

## Case Report

# Colonic Migration of a Nephroureteral Stent Through a Colovesical Fistula

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### Abstract

#### Description

We describe a case of a patient with a two-year history of prostate cancer who underwent placement of nephroureteral stents. He subsequently presented to the hospital with complications from prolonged retention of the stents, which ultimately lead to a secondary diagnosis of adenocarcinoma of the rectum. A colonoscopy performed approximately two weeks after a bilateral nephroureteral tube exchange demonstrated what was believed to be locoregional metastatic disease and a fistulous connection with the distal nephroureteral stents. Radiographic features of this complication are discussed together with proper management and possible complications of distal nephroureteral stents. Both nephroureteral stents were explanted, and nephrostomy catheters were sequentially replaced to allow for healing of the fistula.

#### Keywords

stent; stents/adverse effects; ureteral stents; nephroureteral stent; ureter; urinary fistula; ureterocolic fistula; colovesical fistula; complications

Author affiliations are listed at the end of this article.

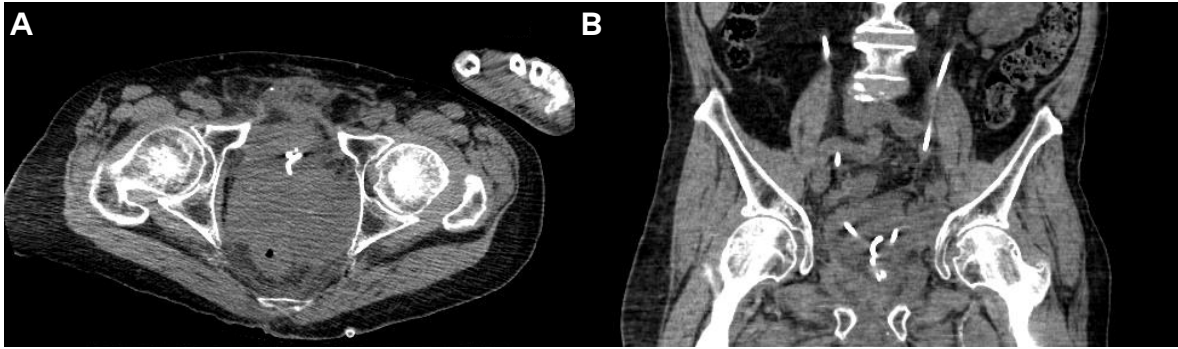
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## Introduction

Nephroureteral stents were first developed in the 1960s and play a fundamental role in urological focused medicine. They are one of the most commonly used urological devices today and allow for the creation of ureteral patency and drainage of the urinary system.<sup>1</sup> Although beneficial to patient care, stents are not without their risks or adverse reactions. These complications include urinary tract infections, malposition, migration, inadequate relief of obstruction, encrustation, stent fracture, urethral erosion or fistulization, prolonged retention of stents due to neglect or oversight, hematuria and pain.<sup>2</sup> Risk factors are associated with symptoms of bladder irritation and inflammation and occur in up to 80% of patients.<sup>2</sup> The complication risk increases with prolonged stenting.<sup>3</sup> Rare cases of ureterocolic fistulae have occurred in the older polyethylene<sup>4</sup> and self-expandable ureteral stents.<sup>5</sup> We present a case of an older male with chronic ureteral obstruction requiring long-term diversion with bilateral nephroureteral stents who developed a colovesical fistula.

## Case Presentation

The patient is a 77-year-old Hispanic male with a history of prostate cancer status post prostatectomy, which was followed by cycles of chemoradiotherapy and adjuvant bilateral nephroureteral stent and nephrostomy placement for obstructive uropathy. He presented approximately two years after multimodal therapy with hematochezia, foul-smelling, brown-colored urine and pneumaturia. Laboratory and physical work revealed the patient had an elevated white count and met sepsis criteria. Blood cultures were obtained revealing bacteremia for which the patient was treated with empiric antibiotic therapy. An imaging workup, including a non-contrasted CT of the abdomen and pelvis, demonstrated a large pelvic mass involving the urinary bladder closely associated with the distal nephroureteral stents. (**Figure 1**) An immediate colonoscopy was delayed, and, in the interim, the patient received an uncomplicated scheduled nephroureteral stent replacement under direct fluoroscopy with two 8 French 24 cm catheters. A subsequent colonoscopy performed approximately two weeks after



**Figure 1.** CT demonstrated a large pelvis mass involving the rectum and urinary bladder that enveloped the distal nephroureteral stents.

