Scientific Research Publishing

Open Journal of Urology, 2025, 15(3), 69-75
https://www.scirp.org/journal/oju
ISSN Online: 2160-5629
ISSN Print: 2160-5440

An Uncommon Complication of Suprapubic Catheter

Moses A. Ogunjimi[1,2], Abraham T. Oladimeji[3*], Olukayode A. Oseni[1], Emmanuel A. Jeje[1,2]

[1]Department of Surgery, Lagos University Teaching Hospital, Lagos, Nigeria
[2]College of Medicine, University of Lagos, Lagos, Nigeria
[3]Urology Unit, Department of Surgery, Federal Medical Centre, Lagos, Nigeria
Email: *babscology@yahoo.com

How to cite this paper: Ogunjimi, M.A., Oladimeji, A.T., Oseni, O.A. and Jeje, E.A. (2025) An Uncommon Complication of Suprapubic Catheter. *Open Journal of Urology*, **15**, 69-75.
https://doi.org/10.4236/oju.2025.153008

Received: February 2, 2025
Accepted: March 10, 2025
Published: March 13, 2025

Abstract

We report an uncommon complication of indwelling suprapubic catheter in an adult male. Suprapubic catheterization is a form of urinary diversion which is often indicated in patients with urethral stricture and bladder neck stenosis. Suprapubic catheter can also be placed post-operatively to allow for the urinary bladder and urethral to heal properly after being operated on. However, when a suprapubic catheter is retained for longer than necessary, it can serve as a nidus for stone formation in the bladder. Hence, to prevent complications like this, healthcare providers should pay significant attention to the regular care of suprapubic catheters and adequately educate patients on the same if suprapubic catheter is indicated. After evaluation, our patient had suprapubic cystostomy and removal of the retained catheter. The immediate post-operative period was uneventful, and he has been on follow-up for definitive interventions.

Keywords

Retained Suprapubic Catheter, Suprapubic Cystostomy, Complications of Urinary Catheter, Bladder Stone

1. Introduction

Suprapubic catheterization is a form of urinary diversion which is often indicated in patients with urethral stricture, bladder neck stenosis, and in some functional causes of bladder outlet obstruction such as neurogenic urinary bladder [1]. Suprapubic catheters can also be used post-operatively to allow for the healing of the urinary bladder and or urethra after surgeries on these organs [2]. The catheter being a foreign body, is often encrusted with calcium oxalate and other constitu-

ents of urine within the urinary bladder. If infection supersedes, rapid aggregation of more solutes may occur as struvite on the nascent stone [3]. It may become very difficult to remove suprapubic catheter in the usual way because of stone formation around it. This usually occurs more over the balloon of latex catheters when they have been left *in-situ* for a very long time [4]. The incidence of retained suprapubic catheter is 0.07% to 2.2% [5].

Prolonged indwelling urinary catheters are also often associated with other complications such as bacteriuria, peri-catheter leakage, and trauma to the urothelium apart from the uncommon occurrence of stone formation [6]. The treatment options available for retained suprapubic catheter due to calculus over the catheter's balloon include open cystolithotomy, Extracorporeal Shock Wave Lithotripsy (ESWL) and percutaneous cystolithotripsy [7]. We recently managed a patient who had a neglected suprapubic catheter for forty months (one of the longest documented durations) with resultant stone formation around the catheter's balloon. We believe that this report should improve the practices of general medical practitioners who see patients with temporary urinary catheters regularly to avoid this preventable complication in others.

2. Case Report

A 66-year-old man with a retained suprapubic catheter and peri-catheter leakage of purulent urine recently presented with a referral for management at our outpatient urology clinic. He had fallen into a soak-away pit about 6 years prior to the presentation and had profuse urethral bleeding (suggestive of trauma to the urethra following hitting the perineum against hard structure) which resolved spontaneously then. He subsequently developed acute urinary retention a few weeks after sustaining the urethral trauma and he had a suprapubic cystostomy done at a private hospital after failed attempts at urethral catheterization. He was changing the latex suprapubic catheter monthly until forty months before his presentation to us when he defaulted from follow-up with his previous doctor. He defaulted because of prolonged follow-up with no date for definitive intervention insight.

