

Spontaneous Intravesical Knotting of a Feeding Tube in a Late Preterm Neonate: A Case Report

Mazen Abuanza¹, Mohamed Abdellatif^{1*}, Asad Rahman¹, Sareyah Al Sibai² and Faris Al Kalbani³

¹Neonatal Intensive Care Unit, Child Health Department, Sultan Qaboos University Hospital, Muscat, Oman

²Pediatric Surgery Unit, Department of Surgery, Sultan Qaboos University Hospital, Muscat, Oman

³Pediatric Residency Training Program, Oman Medical Specialty Board, Muscat, Oman

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ABSTRACT

Feeding tubes (FTs) are commonly used as urinary catheters in neonates and children. Though generally safe, serious complications can result if the catheter spontaneously knots inside the bladder. We report a case of a spontaneous knotting of an intravesical Fr 6 FT in a late preterm female baby following urethral catheterization to collect a urine sample. The knotted catheter was removed via suprapubic cystostomy. The infant had good postoperative recovery.

Urinary catheterization using feeding tubes (FTs) is a common procedure in neonatal intensive care units (NICU).¹ Urinary catheterization is often required to relieve fluid retention, to collect urine, and occasionally for radiological studies.² FTs sizes Fr 5, Fr 6, or Fr 8 are commonly used due to their availability and ease of use.³ Although the procedure is safe, complications have been reported, including trauma during insertion, hematuria, and tube knotting within the urinary bladder.³ Removal of a knotted tube from the bladder can be a major challenge. We report a case of spontaneous knotting of the FT within the bladder of a late preterm female infant.

CASE REPORT

A 44-year-old woman (multigravida 9, multipara 6) delivered a late preterm female infant at 34 weeks of gestation by cesarean section under general anesthesia due to the baby being in a transverse lie. The mother had gestational diabetes. During her previous pregnancy, she had been positive for Group B *Streptococcus* infection.

Antenatal steroids were administered four hours prior to delivery. The newborn's Apgar scores were 7 and 9 at one and five minutes, respectively. Her birth weight was 1.68 kg (3–10th percentile), head circumference 31 cm (10–50th percentile),

and length 45 cm (50th percentile). She also had asymmetrical intra-uterine growth restriction.

The baby developed respiratory distress and was admitted to the NICU where she was put on nasal continuous positive airway pressure and started on intravenous antibiotics ampicillin and gentamycin. The respiratory support was weaned off after seven days. However, nasogastric feeding continued for four weeks due to difficulty to establish oral feeding. Therefore, further investigations were performed, including head ultrasound, tandem mass spectrometry, serum ammonia, and urine for organic acid. The infant was catheterized with an Fr 6 infant FT to collect urine for organic acid analysis.

While removing the catheter 24 hours later, the nurse and the on-call physician noticed significant resistance. Examination showed that the catheter was deeply introduced into the bladder and was lodged at catheter level 11 cm. A supine x-ray of the abdomen showed a spontaneous true knot in the FT in the bladder [Figure 1]. Attempts by the pediatric surgical team to pull out the tube were unsuccessful.

The infant went for surgical intervention under general anesthesia. Following failed attempts of a guide-wire endoscopic retrieval, suprapubic cystostomy was successfully performed. The FT was found knotted in the urinary bladder. The knot was about 4 cm from the tip of the catheter [Figure 2]. After removing the tube, the urethra and the bladder mucosa were evaluated, and no further

*Corresponding author: ✉marinamatbaki@ppukm.ukm.edu.my



Figure 1: X-ray showing the knotted catheter (arrow) in the bladder of a late preterm female infant.

complications were detected. A Foley catheter was inserted into the bladder for urinary drainage for five days, during which the infant was administered antibiotics. She made a good post-operative recovery and was discharged after seven days.

