Metal Ureteral Stent for Benign and Malignant Ureteral Obstruction

Aaron D. Benson, Eric R. Taylor and Bradley F. Schwartz*

From the Division of Urology, Southern Illinois University School of Medicine, Springfield, Illinois

Purpose: Metal ureteral stents are a relatively new version of a device with a long history of relieving ureteral obstruction. Metal stents are effective for relieving ureteral obstruction but success regarding patient tolerability has been variable. We present our single institution experience with long-term metal ureteral stent placement.

Materials and Methods: The charts of patients undergoing metal ureteral stent placement for chronic ureteral obstruction were reviewed. Data collected included patient age, gender, diagnosis/cause of obstruction, laterality, duration of indwelling metal stent, number of routine metal stent changes, complications and early discontinuations or stent changes.

Results: A total of 23 patients underwent placement of metal ureteral stents between February 2008 and September 2010. Bilateral stents were placed in 5 patients and 9 underwent a yearly metal stent exchange for a total of 42 ureteral units treated with metal ureteral stents. All metal stents were placed to relieve ureteral obstruction due to ureteral stricture, ureteropelvic junction obstruction, retroperitoneal fibrosis or extrinsic malignant obstruction. There were 3 metal stent failures in 2 patients with malignant ureteral obstruction. There were no complications, or early discontinuations or changes due to adverse symptoms, patient dissatisfaction, worsening renal function or progressive hydronephrosis.

Conclusions: Metal ureteral stents are effective for benign and malignant ureteral obstruction in the absence of urolithiasis. Good tolerability and annual stent exchange make metal stents an appealing alternative for patients with chronic ureteral obstruction treated with indwelling ureteral stents.

Key Words: metals, stents, ureteral obstruction

Abbreviations and Acronyms

MUO = malignant ureteral obstruction

PCN = percutaneous nephrostomy

UPJ = ureteropelvic junction

UU = ureteral unit

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* Correspondence: Division of Urology, Southern Illinois University School of Medicine, PO Box 19665, Springfield, Illinois 62794-9665 (telephone: 217-545-7362; FAX: 217-545-7305; e-mail: bschwartz@siumed.edu).

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Ureteral stents have long been used for the management of ureteral obstruction of various causes. Silicone or plastic ureteral stents are the most commonly used ureteral stents owing to familiarity and ease of use. Despite the advantages, these standard ureteral stents have demonstrated relatively high failure rates in the management of chronic ureteral obstruction, especially in cases of advanced pelvic malignancy or retroperitoneal metastases.[1–3] The failure of these pliable stents in long-term and potentially progressive ureteral obstruction may be due to compressibility and the propensity for encrustation. The risk of stent encrustation due to long stent dwell time[4] also occurs with certain causes of nonmalignant or intrinsic ureteral obstruction requiring chronic indwelling ureteral stents such as UPJ obstruction or recurrent/refractory ureteral stricture.

Subsequently various stent designs have been developed, including metal

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or spiral coiled ureteral stents. The metal Resonance® stent has gained notoriety since it was first reported to relieve ureteral obstruction caused by metastatic breast cancer and retroperitoneal fibrosis.[5] Since this introductory report this metal ureteral stent design has demonstrated relative success in treating chronic ureteral obstruction compared to polymer stents.[6,7] However, more rigid metal ureteral stents may lead to more bothersome lower urinary tract symptoms such as pain, dysuria and gross hematuria.[8,9] Poor tolerability may lead to early removal and more procedures (eg polymer stent changes) to treat the chronic obstruction. Without bothersome symptoms the Resonance stent has the potential to decrease significantly the number of procedures required for the treatment of chronic ureteral obstruction. We present our experience with metal ureteral stents for the treatment of chronic ureteral obstruction of various etiologies.