Physical examination revealed an anxious, elderly man with offensive ammoniacal odour, who had an indwelling discoloured and amputated suprapubic catheter *in-situ*, but he was otherwise healthy looking. The short stump of the catheter was projecting over the suprapubic region with copious egress of purulent urine around it. **Figure 1**. There was marked tenderness around the suprapubic cystostomy site, but his urinary bladder was not distended. An examination of his external genitalia revealed induration along the bulbar urethra; however, systemic examination revealed no other abnormalities.

The results of his relevant laboratory investigations, which included complete blood count, serum electrolytes urea and creatinine were all normal. Urinalysis showed trace of blood and many leucocytes (+++) only. Urine microscopy, culture and sensitivity revealed triple phosphate crystal and the growth of Proteus

mirabilis sensitive to amoxicillin clavulanate. A plain abdominal radiograph was taken, and it revealed complete calcification of balloon of the indwelling catheter he had *in-situ* (Figure 2(a)).

The diagnosis of a retained suprapubic catheter secondary to stone formation around the catheter with background post-traumatic urethral stricture was made. He was duly investigated and properly counselled for surgical treatment after controlling the active urinary tract infection which he also had. He consented and underwent open suprapubic cystolithotomy under local anaesthesia with conscious sedation. The catheter stump with the stone around the balloon was retrieved. Figure 2(b). A new suprapubic catheter was also inserted via a new stoma for continuous bladder drainage. He has since been attending the urology clinic faithfully for necessary follow-up and for appropriate planning for the definitive treatment of the primary condition (urethral stricture) which necessitated his use of suprapubic catheter is presently ongoing.

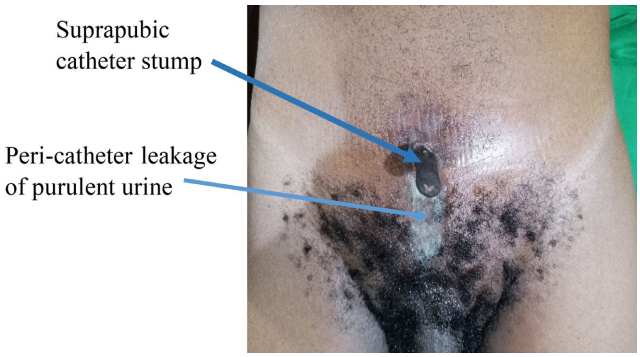

Figure 1. Catheter stump with peri-catheter leakage of purulent urine in the suprapubic region.

Figure 2. (a) Plain abdominal radiograph showing oval calcific density centrally located in the pelvis; (b) Surgical specimen consisting of the Catheter stump with calcified balloon.

3. Discussion

Retention of urethral or suprapubic catheters may occur because of several reasons. Known and reported causes of such retention include encrustations or stone

formation around the intravesical parts of the catheter [7] [9], faulty balloon mechanism, and cuffing effect of the deflated balloon [6]. Long-term catheter bladder drainage may result in bladder stone formation uncommonly; with a reported incidence of 0.07% to 2.2% in patients with chronic indwelling catheters [5]. Our index case had a big calculus formed around the balloon of his indwelling catheter which had overstayed for over three years without the usual recommended regular replacements.

Bacteriuria in the presence of an indwelling catheter is often unavoidable, the duration of catheterization being the most important risk factor for it. The incidence of bacteriuria in catheterized patients has been reported to be approximately 10% per day of catheterization [10]. With bacteriuria in catheterized individuals, there are often at least two colonies of bacteria identifiable. These include the bacteria growing in the urine (Planktonic growth) and those responsible for Biofilm growth (layers of organism on the infected indwelling catheters) which provides surface for crystal precipitation and aggregation [5]. The initial event in urinary catheter biofilm formation is development of a conditioning film by bacteria which consists of proteins, electrolytes, and other organics adhering to the catheter surface. Thereafter, free-floating bacteria attach to the conditioning layer via hydrophobic interactions, electrostatic interactions, and flagella. The microorganisms attached to the catheter surface secrete exopolysaccharides forming gel-like matrix (extracellular polysaccharide matrix of bacterial glycocalyces) to reinforce their attachment. Bacteria multiply and spread over the surface and form a loosely packed three-dimensional (3D) structure. Lastly, individual organism detaches from the biofilm to complete the life cycle [11]. The urinary protein and salts from the patient often complex with this bacterial matrix, leading to encrustations of the catheter [12]. Colonization with urea-splitting organisms usually raises urinary pH through conversion of urea into ammonia. This alkaline medium further enhances the precipitation of magnesium-ammonium-sulfate (struvite) and apatite (calcium-phosphate) crystals on the catheter encrustations leading to calculus formation. This scenario is typical and is in keeping with the findings in our patient whose urine microscopy showed triple phosphate crystals and whose urine culture also yielded growth of Proteus mirabilis (a urea-splitting organism). The Proteus mirabilis increases the pH of the urine which enhances crystallization and with aggregation an infected or struvite stone is formed. The plain abdominal x-rays done showed a huge calcific density (radio-opaque calculus) within the pelvis in the region of urinary bladder.

