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Case Report

An easy technique for removal of knotted catheter in the bladder: percutaneous suprapubic cystoscopic intervention

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Abstract: Uncontaminated urine samples are indispensable to precisely diagnose urinary tract infections in newborns or infants. Among many clinical interventions for urine collection are described, the most common noninvasive practice is using sterile bags, associated with significant contamination of samples. In children, however, invasive methods i.e. catheterization, are generally needed for reliable urine specimens. Almost always all the inserted catheters are easily drawn back, nevertheless, might not work as expected, and lead to considerable problems that cannot be overcome. Herein, a case of a female newborn treated with a successful percutaneous suprapubic cystoscopic procedure for extracting knotted urinary catheter in the bladder is presented. The least invasive and easiest technic is suggested to be used when catheter is knotted in the bladder, as elaborately stated.

Keywords: Knotted urethral catheter, urinary catheterization, percutaneous cystoscopy

Introduction

Indispensable for the medical practice, application of urethral catheters for urine culture have increased significantly due to false-positive urine bag cultures [1]. All kinds of these catheters are known to hardly ever knot spontaneously. The possible incidence is 0.2 per 100,000 catheterizations [2].

Although all types of catheters, stents, and tubes are now most common part of clinical practice, their use is not free of complications and problems [2]. Rare reports related to catheter knotting can be found literature, including a deadly consequence a double-knotted catheter in a patient after coronary artery bypass grafting [3, 4]. Herein, an extra case with a review of the literature concerning this complication and its surgical management is reported.

Case report

A 21 day-old female newborn was consulted to pediatric surgery clinic, formerly catheterized with a 6 Fr infant feeding tube to obtain urine sample in pediatric ward. After collection of the specimen, an attempt to remove the catheter failed due to a resistance from inside. Consequently, after consulting to pediatric surgery, it was unraveled that the problem was catheter knotting as confirmed by ultrasonography (**Figure 1**). Using a guide wire, attempts to untie the knot were unsuccessful. After obtaining informed consent from her family, a percutaneous suprapubic cystoscopy was applied. Under general anesthesia, a cystoscope was inserted into the bladder just above the pubic symphysis in the midline, and the knotted catheter was found inside the urinary bladder. 5 Fr grasping forceps was introduced through the working channel of cystoscope, and the knotted

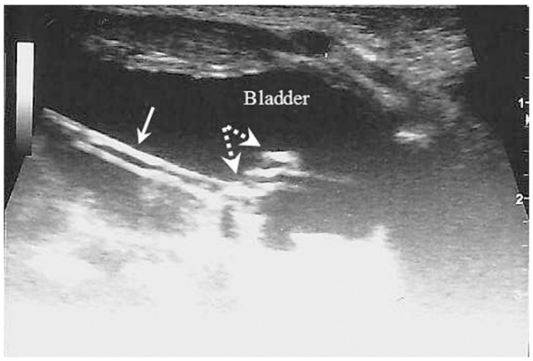

Figure 1. A pelvic sonography shows a knotted catheter in the bladder. The catheter in the bladder (white arrow), knot in the catheter (dashed arrows).

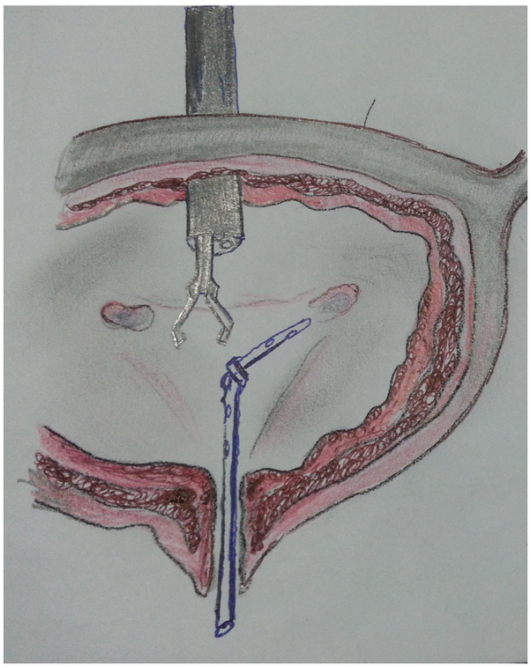

Figure 2. Schematic view shows after filled the bladder with saline, cystoscope was inserted to the bladder.

catheter was grasped, cut at a distance, and pulled out along with the cystoscope (**Figures 2**-**4**). The remainder catheter was taken out via urethra. Patient was discharged at the same day after the procedure. The recovery period was uncomplicated as without a scar formation.

