



Unintentional ipsilateral ureteral cannulation causing bilateral obstructive uropathy and azotemia in multiple sclerosis

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ABSTRACT

Lower ureteral obstruction secondary to a misplaced or migratory suprapubic or transurethral Foley catheter is a rare event. We recently encountered recurrent lower right ureteral transurethral Foley catheter misplacement causing abdominal pain, worsening azotemia and sequential bilateral obstructive uropathy. Notably, on both occasions, in May 2016 and again in October 2016, initial interpretations of the CT scan of the abdomen missed the diagnosis. We submit that in patients with shrunken neurogenic bladders together with dilated lower ureters (hydroureters), such as in patients with multiple sclerosis and spinal cord injury, there is a need for a more cautious approach in the placement of both transurethral and suprapubic Foley catheters.

Implication for health policy/practice/research/medical education:

In patients with shrunken neurogenic bladders together with dilated lower ureters (hydroureters), such as in patients with multiple sclerosis and spinal cord injury, there is a need for a more cautious approach in the placement of both transurethral and suprapubic Foley catheters.

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Introduction

Lower ureteral obstruction with misplaced or migratory suprapubic or transurethral Foley catheters is a rare event (1-3). By 2014, Anderson and Greenlund had acknowledged that only eight such cases of unintentional ureteral cannulation had been described in the literature (2). We recently encountered a patient who had experienced recurrent lower right ureteral transurethral Foley catheter misplacement causing abdominal pain, worsening azotemia due to sequential bilateral obstructive uropathy. The implications of the safety of “blind” transurethral Foley catheter placements in such clinical scenarios in patients with accompanying shrunken urinary bladder and hydroureters as in patients with long

standing progressive multiple sclerosis and spinal cord injury is reviewed.

Case Presentation

For several years now, we have followed a 41-year-old Caucasian female with complications of secondary progressive multiple sclerosis diagnosed since 1995. She is legally blind, and has a neurogenic bladder with overflow incontinence requiring chronic indwelling transurethral Foley catheter drainage that is changed once every month. She has experienced recurrent pyelonephritis, and in the last few years has stable chronic kidney disease (CKD) stage III/IV with baseline serum creatinine of 1.7 mg/dL – 2.3 mg/dL, estimated glomerular filtration rate (eGFR)

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of 27-35 mL/min/1.73 m² BSA. In October 2016, she was evaluated for new onset acute excruciating right flank/quadrant pain (10/10). Her chronic indwelling urinary Foley catheter had been replaced with a new one just 3 days earlier. She presented on admission with right flank/lower quadrant pain, decreased appetite, chills, and dizziness. Urinalysis suggested pyelonephritis and intravenous levofloxacin was started. Acute kidney injury on CKD was evident with rising serum creatinine (Figure 1). Initial CT scan of the abdomen was interpreted as otherwise stable bilateral hydroureters with worse right-sided hydroureter (Figure 2). The interpreting radiologist read the scan as showing a distal right ureteral stent. Despite intravenous fluids and intravenous antibiotics, the abdominal pain persisted and urology was therefore consulted. The urologist, who was very familiar with the patient, again reviewed the CT scan images and quickly recognized that the Foley catheter inflated balloon was indeed in the lower right ureter (Figure 2) – this had been misdiagnosed by the radiologist as a lower ureteral stent. Previous retrograde pyelogram had demonstrated gross bilateral hydroureters and a shrunken urinary bladder (Figure 3).

Initial attempts by the urologist to remove the Foley catheter failed and the next day at cystoscopy and subsequent ureteroscopy, the Foley catheter balloon was reached, penetrated and deflated using a sharp guided instrument. The balloon was inspected once the Foley catheter was removed and there was no evidence of a missing piece to the balloon. Urine cultures from three days prior to the admission grew *Escherichia coli* >100 000 col/mL and the levofloxacin course was completed. The right flank/lower quadrant pain immediately resolved following the successful removal of the misplaced transurethral Foley catheter. Her kidney function slowly improved and the patient was soon discharged.