Our index patient had the retained suprapubic catheter indwelling for more than three years without being changed. This time duration was much longer than what was previously reported by Okwudili *et al.* in a 56-year-old man from Southeast Nigeria. Their own patient with bladder outlet obstruction secondary to benign prostatic enlargement that had a suprapubic catheter *in-situ* continuously for less than two years without changing it throughout the period [13].

Diverse therapeutic choices exist for managing retained urinary bladder cathe-

ters depending on the cause of catheter retention. The goal of treatment is to remove the retained catheter through the simplest and least invasive means without leaving fragments of the catheter or its balloon which may form a nidus for stone formation [14]. Minimally invasive option of the removal of retained urinary catheter due to stone formation involves the use of extracorporeal shock wave lithotripsy (ESWL) to fragment the stone [15]. Even though we don't have this facility in our practice, the removal of a stone of the size seen in our patient, who also had bladder outlet obstruction, would have been almost impossible using ESWL without any incision. Singh *et al.* [4] and Maison *et al.* [8] have also described the use of suprapubic cystostomy to remove retained suprapubic catheters due to stone formation over the catheter tip just like what we did for our patient.

4. Conclusion

We encourage healthcare providers to counsel patients with indwelling urinary catheters on the necessary regular care that are required with particular emphasis on the need for timely replacements of their urethral or suprapubic catheters to prevent catheter retention. The information leaflets accompanying their urinary catheters which should specify their indication, appropriate time for necessary changes, as well as other important care and possible complications should be properly explained and given to the patients. This measure will likely engender their cooperation and compliance with the necessary regular follow-up. Medical practitioners should entertain high index of suspicion for Suprapubic catheter retention due to stone formation when such indwelling catheters have not been changed for a long time after the specified period for routine changes.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Sheriff, M.K.M., Foley, S., McFarlane, J., Nauth-Misir, R., Craggs, M. and Shah, P.J.R. (1998) Long-term Suprapubic Catheterisation: Clinical Outcome and Satisfaction Survey. *Spinal Cord*, **36**, 171-176. https://doi.org/10.1038/sj.sc.3100536

[2] Morey, A.F., Brandes, S., Dugi, D.D., Armstrong, J.H., Breyer, B.N., Broghammer, J.A., et al. (2014) Urotrauma: AUA Guideline. *Journal of Urology*, **192**, 327-335. https://doi.org/10.1016/j.juro.2014.05.004

[3] Schwartz, B.F. and Stoller, M.L. (2000) The Vesical Calculus. *Urologic Clinics of North America*, **27**, 333-346. https://doi.org/10.1016/s0094-0143(05)70262-7

[4] Goel, A., Singh, D. and Vasudeva, P. (2010) 'Egg Shell' in Bladder: A Calculus around Neglected Foley Balloon Catheter. *Indian Journal of Urology*, **26**, 299-300. https://doi.org/10.4103/0970-1591.65410

[5] Kohler-Ockmore, J. and Feneley, R.C.L. (1996) Long-term Catheterization of the Bladder: Prevalence and Morbidity. *British Journal of Urology*, **77**, 347-351. https://doi.org/10.1046/j.1464-410x.1996.09074.x

[6] Robinson, J. (2005) Suprapubic Catheterization: Challenges in Changing Catheters. *British Journal of Community Nursing*, **10**, 461-464.

