



KNOTTED URETHRAL CATHETER IN AN INFANT: A CASE REPORT.

Pediatrics

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ABSTRACT

Unintended knotting of infant feeding tubes inserted perurethrally for collection of a urine sample, imaging, clean intermittent catheterization, etc. is a rare complication in pediatric patients. The feeding tubes used in infants if advanced too far into the bladder may form a knot as the bladder empties. Surgical intervention is required especially if it is lodged in the urethra. We present a case of a male infant aged 3 months catheterized with a 6 Fr feeding tube for urine sample collection, which required a urethrotomy for removal. Resident and nursing staff must be educated about the length of catheter insertion, the chance of knotted catheter and steps to take if it occurs.

KEYWORDS

Catheter, Intravesical Knotting, Urethrotomy, catheterization complications.

INTRODUCTION

Urethral catheterization done for various purposes such as urine sample collection, monitoring of fluid therapy, clean intermittent catheterization, voiding cystourethrogram (VCUG), is an invasive procedure and has a low complication rate. Infant feeding tubes or Foley catheters are mainly used in infants and children for urethral catheterization purposes. Some of the reported complications are infection, catheter-associated trauma, bladder rupture, etc. Knotting of the feeding tubes and Foley catheters inserted into the bladder through urethral catheterization is a very rare complication. It may clinically be manifested as the inability to deflate the catheter balloon or the inability to pull out the feeding tube.

Here is a case report of a 3 month male infant who developed catheter knotting after a feeding tube was inserted for collection of a clean urine sample.

Case Report:

A 3 month male child presented to the pediatric emergency department with failure to thrive. A 6F feeding tube was aseptically inserted by the pediatric resident to collect a clean urine sample. The feeding tube was inserted upto 15 cms and urine sample was collected. Resistance was felt immediately on attempting to remove the catheter. The catheter got stuck at 13 cms mark and couldnot be removed despite pulling with efforts. It couldn't be pushed in either.

On examination by a pediatric surgeon, firm mass could be palpated at the bulbar urethra. An x-ray revealed a knot in the infrapubic region with a loop extending into the bladder. A sonogram could not identify the position of the tip of the feeding tube.[Figure 1]

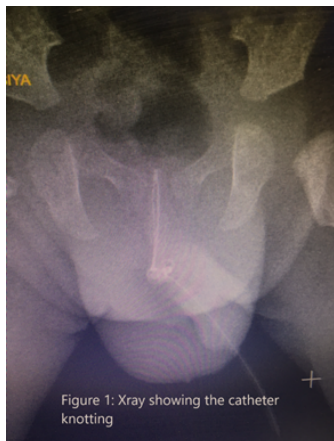


Figure 1: Xray showing the catheter knotting

An attempt was made to instil a lubricant jelly in the peri catheter region into the urethra, but couldn't aid in pulling out the catheter. A guide wire was passed which met with resistance and a failed attempt to untie the knot.

The patient was taken to the operating room and under general anesthesia, another attempt was made to withdraw the catheter which failed. A urethrotomy was done at the bulbar urethra and the knot was brought out from the incision along with the loop of the catheter. The catheter was cut flush with the external meatus and entire knot with loop was delivered from the incision.[Figure 2, Figure 3]



Figure 2: Intraoperative urethrotomy photograph

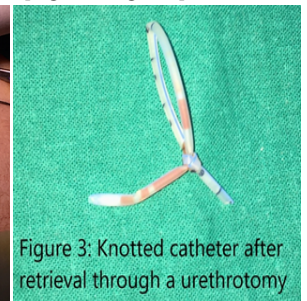


Figure 3: Knotted catheter after retrieval through a urethrotomy

Urethroplasty was done in two layers with 6-0 polyglactin suture over a 6F feeding tube. The feeding tube was removed on the 10th post operative day without any complications.

DISCUSSION:

Catheters inserted for various purposes, urological as well as non-urological, are known to rarely knot spontaneously inside the urinary bladder with an estimated incidence of 0.2 per 100,000 catheterizations [1]. Raveenthiran could find only 40 cases of knotted urinary catheters on a review of the world literature [2]. Another literature reported a total of 29 publications representing 31 cases which were identified using the PubMed search [3].

