteropelvic obstruction who was reluctant for definitive surgical management. Treated initially with Memokath insertion, unfortunately, Encrustation of the Memokath stent occurred within the first 6 months of its placement resulting in deterioration of obstructive uropathy. The encrusted Memokath stent was managed by robotic-assisted laparoscopic extraction followed by dismembered pyeloplasty.

## Case presentation

A 28-year-old gentleman presented complaining of recurrent dull, aching, intermittent right loin pain for several months. had no history of fever, lower urinary tract symptoms, or nephrolithiasis. He had a history of open pyeloplasty in 2005, when he was 10 years old, for right pelviureteric junction obstruction. A clinical examination showed mild tenderness in the right loin area and a scar from the previous surgery. Investigations showed normal urea and creatinine. Radiological evaluation, initially CT with contrast, showed severe right pelvicalyceal dilatation with an abrupt cut of contrast at the pelviureteric junction (PUJ) with no ureteral dilatation (Fig. 1). The renogram Tc-99-MAG3, showed right side hydronephrosis, with a split renal function of the right kidney of 28%, with an obstructive pattern showing decreased radiotracer uptake in a thinned-out renal cortex in addition to delayed excretion of the tracer that accumulates in a dilated collecting system even after Lasix injection (Fig. 2). That confirms obstruction at the PUJ level.

While the patient was reluctant to go for redo-pyeloplasty the option of short versus long-term ureteric stenting was discussed with the patient who opted for balloon dilatation and insertion of Memokath metallic stent to overcome the obstruction at the level of right PUJ.

Patient underwent cystoscopy, Balloon Dilatation of right PUJ followed by insertion of Ureteral Memokath metallic stent,



**Fig. 1 – CT showing sever right side hydronephrosis (blue arrow).**

a 30 mm long double coned stent was used (Fig. 3), the patient was discharged from the hospital in good condition,

Upon follow-up 3 months after Memoakth insertion patient reported no loin pain, ultrasound showed right side renal hydronephrosis and cortical thinning. Stent visualized at the region of the right pelviureteric junction.

The left kidney was normal in size and echogenicity (Fig. 4).

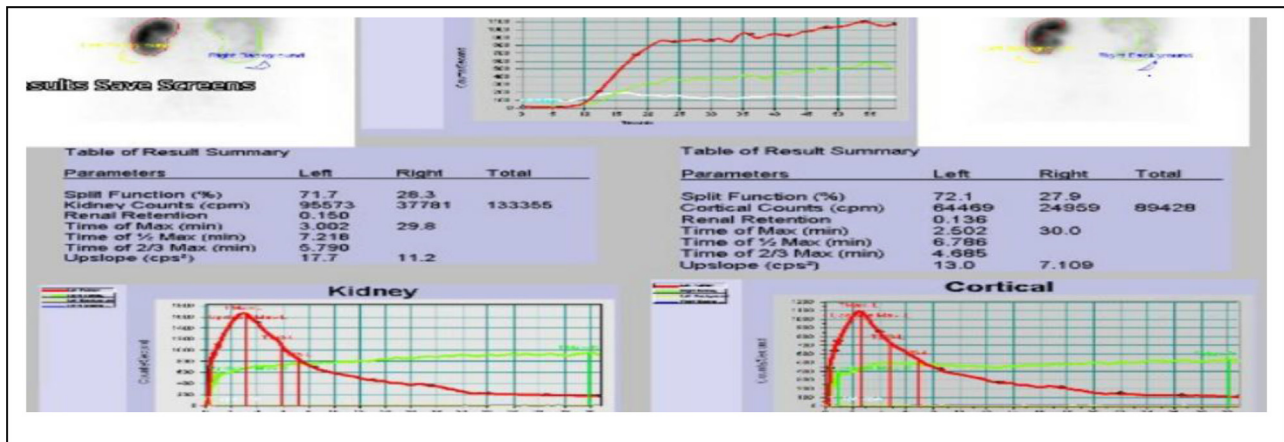
A follow-up renogram 6 months after the insertion of Memokath showed a delayed excretion of the right kidney with split function of 21.4%. As the patient was complaining of loin pain along with features of obstruction on the renogram, the decision was for robotic- assisted laparoscopic removal of Memokath followed by right robotic pyeloplasty.

During the robotic-assisted laparoscopic Memokath extraction, the PUJ was found to be surrounded by severe adhesion. After dissecting the adhesions and tracing the ureter up to the PUJ (Fig. 5), transection of the ureter revealed that although the Memokath was in place, it was encrusted and obstructed internally. The Memokath was extracted, followed by dismembered pyeloplasty.

