

# TRANSURETHRAL REMOVAL OF KNOTTED BLADDER DRAINAGE CATHETER IN A MALE FOLLOWING BLADDER NECK RECONSTRUCTION

ROBERT A. BALL, M.D.  
CHARLES E. HORTON, JR., M.D.  
JAMES A. MANDELL, M.D.

From the Division of Urology, The Children's Hospital,  
and Harvard Medical School, Boston, Massachusetts

---

*ABSTRACT—Removal of a knotted straight catheter transurethrally in an eight-year-old boy on clean intermittent catheterization with a history of exstrophy/epispadias and previous bladder neck reconstruction is described.*

---

Clean intermittent catheterization is a safe and effective method of bladder evacuation. An infrequent complication of this procedure is knotting of the catheter intravesically. We recently treated, endoscopically, an eight-year-old boy with prior extensive urethral and bladder reconstruction for this problem.

## Case Report

The patient is an eight-year-old male with a history of exstrophy-epispadias who had previously undergone a bladder closure followed by an ileocecal augmentation cystoplasty and bladder neck reconstruction. The patient was maintained on an every four-to-six-hour clean intermittent catheterization regimen using an 8F red Robinson catheter without any complications. There was no prior history of difficulty in catheterizing. On the day of admission the patient had catheterized himself in his usual fashion but was unable to remove the catheter. On examination in the emergency department, the patient was noted to have an 8F catheter exiting his urethral meatus which with gentle traction was found to be anchored within the bladder (Fig. 1). An x-ray film of the pelvis confirmed the diagnosis of a knotted catheter intravesically (Fig. 2).

A single nontraumatic transurethral catheter extraction was planned due to the patient's extensive previous lower urinary tract reconstruc-

tive procedures and if this failed to proceed with an open cystotomy.

Under general anesthesia the patient was placed in the dorsal lithotomy position. The urethra was dilated with sounds to 16F. A 13F cystoscope was introduced transurethrally adjacent to the catheter. In the bladder the knotted catheter tip was easily identified, however it could not be extricated through the neourethra. An attempt, therefore, was made to untie the catheter in the bladder before proceeding with a formal open cystotomy. To shorten the arms of the knotted catheter, the end exiting the penis was pulled tight against the bladder neck and the catheter was divided flush with the glans penis. The remaining catheter was replaced into the bladder. Using an alligator forceps through the cystoscope, the foreshortened limb of the catheter was passed through the knotted loop of catheter untying the knot. The remaining twisted catheter was then easily removed from the bladder (Fig. 3). The patient subsequently has been able to catheterize himself without difficulty and has remained continent.

## Comment

In the pediatric population there is extensive experience with the use of clean intermittent catheterization in patients with detrusor dysfunction, vesicoureteral reflux, congenital

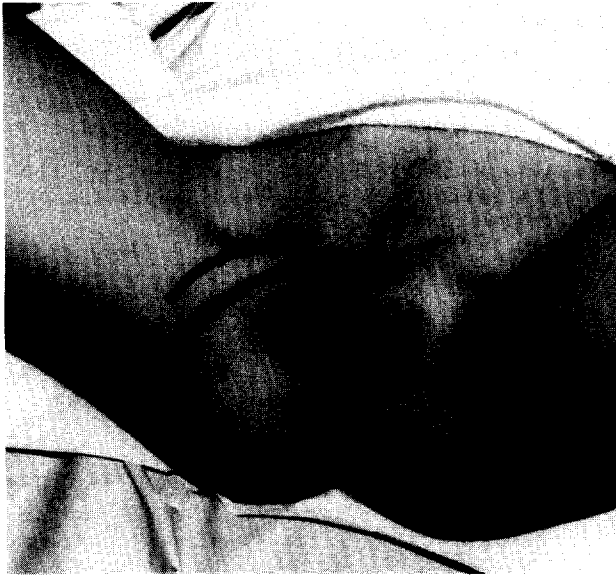


FIGURE 1. Eight-year-old male with 8F red Robinson catheter which could not be removed after clean intermittent catheterization.

disorders, and after genitourinary surgical reconstruction.<sup>1-3</sup> Major complications of clean intermittent catheterization are rare but include infection, ranging from asymptomatic bacteriuria to pyocystitis and pyelonephritis, urethral trauma causing stricture or urethral false passages, and stone formation in the bladder.<sup>4</sup> Minor complications are more common and include difficulty passing the drainage catheter, resulting in urethral bleeding and penis swelling.<sup>1</sup>

The complication of a knotted catheter has been reported nine previous times. The patients have typically been young females or infant males; no adult cases have been reported. The catheter involved is most often an 8F pediatric feeding tube. This is most frequently associated with the performance of a lower urinary tract urography study or drainage of acute retention in newborns or myelomeningocele patients.<sup>5-7</sup> A single episode of a 10F red rubber catheter knotting during clean intermittent catheterization in a four-year-old patient with myelomeningocele has been described.<sup>8</sup> Consistent in the histories of all these patients is deep advancement of the catheter into the bladder. A possible mechanism for catheter knotting would appear to be the extra length of catheter in the bladder coils around itself, and as the bladder decompresses the catheter end loops through the coil. When counter traction to remove the catheter is applied, the coils tighten cinching down in a knot.

