Method Article

RETAINED URETHRAL CATHETER: NOVEL METHOD OF REMOVAL USING TRANS-RECTAL ULTRASOUND GUIDANCE

ABSTRACT

Background

Urethral catheterization is a common procedure in medical practice. Retention of urethral catheter due to inability to deflate the balloon can be a distressing complication for the patient on prolonged indwelling urethral catheter. Several techniques have been devised for removal of such retained urethral catheters

Objective

The aim of this study is to present our experience in the management of retained urethral catheters using trans-rectal ultrasound-guided balloon puncture at the Urology unit of Usmanu Danfodiyo University Teaching Hospital Sokoto, Nigeria.

Methods

This was a prospective case series of five men referred to the unit with non–deflatable urethral catheters between July 2013 and January, 2014.

Results

Five men were referred with retained urethral catheters. The mean age of the patients was 46.4 years with a range of 25-80 years. Indications for catheterization were benign prostatic hyperplasia, burns, and paraplegia. All had successful catheter removal by ultrasound-guided balloon puncture

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Conclusion

Retained urethral catheter can be successfully managed by trans-rectal ultrasound guided balloon puncture which is minimally invasive and does not require regional or general anaesthesia.

Key words: ***urethral catheterization complications, retained urethral catheter, trans-rectal ultrasound-guided removal***.

Introduction

Urethral catheterization is one of the most commonly performed invasive procedure on the hospitalized patient and is done for a variety of medical and surgical indications [1-2]. Though apparently a simple procedure, urethral catheterization may be associated with certain complications especially when the duration of indwelling is prolonged. These complications include urinary tract infection, urethritis, entero-vesical fistula, urethral strictures and rarely, death [3-8]. However, retention of urethral catheter is a rare complication of this procedure which may be a source of significant distress to the patient, relatives and the physician.

The causes of retained and non-deflating urethral catheters include mechanical obstruction of the inflation lumen, crystallization of inappropriate balloon fluids such as normal saline, defective valve, obstruction of the inflation channel by debris, error in deflation technique and heavy encrustation of salt deposits [9-10]. Other rare documented causes of retained urethral catheters include catheter fracture [11], and wrong and inadvertent placement in the proximal ureter [12]

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We describe a technique we used in the management a series of patients who presented to our practice with retained urethral catheters.

Patients and Methods

Between July 2013 and January 2014, five male patients were referred to us with retained urethral catheters. Attempts at removal by the referral medical teams had been unsuccessful. All the patients were clinically assessed and the indications for urethral catheterization were noted. Each was counselled and informed consent was obtained. Intravenous antibiotics comprising of 1gram of ceftriaxone was administered. Patient was placed in the left lateral position and 20 ml of lignocaine jelly was introduced rectally and allowed for a minimum of five minutes in order to achieve rectal anaesthesia. 6.5Mz rectal probe coupled to a needle guide and semi-automatic prostate biopsy gun after covering the probe with condom containing ultrasound jelly was introduced into the rectum. The urinary bladder with the non-deflating catheter balloon was imaged. Under ultrasound guidance, the catheter balloon was punctured and the catheter removed.

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Results

The mean age was 46.4 years with a range of 25-80 years

Indications for urethral catheterizations were benign prostatic hyperplasia 2, burns 1 and spinal cord injury with paraplegia 2

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All patients had successful catheter removal by ultrasound-guided trans-rectal balloon puncture. None of the patients developed signs of sepsis.

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All were promptly discharged to the referring physician.

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Discussion

Retained or non-deflating urethral catheter balloon though an uncommon problem may be a source of anxiety to the patient, relatives and the attending physician and this may necessitate referral to the urologist. Most of the cases in this series were observed in men although there have been reports of occurrence and treatment in women [13, 14]. The higher incidence of retained urethral catheters in men is due to the anatomic differences between the sexes as well as the more frequent indication for urethral catheterization in male subjects. After insertion, the urethral catheter is maintained in its position by inflation of the balloon with sterile water and this may be later removed by deflation using a syringe attached to the balloon port.

