International Surgery Journal
Pal LS et al. Int Surg J. 2026 Sep;13(9):1769-1772
https://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902
DOI: https://dx.doi.org/10.18203/2349-2902.isj20263010

Case Report

Spontaneous knotting of infant feeding tube in the urinary bladder

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Received: 08 July 2026
Accepted: 13 August 2026

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ABSTRACT

In neonatal intensive care settings and paediatric wards, healthcare providers frequently use infant feeding tubes for urinary bladder catheterization when appropriately sized Foley catheters are unavailable. Though it is a safe procedure, it can lead to a serious problem if the catheter knots spontaneously inside the urinary bladder. This report describes an unusual complication where a 6 French feeding tube became knotted spontaneously within the bladder of a 3-month-old male infant during routine urinary catheterization performed for urine sample collection and output monitoring. The knotted catheter was extracted via percutaneous endoscopic suprapubic cystotomy. The patient had a successful post-operative recovery.

Keywords: Catheter knotting, Infant feeding tube, Intravesical foreign body, Intravesical knotting, Self-knotting

INTRODUCTION

Urethral catheterization of infants by feeding tube is a common procedure in neonatal ICU and paediatric ward.[1] Urinary catheterization is mostly required for cases of urine retention or to collect urine sample or urine output monitoring and occasionally for radiological studies.[2] Literature suggests that this complication occurs predominantly in male paediatric patients, though it remains exceptionally rare with documented frequency of approximately 2 cases per million catheterizations.[3,4] Feeding tubes sizes 5 Fr to 8 Fr are commonly used due to their easy availability. Although generally considered safe, the procedure may be associated with complications, including traumatic insertion resulting in haematuria and tube knotting within the urinary bladder.[4]

However, intravesical knotting of tube is not common; its removal may become challenging and adds to the patient morbidity. In this case, we report spontaneous intravesical knotting of the feeding tube in a 3-month-old male infant.

CASE REPORT

Parental consent was obtained in written form prior to documenting this clinical encounter. A 3-month-old male admitted in paediatric ward acute febrile illness and seizures. A 6 Fr feeding tube was inserted transurethrally for urine collection and output measurement. Approximately two days following placement, resistance was encountered during attempted catheter removal Examination of the child revealed that the catheter had been inserted to a depth of 12 cm into the bladder. Plain radiography of the pelvic region demonstrated catheter coiling consistent with intravesical knotting (Figure 1). Following surgical consultation, gentle traction proved ineffective, prompting urological consultation for further management. Operative management proceeded under general anesthesia, with successful catheter retrieval accomplished via percutaneous suprapubic cystotomy. Urinary bladder was distended retrograde by normal saline through knotted catheter and suprapubic terumo straight tip glidewire passed by Seldinger technique (Figure 2) followed by sequential dilatation of tract while continuing retrograde irrigation.



Figure 1: X-ray showing the knotted catheter in the bladder.

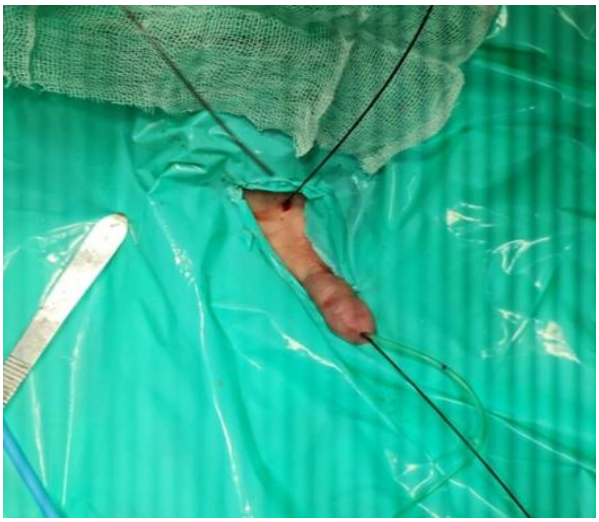


Figure 2: Percutaneous Suprapubic approach.

10 Fr working sheath placed over glide wire and 9 Fr semi rigid ureteroscope was used. Endoscopic examination revealed a knotted catheter within the bladder lumen. Meatal end of infant feeding tube was divided and knotted IFT extracted by using grasper (Figure 3). Direct visualization confirmed a true knot formation located approximately 3 cm proximal to the catheter tip (Figure 4). Post-extraction examination of the urinary bladder and urethra revealed intact mucosa with no evidence of iatrogenic injury. A 6 French Foley catheter was placed using guide wire assistance to maintain bladder decompression for one week, with concurrent intravenous antibiotic coverage. The patient's postoperative course was uneventful (Figure 5), with hospital discharge on postoperative day 8.

