KESANS: International Journal of Health and Science
2808-7178 / 2808-7380
http://kesans.rifainstitute.com/index.php/kesans/index

Intravesical Retention of a Fractured Reused Nelaton Catheter in the Postpartum Period: A Case Report

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Article Information
Submitted: **22 September 2026**
Accepted: **13 October 2026**
Publish: **23 October 2026**

Keyword: Catheter Fracture; Foreign Body; Nelaton Catheter; Postpartum Period; Urinary Bladder;

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Year: 2026

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Abstract
Introduction: *Catheter fracture with intravesical retention is a rare complication of urinary catheterization that may cause infection, irritation, or calculus formation.* ***Objective:*** *To describe the management of a fractured, reused Nelaton catheter retained after vaginal delivery.* ***Case Report:*** *A 35-year-old multiparous woman was referred four hours postpartum with retained placenta and catheter fracture. A repeatedly reused Nelaton catheter fractured during withdrawal. Following placental delivery, ultrasonography identified an intravesical foreign body. Open cystotomy successfully retrieved a 13-cm fragment. The patient was discharged on postoperative day four and reported no urinary difficulties at one-month follow-up.* ***Discussion:*** *Repeated reuse may compromise catheter integrity, although causality remains unconfirmed. Early recognition and imaging facilitated management. Cystoscopic retrieval should be considered when feasible, while open cystotomy requires individualized justification.* ***Conclusion:*** *Catheter inspection, avoidance of informal single-use device reuse, and prompt investigation of missing fragments are essential to prevent complications and improve patient safety*

How to Cite **Deasyka Yastani, Jimmy Panji Wirawan, Lily Marliany, Dita Setiati, Aditya Krishna Murthi/Intravesical Retention of a Fractured Reused Nelaton Catheter in the Postpartum Period: A Case Report/Vol. 6, No. 1, 2026**
DOI https://doi.org/10.54543/kesans.v6i1.756
e-ISSN/p-ISSN **2808-7178 / 2808-7380**
Published by **CV. Rifainstitut/KESANS: International Journal of Health and Science**

Introduction

Urinary catheterization is used in obstetric practice to decompress the bladder when indicated and to monitor urine output in selected patients. A distended bladder may impede third-stage management. The 2025 World Health Organization (WHO) guidance includes bladder emptying among measures considered before manual placental removal becomes indicated in a woman with a retained placenta without postpartum hemorrhage. Bladder decompression is an adjunct, not a substitute for timely assessment and definitive treatment of retained placenta (WHO, 2025). In the present case, this was the stated reason for catheterization; the record does not provide measured bladder distension or a diagnosis of urinary retention.

A Nelaton catheter is a straight catheter without a retention balloon and is suitable for intermittent or one-time bladder drainage. This differs from a Foley catheter, whose balloon permits indwelling drainage. Intermittent catheters are available in different materials, sizes, and coatings; the device name alone does not establish its composition or stiffness (European Association of Urology Nurses [EAUN], 2024). Their role in brief bladder emptying makes Nelaton catheters relevant to obstetric care, although this report cannot estimate how frequently they are used in local obstetric services.

Device safety is particularly important when repeated use occurs without documented manufacturer instructions or validated reprocessing. Limited availability and cost may create pressure to reuse equipment, but the reason for reuse in this patient was not recorded. Contemporary evidence distinguishes devices designed for reuse from informal reuse of single-use devices. A systematic review identified uncertainty concerning cleaning methods and their effects on microbial contamination and catheter integrity (Grasdal, Walter, & Krassioukov, 2022). Current patient-safety guidance also addresses infection and injury risks associated with reuse of single-use equipment (Centers for Disease Control and Prevention [CDC], 2023a).

Catheter fracture is an uncommon reported complication; an early Foley catheter case provides historical context (El-Sherif et al., 1991). Its frequency cannot be inferred from isolated reports. This report describes immediate recognition and removal of a 13-cm Nelaton catheter fragment retained in the bladder after delivery. The clinical relevance lies in the intersection of postpartum care, device integrity, and rapid referral when a simple drainage procedure results in an intravesical foreign body.

Case Report

Patient Information and Clinical Findings

A 35-year-old woman, parity 4, was admitted to the hospital because of a retained placenta and a suspected retained urinary catheter fragment. Four hours earlier, she had undergone vaginal delivery assisted by a traditional birth attendant. When the placenta was not delivered, a midwife was called. The midwife inserted a Nelaton catheter to empty the bladder in the expectation that bladder decompression would facilitate placental delivery. According to the referral history, the catheter had been reused repeatedly over an extended period.

The device was described as a straight Nelaton catheter without a retention balloon. Its manufacturer, model, French size, original total length, material composition, expiry date, and original labeling were not available in the clinical record. The number of previous uses, whether it had been used in other patients, and the cleaning, disinfection,

sterilization, and storage methods were also undocumented. The 13-cm measurement refers to the retrieved fragment, not the original full catheter length.