DISCUSSION

Although urinary bladder catheterization is a common and safe procedure in neonatal practice, it is not free of complications.¹ FTs are commonly used in neonates due to the shortage of suitably sized Foley catheters. It has been reported that knotting of catheters is more frequent in male neonates, with an incidence of 0.2 per 100 000.^{3,4} Other complications include trauma during insertion and hematuria. Risk factors of pediatric catheter knotting are related to the length of insertion, physical properties of the tubing, catheterization technique, and the patient's anatomical characteristics.⁵

Great care and expertise are required for inserting neonatal catheters. Among the reported strategies to minimize complications are using short catheters of standard lengths and adopting intermittent catheterization.⁶ When inserting a Foley catheter, its balloon should be fully inside the bladder before inflating to avoid urethral trauma. At birth, the length of the male urethra is about 5 cm and that of the female is about 2.2 cm.⁷ The insertion length of catheter should not exceed 5–6 cm in term newborns of either sex or 2.5–5 cm in premature babies.⁶ In

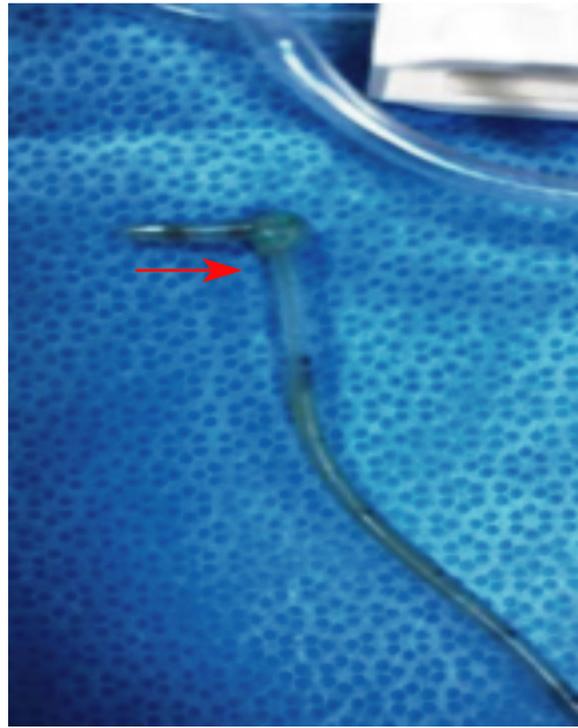


Figure 2: Post-operative photo showing the knotted catheter (arrow).

the present case, excessive insertion length of the catheter (11 cm) was the main reason for knotting of the tube. The most common reported reasons for knotting are inserting the catheter > 10 cm and incorrectly inserting and securing the tube.^{8,9} Other risk factors include over-distended urinary bladder, bladder spasm, and using small sized catheters (Fr 10),^{4,10} and failing to externally secure the tube to prevent further progression into the bladder.^{3,4,10}

Conservative management strategies should be attempted before surgical intervention, such as untying the knot using an endoscopic retrieval guidewire, or applying constant traction under anesthesia.^{9,11,12} The constant traction method carries the risk of urethral injury and is unsuitable for bulky knots and true knots. The current case featured a true knot.

The endoscopic retrieval guidewire manipulation technique is sometimes effective if the knot is loose. We attempted this but unsuccessfully. Therefore, suprapubic cystotomy was performed to remove the knotted catheter from the bladder. This surgical procedure has been reported to be practical and cost effective in such cases.^{4,8} The reported risks include post-operative complications, such as bladder dysfunction and urethral stricture, as well as the need for long-term follow-up.¹³

CONCLUSION

Insertion of a FT for urinary catheterization in neonates requires caution, precision, and training. It is essential to select the catheter insertion length according to the age and sex of the infant. Complications, though rare, could be hazardous, which should always be kept in mind. Where suprapubic cystotomy is performed to take out the knotted catheter, long-term monitoring for postoperative complications may be required.

Disclosure

The authors declared no conflicts of interest. No funding was received for this study. Consent has been obtained from the parents of the neonate to publish this case report.

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