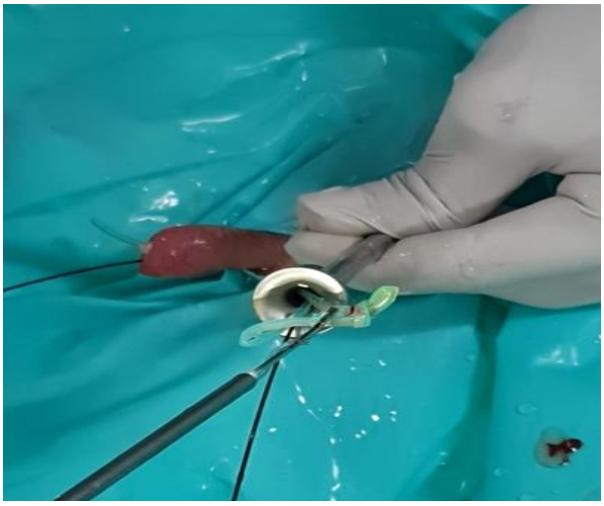


Figure 3: Infant feeding tube extraction by grasper.



Figure 4: Post-operative photo showing the knotted IFT.



Figure 5: Wound after 7 days showing healthy healing.

Table 1: Brief clinical timeline.

Time	Event
15 November 2021	Admission in paediatric ward.
16 November 2021	Catheterization of patient by IFT.
18 November 2021	Retained IFT diagnosed by radiology.
19 November 2021	Gentle traction method failed; Urology consultation done.
23 November 2021	Retained IFT removed endoscopically by percutaneous approach.
30 November 2021	Foley Catheter removed.
01 December 2021	Uneventful recovery and discharge.

DISCUSSION

Clinicians must maintain awareness of potential catheterization complications including mucosal trauma, bleeding, and intravesical knotting to ensure appropriate preventive measures and timely intervention. Multiple factors contribute to the risk of knotting, including excessive insertion depth, narrow catheter gauge, material flexibility, operator technique, and patient-specific anatomical considerations.[5] Preventive strategies include selecting appropriately sized catheters, limiting insertion depth to anatomically appropriate distances, employing intermittent rather than indwelling techniques when feasible, and ensuring proper balloon positioning before inflation.[6] Urethral length varies by age and sex: neonatal male's average 5 cm (increasing to 8 cm by age three and 17 cm in adulthood), while female urethral length ranges from 2.2 cm at birth to 2.5-3.8 cm in adulthood.[7] Recommended insertion depths are 5-6 cm for term neonates and 2.5-5 cm for preterm to minimize complications.[6] In this case excess insertion length of the feeding tube (12 cm) was the reason for knotting while additional factor being size 6 Fr feeding tube.

Primary causative factors for knotting include inserting catheters beyond 10 cm and inadequate securing techniques that permit excessive intravesical catheter length.[3,8,9] Additional contributing factors include narrow-gauge catheters (≤10 French), bladder overdistension, detrusor muscle spasm and inadequate catheter securement allowing excessive advancement into the bladder.[1,3,10] Current generated by urine flow appears to play an important role in the process of catheter knotting.[3] Conservative approaches merit consideration before operative intervention, including guide wire manipulation and controlled traction under anesthesia, though the latter carries risk of urethral damage.[8,9,11-13] Constant pull technique has demonstrated limited efficacy with tight or bulky knots, as encountered in this patient, though looser configurations may respond to wire-guided manipulation.

However, in our case, this technique was attempted but failed. Instead, knotted catheter was removed from the bladder by suprapubic cystotomy.[12] Long term sequelae including urethral stricture and bladder dysfunction have been documented in the literature, necessitating extended postoperative surveillance.[14]

Table 2: Summary of various management techniques.

Authors	Retained IFT removal techniques
Harris et al[11]	Used angiographic guidewire manipulation under fluoroscopy in a 5 month old boy.
Sugar et al[1]	Used manipulation/dilatation in newborn.
Foster et al[8]	Used traction under anaesthesia in 3 cases, open cystostomy in 1 case and endoscopic removal in 1 case.
Arena et al[4]	Used traction under analgesia in 10 year old boy.
Dogra et al[12]	Used endoscopic technique in a 12 year old child.
Eke et al[13]	Used traction under anaesthesia in 7 year old boy.
Tang et al[2]	Used open cystostomy in low birth weight neonate boy.
Singh et al[5]	Used manipulation under anaesthesia in two cases and catheter division followed by cystoscopic extraction in one case.
Current case	Used percutaneous endoscopic extraction under anaesthesia in 3 month old boy.

CONCLUSION

In summary, paediatric urinary catheterization using feeding tubes demands meticulous technique and comprehensive training. Although infrequent, serious complications warrant clinical vigilance and prompt recognition. It is prudent to carefully calculate the insertion length of infant feeding tube in accordance with age and sex of the infant to avoid adverse outcomes. All personnel performing catheterization procedures require standardized training in prevention strategies to reduce complication risk. Infant feeding tube should not be inserted too high up in the bladder and fix the catheter to prevent proximal migration which can lead to coiling and resultant knotting. Intravesical knotting of a catheter is a challenging complication to manage. Post-operative follow up is advisable to detect delayed complications including urethral stricture or bladder dysfunction.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Pal LS, Oli P. Spontaneous knotting of infant feeding tube in the urinary bladder. Int Surg J 2026;13:1769-72.