A widely accepted hypothesis for knotting is the insertion of the catheter far into the bladder. When excessive length of the highly flexible small calibre catheter is inserted into the bladder, it forms a loop and coils on itself. As the bladder decompresses, the catheter tip further loops through the coil. When the catheter is pulled out, the coil tightens clinching down into a knot. If the diameter of this knot exceeds that of urethra the catheter gets stuck. Bladder spasm has been also been attributed as a risk factor [4]. Water-current generated by the flow of urine around the catheter may also play a role in the genesis of catheter knotting [2]. Raveenthiran suggested that the catheters slender than 10 Fr, over-distended bladder and insertion of excessive length (greater than 10 cm beyond bladder neck) of catheters must be considered as risk factors for catheter knotting [2]. In this case, the knot had got impacted in the bulbar urethra.

Although knotting of urethral catheters is rare, removal represents significant morbidity, such as general anesthesia, radiation exposure during fluoroscopy, and transient hematuria [1]. Potential for further complications such as stricture formation also needs to be considered. Surgical reconstruction also has its own complications.

Several techniques have been described to retrieve the knotted

catheter. They include sustained traction under anesthesia, untangling the knot using a guide-wire through the catheter under fluoroscopy, endoscopic retrieval and percutaneous suprapubic cystoscopy [5-7]. Guide-wire manipulation is useful only at the early stage when the knot is not tight enough [5].

A newborn male urethra measures 5 cm. This increases to 8 cm and 17 cm by 3 yrs and adulthood respectively [8]. The Female urethra measures 2.18 cm at birth and increases to 2.54 cm by 5 yrs and 3.78 cm in adulthood [8]. The insertion lengths of 6 cm in a male newborn and 5 cm in a female newborn have been recommended [9]. In extremely premature babies with birth weight of <750 grams the insertion length of <5 cm in boys and <2.5 cm in girls is recommended [9]. It is important to secure the catheter well in order to prevent inadvertent advancement of the catheter into the bladder [1]. Besides preventing knotting; this also avoids troublesome bladder spasms.

CONCLUSION:

The pediatric resident and nursing staff must be educated about the length of catheter insertion, the chance of knotted catheter and steps to take if it occurs. The insertion lengths of 6 cm in a male newborn and 5 cm in a female newborn have been recommended. In extremely premature babies with birth weight of <750 grams the insertion length of <5 cm in boys and <2.5 cm in girls is recommended.

REFERENCES:

- [1] Arena B, McGillivray D, Dougherty G. Urethral catheter knotting: be aware and minimize risk. *Can J Emerg Med* 2002;4:1-5.
- [2] Raveenthiran V. Spontaneous knotting of urinary catheters: clinical and experimental observations. *Urol Int* 2006;77:317-21.
- [3] Spontaneous knotting of urinary catheters placed with nonindwelling intent: Case series and literature review. Singh VP, Sinha S. *Urol Ann*. 2019 Oct-Dec;11(4):443-446. doi: 10.4103/UA.UA_15_19
- [4] Arda IS, Ozyaylali İ. An unusual complication of suprapubic catheterization with Cystofix: catheter knotting within the bladder. *Int J Urol* 2001;8:188-9.
- [5] Harris VJ, Ramiro J. Wire manipulation of knot in a catheter used for cystourethrography. *J Urol* 1976;116:529.
- [6] Rampersad, B. "A simple endoscopic method for removal of a knotted urethral catheter." *Annals of the Royal College of Surgeons of England* vol. 100,1 (2018): 79. doi:10.1308/rcsann.2017.0108
- [7] Ozkan, Aybars et al. "An easy technique for removal of knotted catheter in the bladder: percutaneous suprapubic cystoscopic intervention." *International journal of clinical and experimental medicine* vol. 6,7 603-5. 1 Aug. 2013
- [8] Smith AB, Adams LL. Insertion of indwelling urethral catheters in infants and children: a survey of current nursing practice. *Pediatric Nurs* 1998; 24: 229-234
- [9] Carlson D, Mowery B. Standards to prevent complications of urinary catheterization in children: should and should-nots. *J Soc Pediatr Nurs* 1997;2:37-41.