During attempted withdrawal, the midwife heard a cracking sound and observed that the catheter had fractured. The patient was referred immediately. On admission she was clinically stable, and her vital signs were within normal limits. The uterine fundus was one finger width above the umbilicus with good contraction, and the umbilical cord protruded from the vagina. Vaginal examination showed that part of the placenta had descended into the vagina. The placenta was delivered completely using gentle traction with fundal pressure.

Diagnostic Assessment and Therapeutic Intervention

Ultrasonography demonstrated a hyperechoic structure within the urinary bladder, consistent with the retained catheter segment. A general surgeon performed an open cystotomy and retrieved a 13-cm fractured Nelaton catheter segment (Figure 1). The reason for choosing open rather than cystoscopic retrieval, including the availability of endoscopic equipment and expertise, was not documented. No failed cystoscopic attempt is recorded.



Figure 1. Operative and specimen findings. (A) The catheter fragment visualized within the urinary bladder during open cystotomy. (B) The retrieved 13-cm Nelaton catheter segment. (C) Close-up view of the fractured end.

Outcome and Follow-Up

The postoperative course was uncomplicated based on the available record. The patient was discharged on postoperative day 4 with an indwelling urinary catheter planned for seven days. At follow-up one month later, she was clinically well and reported no difficulty with urination.

Table 1
Timeline

Time	Clinical event
Four hours before admission	Vaginal delivery assisted by a traditional birth attendant; placenta remained undelivered.
Before referral	A reused Nelaton catheter was inserted by a midwife for bladder decompression; the catheter fractured during withdrawal.
At admission	Patient clinically stable; placenta delivered completely with gentle traction and fundal pressure.
During hospitalization	Ultrasonography identified an intravesical foreign body; open cystotomy retrieved a 13-cm catheter fragment.
Postoperative day 4	Discharged with urinary catheterization planned for seven days.
One month	Clinically well, with no reported voiding difficulty.

1. Discussion

Clinical interpretation of the event

The sequence of a cracking sound, an incomplete removed catheter, ultrasonographic localization, and retrieval of a matching fragment supports a catheter fracture with intravesical retention. The complication occurred during withdrawal after brief postpartum bladder drainage rather than during chronic indwelling catheterization. Unlike a Foley catheter, the Nelaton device had no retention balloon, so balloon deflation failure is not an appropriate explanation. The immediate recognition of an incomplete device prompted referral before delayed urinary symptoms became the primary presentation.

Retained catheter material can be clinically significant even when the patient initially appears well. Foreign material may act as a nidus for infection or encrustation and can cause bleeding or irritative symptoms. An uncomplicated one-month outcome after retrieval is reassuring for this patient but does not establish the natural history of an untreated fragment. Nor can this case quantify a reduction in complications attributable to early removal. It demonstrates the practical value of treating a missing catheter segment as a finding requiring investigation rather than dismissing it because vital signs are normal.

Possible mechanisms of catheter fracture

Repeated reuse was the suspected principal contributor to catheter fracture in this patient. It may have reduced catheter integrity, but this mechanism was not confirmed by materials testing. Repeated bending, traction, kinking, and handling can concentrate stress in a weakened tube. Cleaning chemicals, heat, drying, and storage may alter material properties depending on the polymer and the reprocessing method. These are possible mechanisms rather than documented exposures: neither the material nor the reprocessing history was available. It would therefore be inappropriate to assert that polyvinyl chloride degradation, loss of plasticizer, excessive withdrawal force, or a particular sterilization method caused this fracture.

Recent research provides biological and mechanical plausibility without establishing causation for this event. A three-participant pilot study found surface damage, debris, and bacterial deposits on reused intermittent catheters after three days. The participants did not develop clinical infection during the study, and the findings cannot be translated into a fracture rate or directly generalized to postpartum patients (Grasdal, Lai, et al., 2022). A systematic review likewise concluded that evidence supporting specific cleaning methods remained limited (Grasdal, Walter, & Krassioukov, 2022). Surface microdamage is not equivalent to complete catheter fracture.

The most defensible interpretation is therefore a device failure temporally associated with a history of repeated reuse. Alternative contributors include a pre-existing manufacturing defect, aging, storage damage, or mechanical stress during removal. The record cannot distinguish among these explanations. Inspection of the retrieved device and original packaging, documentation of prior use, and formal mechanical or materials testing would strengthen a causal assessment. Reuse should remain a suspected contributor rather than a definitive etiologic diagnosis.

Localization and choice of retrieval approach

Ultrasonography was useful because it demonstrated the fragment within the bladder without ionizing radiation. In a patient with a known missing catheter segment, imaging should address its location and whether associated injury is suspected. A negative or equivocal ultrasound would not by itself exclude retained material when device inspection shows a missing portion. Further investigation should be guided by the clinical findings and specialist assessment. In this case the positive ultrasound and operative retrieval supplied concordant evidence; no additional imaging findings are available.

Cystoscopy permits direct inspection of the urethra and bladder and may allow grasping and transurethral extraction during the same procedure. The BAUS consensus recommends cystoscopic removal of intravesical foreign bodies where possible, with open surgery when this cannot be achieved (Sahai et al., 2021). Feasibility depends on shape, rigidity, orientation, encrustation, and safe passage through the urethra, as well as equipment and expertise. A 13-cm length alone does not establish that endoscopic retrieval is unsuitable.