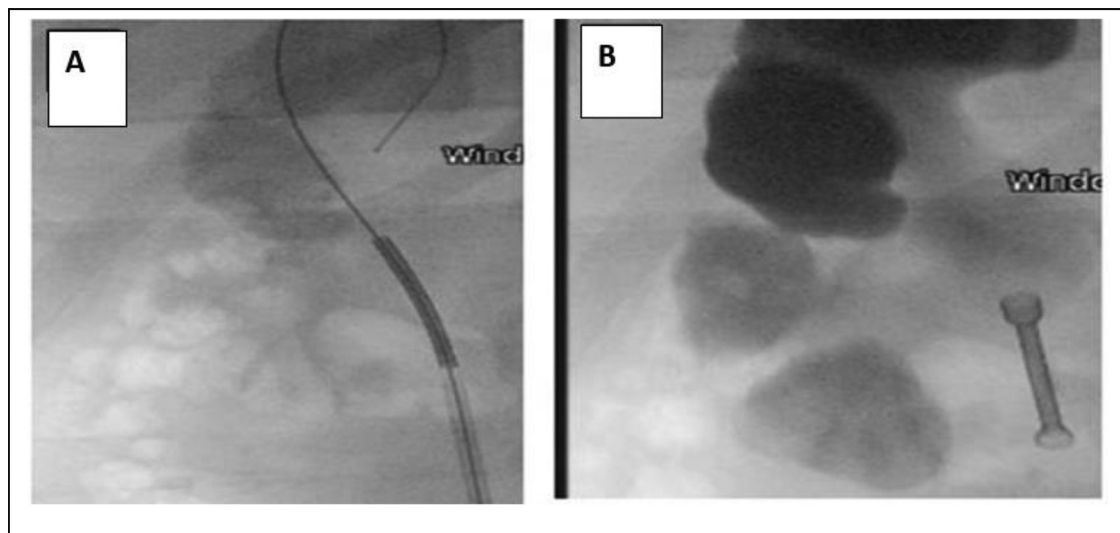
Upon follow-up, the patient had no complaints, and a renogram performed one year after stent extraction and pyeloplasty showed no obstruction, with stable right renal function, showing a 25% split renal function of the right kidney.

## Discussion

The surgical option for the management of ureteric strictures can has a wide variety of approaches ranging from open to Minimally invasive techniques such as laparoscopic intervention and robotic-assisted, and endoscopic management, On the other hand, the management of recurrent ureteric



**Fig. 2 – Renogram showed: prolonged parenchymal transit time in thinned-out cortex and delayed excretion with additive tracer accumulation in its dilated collecting system of the right kidney.**



**Fig. 3 – (A) Balloon dilatation of the right PUJ stricture, (B) double coned Memokath at the level of right PUJ.**

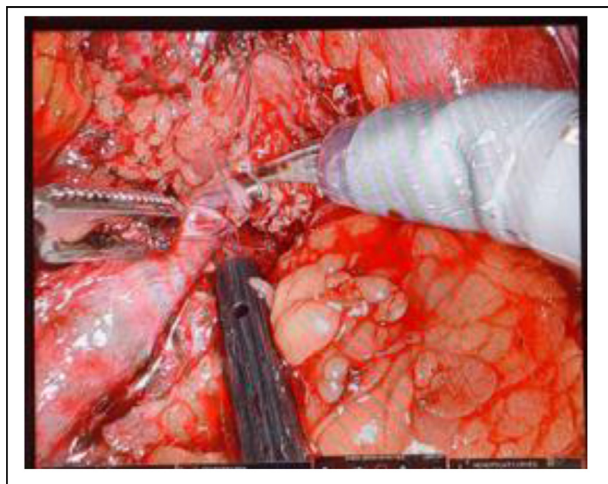


**Fig. 4 – Follow up ultrasound 3 months after Memokath insertion showing right side hydronephrosis with Memokath stent in place.**

obstruction is challenging and demanding and carries significant risk of morbidity and failure with need for retreatment [9], nevertheless, the minimally invasive methods are becoming more viable in recurrent strictures and PUJ obstruction [10]. On the other hand, for those unable, unwilling, or unsuitable to tolerate those invasive procedures, metallic stents like Memokath is an alternative option in such situations with better durability and safety profile and less need for replacement in comparison to the conventional double J stent [6].

The Memokath stent is a thermally expandable stent built from a single biocompatible nickel-titanium alloy wire that spirals to produce the funnel-shaped stent. The stent is inserted endoscopically near the site of the stricture, dilated and opened with warm water at 55°C, and then removed with cold water. At 10°C, the stent softened and could be safely extracted [7]. Four different types of memokath 051 are in use (single or double cone for either antegrade or retrograde stenting) each





**Fig. 5 – Dissecting the adhesion around the PUJ and the Memokath.**

with a unique length, the available lengths in the market are 3, 6, 10, 15, and 20 cm [11].

According to experts' opinion, double-J stents are designed to stay in the ureter for up to 6 months without the need for exchange, or removal while metallic stents can remain in the ureter from 12 months to 3 years. The Memokath 051 stent, which has been in use since 1996, showed patency rates ranging from 82% to 100% but has also been associated with substantial migration rates (10.8–17.4%). It has been noticed that the quality of life improves in cases of both benign and malignant ureteric strictures [12–14].

Agrawal. S conducted a study with the longest follow-up on Memokath 051 stent cases, involving 74 patients with ureteric stents only 2 of the 74 stented ureters (3.7%) had stent occlusion due to encrustations [15]. A history of stones or hypercalciuria has been demonstrated to increase the risk of stent encrustation [16].

In our case, the Memokath stent exhibited early encrustation shortly after insertion, contradicting its anticipated long-term patency. This outcome highlights the need for caution in substituting Memokath and other metallic stents for ureteric strictures in place of the gold-standard reconstructive surgery. Such stents should be reserved for carefully selected cases to mitigate adverse outcomes and the necessity for subsequent surgical intervention, which the Memokath stent was originally intended to avoid. Also, more reporting of complications of using metallic stent in ureteral stricture will aid in patients counseling, follow up and selection.

## Conclusion

Although the use of metallic stents, such as Memokath, is a viable option for patients with ureteral strictures, complications like early encrustation, as observed in our case, underscore the importance of regular follow-up. These findings suggest that the use of such stents should be limited to cases where recon-

structive surgery is either declined by the patient or deemed unfeasible.

## Ethical statement

This case has been reviewed and approved by the Institutional Review Board (IRB) under approval number MRC-04-24-443 ensuring adherence to ethical guidelines and participant safety protocols.

## Patient consent

Consent for publication was taken from patient according to institution policy.

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