Discussion

Unintentional ureteral cannulation with transurethral or suprapubic Foley catheterization is very rare (1-3). As at 2014, only eight such cases had been cited in the literature (3). Furthermore, ureteral obstruction secondary to suprapubic catheter migration is an exceedingly rare occurrence. Adeyemo et al reported the first known description of recurrent ureteral obstruction secondary to suprapubic catheter migration in 2013 (2). To our knowledge, our patient is the first report of recurrent ureteral obstruction secondary to transurethral Foley catheter unintentional cannulation of the distal ureter (Figure 2). Moreover, the transurethral Foley catheter inflated balloon in the distal right ureter had produced direct ipsilateral right ureteral obstruction while simultaneously producing indirect contralateral left ureteral obstruction because of the small urinary bladder capacity of our patient (Figure 3). As a result, acute albeit reversible exacerbation of renal failure was evident following relief of the obstructive uropathy (Figure 1). Due to a small urinary bladder capacity and dilated ureters

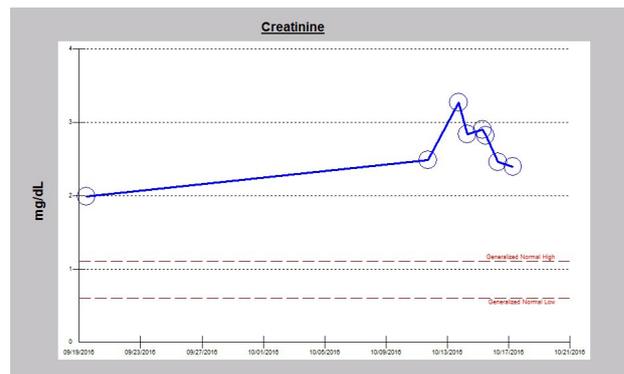


Figure 1. Acute kidney injury in October 2016 following unintentional misplacement of transurethral Foley catheter with inflated balloon in the distal right ureter.



Figure 2. CT scan of the abdomen showing small urinary bladder capacity and transurethral Foley catheter balloon in the distal right ureter.



Figure 3. Retrograde pyelogram had previously demonstrated a small urinary bladder capacity and grossly dilated ureters.

(Figures 2 and 3), our patient had in the last ten months twice experienced the unintentional misplacement of an indwelling transurethral Foley catheter with the inflated balloon resting in the distal right ureter. Such presentation could easily be missed and misdiagnosed as catheter-related urinary tract infection (UTI). Arguably, such scenario, if untreated over a long period of time could

potentially lead to irreversible renal failure and the need for renal replacement therapy.

Conclusion

Recently, some research has gone into assessing and confirming the appropriate bladder management strategy for the spinal cord injury patient with neurogenic bladder (4). By common consensus, suprapubic catheterization is an effective and safe alternative form of bladder management in select patients with spinal cord injury (1,5). Besides, intermittent self-catheterization remains a common therapeutic option among tetraplegics with spinal cord injury (6). Anderson and Greenlund posit that among quadriplegics from spinal cord injury, the spastic, insensate bladder and altered pelvic sensorium found in upper motor neuron syndromes were major risk factors for unintentional ureteral cannulation with a urinary catheter (3). We submit that in patients with shrunken small-sized neurogenic bladders together with dilated lower ureters (hydronephroses), such as in patients with progressive multiple sclerosis and spinal cord injury, there is a need for a more cautious approach in the placement of both transurethral and suprapubic Foley catheters. We posit that the safe placement of these catheters in such circumstances may warrant the use of ultrasound imaging guidance.

Authors' contribution

MACO; Conception, design, acquisition of data, data analysis, interpretation of data, literature review, drafting the article and final approval of manuscript. NA; Critical revising for important intellectual content, design, final approval of manuscript. WM; Acquisition of data and final approval of manuscript. MR; Acquisition of data and final approval of manuscript.

Conflicts of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the article.

Ethical considerations

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