https://doi.org/10.12968/bjcn.2005.10.10.19859

[7] Gite, V.A., Sharma, S., Agrawal, M. and Shaw, V. (2021) Neglected Retained Suprapubic Catheter with Varied Management Options: A Case Series. *Journal of Society of Surgeons of Nepal*, **24**, 71-74. https://doi.org/10.3126/jssn.v24i2.42839

[8] Maison, P. and Yenli, E. (2022) Vesical Calculus around Neglected Foley's Catheter: Case Report. *Postgraduate Medical Journal of Ghana*, **2**, 109-111. https://doi.org/10.60014/pmjg.v2i2.45

[9] Ho, C.K., Khandasamy, Y., Singam, P., Hong Goh, E. and Zainuddin, Z. (2010) Encrusted and Incarcerated Urinary Bladder Catheter: What Are the Options? *Libyan Journal of Medicine*, **5**, 5686. https://doi.org/10.3402/ljm.v5i0.5686

[10] Williams, G.J. and Stickler, D.J. (2008) Effect of Triclosan on the Formation of Crystalline Biofilms by Mixed Communities of Urinary Tract Pathogens on Urinary Catheters. *Journal of Medical Microbiology*, **57**, 1135-1140. https://doi.org/10.1099/jmm.0.2008/002295-0

[11] Gayani, B., Dilhari, A., Kottegoda, N., Ratnaweera, D.R. and Weerasekera, M.M. (2021) Reduced Crystalline Biofilm Formation on Superhydrophobic Silicone Urinary Catheter Materials. *ACS Omega*, **6**, 11488-11496. https://doi.org/10.1021/acsomega.1c00560

[12] Getliffe, K. (2003) How to Manage Encrustation and Blockage of Foley Catheters. *Nursing Times*, **99**, 59-61.

[13] Okwudili, O.A., Nnabuife, A.O. and Ogbu, U.C. (2018) An Unusual Cause of Retained Suprapubic Foley Catheter-Case Report and Literature Review. *Archives of Urology*, **1**, 5-8. https://doi.org/10.22259/2638-5228.0101002

[14] Hukins, D.W.L., Hickey, D.S. and Kennedy, A.P. (1983) Catheter Encrustation by Struvite. *British Journal of Urology*, **55**, 304-305. https://doi.org/10.1111/j.1464-410x.1983.tb03304.x

[15] Kojima, Y., Yoshimura, M., Hayashi, Y., Asaka, H., Ando, Y. and Kohri, K. (1998) Extracorporeal Shock Wave Lithotripsy for Vesical Lithiasis. *Urologia Internationalis*, **61**, 35-38. https://doi.org/10.1159/000030281

Appendix

Medical Photography Consent Form

Patient's Name: _____ Date: 12/02/2025

☐Tick if minor or unable to provide consent

I consent for medical photographs to be made of me or my child (or person for whom I am a legal guardian). I understand that the information may be used in my medical records, for purposes of medical teaching, or for publication in medical photographs. I understand that I will not receive payment from any party. Refusal to consent to photographs will in no way affect the medical care I will receive. If I have any questions or wish to withdraw my consent in the future I may contact: _____

By signing this form, I confirm that this consent form has been explained to me in clear terms which I understand.

CHOOSE AS APPROPRIATE

1. I consent for these photographs to be used in medical publications, including medical journals, textbooks, and electronic publications. I understand that the image may be seen by members of the public, in addition to scientists and medical researchers that regularly use these publications in their professional education. Although these photographs will be used without identifying information such as my name, I understand that it is possible that someone may recognize me. I also agree for my image to be shown for teaching purposes to be used for my medical record.

   Signature_____ Witness_____

2. I agree for my image to be shown for teaching purposes AND to be used for my medical record but NOT FOR medical publication:

   Signature_____ Witness_____

3. I agree to use my image for medical records ONLY:

   Signature_____ Witness_____

4. I agree for my image to be shown for illustration purposes in the office for patient education and my medical record but NOT FOR medical publication.
   Signature_____ Witness_____

   For patients between ages 7 and 18 years a signature below indicates that the information in this consent form has been explained to me, and I assent to use of my images as outlined above:
   Signature_____ Witness_____