Discussion

Reported intravesical knotting of catheters are more common in neonates and children than in

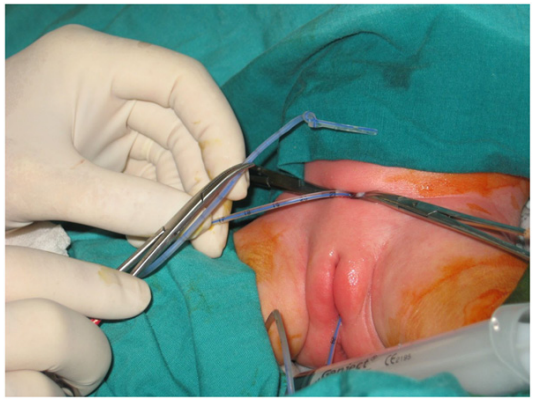

Figure 3. Extracted knotted catheter is seen out of the bladder.

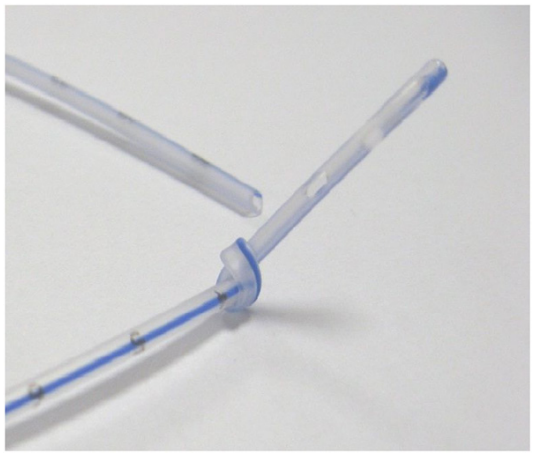

Figure 4. Close-up of the knot on the feeding tube.

adults [3]. Intravesical knotting has been reported not only in catheters left for long term bladder drainage, but also after short term such as clean intermittent catheterization, and voiding-cystourethrography [5]. In the present case, a complication of bladder catheterization for obtaining urine sample was encountered for short time application. Although knotting of urethral catheters is uncommon, pulling the catheters out may lead to severe morbidity, including complications of general anesthesia, radiation exposure, hematuria, stricture development, unfortunately which are usually underestimated [2].

In literature, some clarifications have been offered for the knotted catheters. The predisposition of a catheter knotting most likely depends on elasticity, thickness, and excessive

inserting of the catheter. The catheter twirls around itself leaning towards the little bladder wall forming a loop, through which, in turn, the tip passes in [5]. It was suggested that catheters <10 Fr, and insertion length more than 10 cm should be paid attention for knotting [3]. In the present case, the catheter had been inserted too far into the bladder (20 cm). Additionally, the catheter was 6 Fr, thus narrower than 10 Fr.

A number of techniques have been described for removal of knotted catheter including sustained traction under anesthesia, untying the knot using a guide-wire through the catheter under fluoroscopy, endoscopic removal, and surgical extraction with suprapubic percutaneous cystotomy [5, 6]. Guide-wire manipulation is useful only at the early stage of knot formation when the knot is not tight enough; yet, using this technic was unsuccessful in the present case [5]. Sustained traction holds the risk of urethral injury; moreover, the technic is not beneficial when the knot is bulky or when two catheters knot together. Suprapubic cystotomy has been known as a simple, cost-effective method of removal knotted bladder catheters [3]. To date, this should be replaced by minimal invasive technics such as suprapubic cystoscopic procedure was performed in the present case. It is also significant to make sure the catheter is not impelled more than necessary length into the bladder [2]. Prevention of the complication in the newborn by the placing lengths ≤6 cm in male, and ≤5 cm in female has been suggested [7].

Finally awareness about the complications of catheterization with the presented rare case is considered. With appropriate use of catheters, the risk of knots might be significantly reduced [8]. For this purpose, use of a pre-catheterization scan of bladder to verify the bladder volume has been recommended reducing unnecessary impelling after significant sample volume is available [9]. Recently Nelaton® catheters are available in sizes 4, 6, 8 Fr which may be a more appropriate alternative.

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