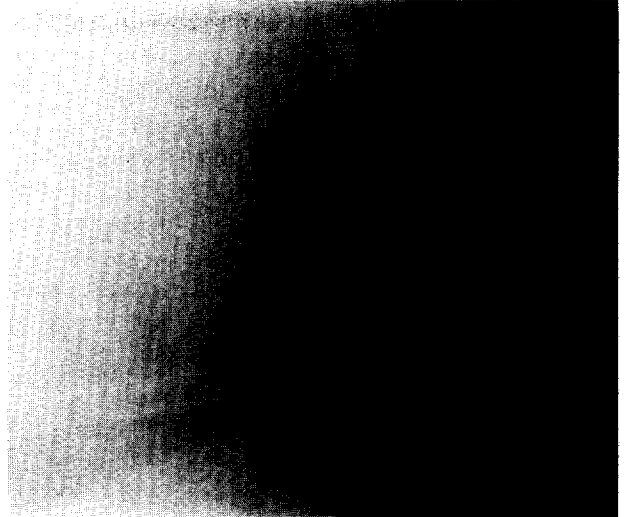


FIGURE 2. X-ray film of pelvis revealing catheter knotted within bladder.



FIGURE 3. Reconstruction of knotted bladder catheter after transurethral transection prior to being untied.

Catheter extraction has been nonoperative in the majority of cases. Often topical urethral anesthesia and urethral dilation with gentle traction on the catheter are successful maneuvers in females. A method of fluoroscopic guided transcatheter wire manipulation also has been described.<sup>9</sup> Two cases of intravesicular catheter knotting have required open surgical removal.<sup>10,11</sup> Both involved formation of complex knots in 5F and 8F pediatric feeding tubes, respectively, that had been indwelling for the purpose of monitoring the urine output in critically ill babies.

In our patient, who had a previous bladder neck reconstruction and large knot in his intravesicular catheter, aggressive urethral dilation

was to be avoided. Our technique of shortening the limb of the knotted catheter and untying it within the bladder enabled us to successfully extract the catheter transurethrally without significant trauma to the neo-urethra and avoid open surgery. As in previous cases, the mechanism of knotting appeared to be deep advancement of the catheter into the bladder. The patient and family were, therefore, re-instructed on proper clean intermittent catheterization techniques.

3299 Woodburn Road  
Suite 200  
Annandale, Virginia 22003  
(DR. BALL)

#### References

1. Cass AS, *et al*: Clean intermittent catheterization in the management of the neurogenic bladder in children, *J Urol* 132:

526 (1984).

2. Plunket JM, and Braren V: Five-year experience with clean intermittent catheterization in children, *Urology* 20: 128 (1982).

3. Bauer SB, Colodny AH, and Retick AB: The management of vesicoureteral reflux in children with myelodysplasia, *J Urol* 128: 102 (1982).

4. Amendola MA, Sonda LP, Dionko AC, and Vidyasagar M: Bladder calculi complicating intermittent clean catheterization, *AJR* 141(4): 751 (1983).

5. Cass AS, and Vitko R: An unusual complication of cystourethrography, *Minn Med* 55: 355 (1972).

6. Sugar EC, and Firlit CF: Knot in urethral catheter due to improper catheterization technique, *Urology* 22: 673 (1983).

7. Gaisie G, and Bender TM: Knotting of urethral catheter within bladder: an unusual complication in cystourethrography, *Urol Radiol* 5: 271 (1983).

8. Klein EA, Wood DP, and Kay R: Retained straight catheter: complication of clean intermittent catheterization, *J Urol* 135: 780 (1986).

9. Harris VJ, and Ramiro J: Wire manipulation of knot in a catheter used for cystourethrography, *J Urol* 116: 529 (1976).

10. Kanengiser S, Joster F, Kogan S, and Ruddy R: Knotting of a bladder catheter, *Periatr Emer Care* 5: 37 (1989).

11. Anderson MH: Urethral catheter knots, *Pediatrics* 85: 852 (1990).