Open cystotomy provides direct access when safe transurethral removal is not feasible or has failed. Contemporary case literature illustrates the importance of assessing the object before choosing an approach: Yokoyama et al. (2022) selected open cystotomy for an entangled intravesical rope after preoperative imaging indicated that endoscopic extraction was unsuitable. That object differs substantially from a catheter segment, so its management cannot justify the operation in this patient. It supports individualized planning rather than routine open extraction.

Compared with cystoscopic extraction, open cystotomy requires an operative incision and bladder closure, with potential wound complications, postoperative pain, urine leakage, and recovery demands. Cystoscopic removal avoids an abdominal incision but can still cause urethral or bladder injury, bleeding, infection, or failure requiring another approach. These are procedural considerations, not complications observed in this patient. This report offers no comparative data and cannot estimate relative complication rates, length of stay, or cost.

The rationale for selecting open cystotomy was not documented. The report does not claim that the fragment was too large, that cystoscopy was unavailable, or that endoscopic removal had failed. The successful extraction and short-term recovery show that the chosen procedure achieved retrieval in this case; they do not show that it was superior to a less invasive alternative. Future documentation should record the object characteristics, endoscopic feasibility, available resources, and decision rationale.

Preventing recurrence in primary and community care

Prevention begins before catheter insertion. Services should provide devices appropriate for the intended procedure, verify packaging and labeling, and ensure that staff understand the distinction between single-use and reusable equipment. For acute obstetric catheterization, informal reuse of a device labeled for single use should be avoided. Inspection should include visible damage and abnormal stiffness before insertion and completeness of the tube and tip after removal. A visibly damaged device should be discarded even if it appears clean.

Staff should use appropriate lubrication and technique and avoid force when resistance occurs. Training should cover recognition of breakage, preservation of removed material, and urgent referral. If a catheter is incomplete after withdrawal, the patient requires assessment and localization of the missing portion. Blind attempts to retrieve an intravesical fragment should be avoided. Referral communication should identify the device, timing of breakage, missing segment, symptoms, and any attempted intervention. These practical safeguards are proposed from the failure sequence in this case; their effectiveness has not been tested in this report.

Cleaning and sterility do not demonstrate mechanical safety. CDC guidance emphasizes staff competency, manufacturer instructions, and oversight of device reprocessing (CDC, 2023b). FDA guidance distinguishes regulated reprocessing of certain single-use devices, which requires relevant validation and regulatory oversight, from informal repeated use (U.S. Food and Drug Administration [FDA], n.d.). These U.S. requirements are cited as patient-safety principles and are not presented as Indonesian law. A purpose-designed reusable device used according to validated instructions is a different situation from undocumented reuse of the catheter described here.

At service level, adequate procurement and stock monitoring are necessary so that safe practice does not depend solely on the individual operator. A device incident should prompt review of procurement, storage, labeling, and training, alongside appropriate reporting through the local safety system. Recording the product and batch, preserving the fragment when feasible, and checking other devices from the same supply may help identify a wider problem. The referral history establishes reuse in this event, but not that stock shortages, financial constraints, or deficient training actually caused it.

Limitations and implications

This retrospective single-patient report cannot establish incidence, risk factors, or comparative effectiveness. Device specifications and the number and method of prior reprocessing cycles were unavailable. There was no materials analysis, urinalysis or culture result, documented cystoscopic evaluation, or recorded justification for open extraction. The history of reuse came from the referral account rather than a prospective device-use log. These gaps limit both causal attribution and evaluation of the treatment decision. Follow-up was limited to one month and relied on clinical well-being and

reported absence of voiding difficulty. This does not exclude later stricture, recurrent infection, or other delayed complications, and no objective long-term assessment is reported. Placental delivery with fundal pressure is described as recorded care, not advocated as a general management recommendation. The case is most useful as a safety signal: a routine postpartum intervention can produce an important device complication, and inspection, prompt referral, and complete retrieval are actionable responses.

Conclusion

This single case documents intravesical retention of a 13-cm Nelaton catheter fragment after postpartum bladder drainage, with successful retrieval by open cystotomy. Repeated reuse may have contributed to device failure, but causation cannot be established without specifications, reprocessing records, and materials testing. Informal reuse of single-use catheters should be avoided, and device integrity should be checked before insertion and after withdrawal. A missing segment warrants prompt localization and specialist assessment. Open cystotomy in this patient should not be generalized as the standard approach; cystoscopic retrieval should be considered when feasible, and the choice of procedure should be individualized and documented.

Declarations

Patient Consent for Publication: Written informed consent for publication of the clinical details and images was obtained from the patient.
Ethical Approval: Not applicable to this single-patient case report.
Conflict of Interest: The authors declare no conflict of interest.
Funding: No specific funding was received for this work.
Author Contributions: All authors contributed to manuscript preparation and critical revision, and approved the final version for submission.

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