MATERIALS AND METHODS

The records of 23 consecutive patients who underwent initial metal ureteral stent placement from February 2008 through September 2010 were reviewed. All stents placed were metal Resonance ureteral stents. All patients were preoperatively evaluated with a history, physical examination and imaging including excretory urography, computerized tomography, retrograde pyelography or nuclear renography that demonstrated chronic unilateral or bilateral obstruction. Each patient had previously undergone a minimum of 1 polymer ureteral stent placement requiring anticipated removal or exchange within 3 or 4 months. Patients were thoroughly counseled on treatment options for chronic ureteral obstruction which included metal stent placement. Metal ureteral stent placement was not offered to patients with ureteral obstruction secondary to urolithiasis. Balloon dilation of ureteral stricture was not required or performed in any patient for metal stent placement. Patients who tolerated the stents and had continued resolution of hydronephrosis underwent scheduled stent exchanges annually.

Data from these clinical interactions were then prospectively collected and analyzed, and included patient age, diagnosis, laterality, stent size/length, current status with or without the stent, number of stent exchanges, length of followup, complications and premature discontinuations. Patients continuing with the metal stent exchanges or who died of their disease with the stent without complication were considered successes, while stent related complications, defined as premature removal or symptoms refractory to oral medications, were considered failures.

Metal ureteral stent placement was performed in a retrograde fashion in all patients. A retrograde pyelogram was performed to assess the ureteral obstruction and ureteral length. Since the ends of the metal Resonance stent are not patent, it must be placed through a supplied sheath, which was placed over the guidewire under fluoroscopic guidance. The guidewire was then withdrawn and the metal ureteral stent was pushed through the sheath after choosing the appropriate length based on estimated ureteral length from the retrograde pyelogram or based on the length of the polymer stent that was removed. Under fluoroscopy the metal stent was pushed through the sheath until it curled within the renal pelvis proximally. The sheath was then withdrawn over the pusher using the Seldinger technique, thereby leaving the metal stent in place. The cystoscope was used to confirm a curl of the distal aspect of the stent within the bladder. Retrograde pyelogram images before and after stent placement are shown in figures 1 and 2, respectively.

RESULTS

Between February 2008 and September 2010 a total of 23 patients underwent placement of the metal Resonance ureteral stent for chronic ureteral obstruction. Bilateral ureteral stents were placed in 5 (22%) patients and 9 (39%) underwent ureteral stent change after 1 year. One patient underwent 2 annual metal ureteral stent changes. A total of 42 UUs were managed with metal ureteral stent placement. In 2 patients with malignant ureteral obstruction a metal stent was placed in each for nearly 12 months before they died of disease with the stent in place. In 1 patient a metal stent was in place for 23 months before muscle invasive urothelial carcinoma of the bladder developed and was managed with radical cystectomy. One patient with metal stent placement for symptomatic left UPJ obstruction and another

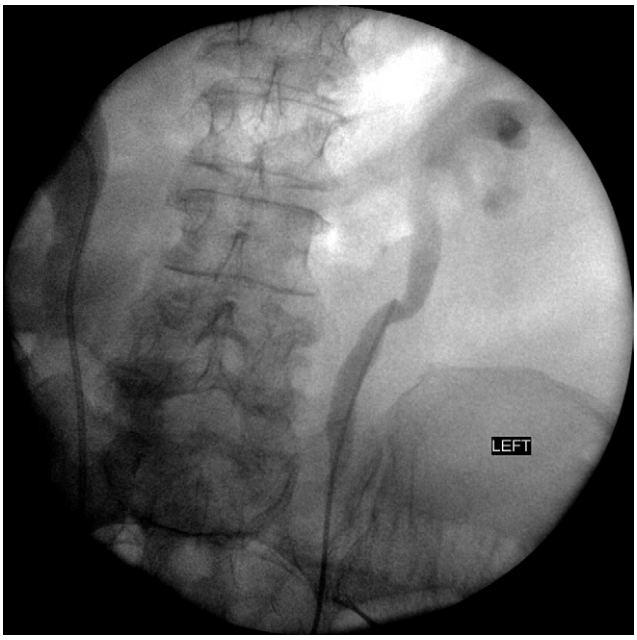

Figure 1. Left retrograde pyelogram before metal stent placement demonstrating renal collecting system and ureteral dilation extending down to area of narrowing in distal ureter. Ureteral access catheter is present within ureter.

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