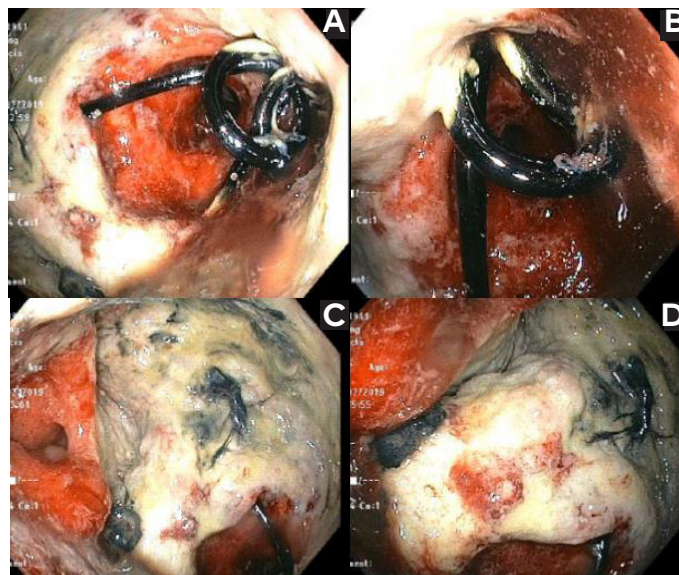
the bilateral nephroureteral tube exchange demonstrated what was believed to be locoregional metastatic disease and a fistulous connection with the distal nephroureteral stent. (**Figure 2**) The fistulous connection posed a clear risk for urosepsis and the interventional radiology service was consulted for the replacement of the nephroureteral stents. Histologic evaluation of the pelvis mass confirmed rectal adenocarcinoma with aggressive local spread.

A subsequent nephrostogram was concerning for enteral contrast, and both nephroureteral stents were explanted. The nephrostomy catheters were sequentially replaced, which allowed the collecting system to be drained and for the fistula to remain relatively dry as well as to heal. Due to advanced locoregional disease involving the rectum and distal ureters,

no further palliative care was considered, and the patient entered hospice care.

### Discussion

We describe a case of a patient who required adjuvant stent placement after multimodal therapy for prostate cancer who subsequently presented with locally invasive adenocarcinoma of the rectum. The underlying pathophysiology of the migration can be debated. However, it is likely that enteral and subsequent ureteral wall compromise by local carcinomatous invasion was the precipitating factor for stent migration. It is unlikely that this migration was an immediate iatrogenic complication as the patient's symptoms of hematochezia predated the most recent stent placement by three months.



**Figure 2.** A fungating, infiltrative and ulcerated non-obstructing large mass was found in the rectum that proved on pathology to be a rectal adenocarcinoma. A large fistula, from the bladder with nephroureteral stents protruding through, was found in the rectum.

Nephroureteral stents are widely used within interventional radiology and urological medicine to treat urinary system obstructions, whether from obstructive urolithiasis, anatomical variants, inflammation, infection or malignancy.<sup>6</sup> They are often placed as a first-line treatment in patients with such obstructions and when presenting with hydronephrosis, pyelonephritis or renal injury.<sup>6</sup> The procedures are often quick and have been shown to be effective in relieving symptoms but also in preventing further renal damage.<sup>7</sup> These stents have also been utilized in patients with chronic renal conditions that need long-term drainage. Within this particular group of patients complications increase in magnitude and frequency.<sup>7</sup>

Most complications of nephroureteral stents are benign and range from mild hematuria to urinary tract infection to bladder irritation.<sup>2</sup> However, in select patient groups, the complications can become far more serious. These groups most often consist of patients with the long-term need for stent drainage or where stents were forgotten. Studies have shown that nearly 50% of these stents are left in place for over three months with some being forgotten for years or lost to follow-up.<sup>8</sup> These patients also tend to have many comorbidities that make them even more susceptible to complications such as in the case of our patient.

One of the most dangerous complications found with nephroureteral stents is fistula formation. These fistulas can form almost anywhere and are a direct result of inflammation caused by long-term stent placement and/or other comorbidities increasing the rate of fistula formation.<sup>9</sup> Fistulas have been reported to form between the ureters and bladder as well as the iliac arteries, uterus, vagina and even subcutaneously.<sup>10</sup> These fistulas often result in many complications, can cause harm and even prove fatal in certain patients.<sup>10</sup> No reported enterovesical fistulas have been reported to date. In our patient, a fistula formed between the colon and bladder, resulting in pyelonephritis, sepsis and serious, near-fatal illness.

It has been shown that there is no significant negative effect in removing nephroureteral stents as early as possible in patients with resolving clinical symptoms.<sup>11</sup> However, prolonged stenting results in an increase in complica-

tions.<sup>8</sup> Therefore, it is important we monitor our patients with nephroureteral stents and ensure proper follow-up, early detection of complications and timely stent removal to avoid significant morbidity or complications within this patient population.

## Conclusion

While nephroureteral stents are an invaluable resource for the treatment of genitourinary disease, complications related to their placement and management can adversely affect patient morbidity and mortality. Understanding these inherent potential complications improves the clinician's ability to manage and educate these patients.

## Conflicts of Interest

The authors declare they have no conflicts of interest.

The authors are employees of Aventura Hospital and Medical Center, a hospital affiliated with the journal's publisher.

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