A variety of techniques have been devised for the management of these patients usually beginning from the simplest, less invasive to more invasive techniques. However, each of these techniques may pose potential risks to the patient. Hollingsworth et al [13], and Shapiro et al [15] have provided an algorithm for the management of retained urethral catheters ranging from flushing, aspiration, hyperinflation of the balloon, cutting of the balloon port proximal to the inflation valve, passing of a wire through the inflation channel, passing of central venous catheter over a pre-placed guide-wire, rupture of the balloon using a variety of chemical solutions and balloon puncture via transurethral, percutaneous and endoscopic routes. Balloon hyperinflation may result in rupture and the deposition of fragments which may form nidus for calculus formation. Chemical deflation techniques using ether or chloroform may result in bladder irritation and chemical cystitis and in patients with vesico-ureteral reflux may result in chemical reflux with subsequent renal injury.

Endoscopic removal of retained urethral catheters using flexible cystoscope and subsequent balloon puncture using trans-bronchial aspiration needle has been reported by Khan et al [16]. Removal of retained urethral catheters by trans-abdominal punctures may be carried out either as a blind procedure, under

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fluoroscopy or by ultrasound guidance [17]. Transabdominal balloon method, although may be easy to carry out, is associated with significant risk of bowel injuries especially if the urinary bladder is not fully distended. In addition to this, it may be difficult in obese patients due to the thick pad of adipose tissue in the anterior abdominal wall.

Our patients were referred to the Urology unit from other units after failed attempts at removal of the urethral catheters by the referring physicians. We were able to remove these by ultrasound- guided transrectal puncture of the balloons. Though this method of removal of retained urethral catheters may not be available in the usual Accident and Emergency room, all our patients were electively referred to us. As Urologists, we are familiar with the use of transrectal ultrasound in the evaluation and treatment of the diseases of the prostate, urinary bladder and the seminal vesicles [18, 19], thus obviating the technical challenge other non-urologist physicians may encounter in the application of this procedure. During this procedure, further evaluation of the prostate including its volume, echotexture and targeted biopsies may be undertaken in those subjects in whom the reason for initial catheterization was due to an enlarged prostate. The close anatomical relationship between the rectum and the urinary bladder enables direct access and thus easier puncture of the retained balloon. This route almost eliminates the possibility of small bowel injuries even in the presence of inadequately distended urinary bladder.

During the procedure, analgesia/anaesthesia was achieved by intra-rectal instillation of lignocaine jelly which we found to be adequate for the procedure as similarly applied during trans-rectal ultrasound-guided prostate biopsy [20]. Reports abound in the literature of other means of achieving anesthesia during transrectal ultrasound-guided prostate biopsies such as periprostatic nerve block, caudal blocks each alone or combinations, each method has demonstrated differing outcomes [20-24]. However, our patients had transrectal ultrasound-guided

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procedure for a different reason unlike in prostate biopsy patients in whom the procedure is usually elective in nature and the associated psychological and emotional complications that occur anticipatory to the probable result of the investigation may influence pain perception and tolerance in these subjects. The above reason may be the reason why more invasive anaesthetic procedures may be needed in patients undergoing transrectal prostate biopsy unlike those who underwent removal of retained catheter balloons.

One of the complications of invasive transrectal procedure is infective episodes which although not frequently encountered may occur as a result of transrectal introduction of microorganisms into the general circulation and this may be a reason for hospital admission with consequent morbidity and mortality[25, 26]. Several methods have been applied to prevent occurrence of sepsis ranging from use rectal enema and administration of antibiotics [27, 28]. All our patients had intravenous peri-procedural antibiotics and there were no infective complications among them.

Conclusion

Retained urethral catheter may be managed by the practising urologist through ultrasound-guided balloon puncture. This procedure in the hands of trained personnel and with administration of prophylactic antibiotics is safe and effective.

Conflict of interest: none declared.

References

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1. Bhatia N, Daga MK, Garg S, Prakash SK. Urinary catheterization in Medical Wards. J Glob Infect Dis 2010; 2: 83-90.
2. Harrison SCW. Managing the urinary tract in spinal cord injury. Indian J Urol. 2010; 26:245-252.
3. Nicolle LE. Catheter associated urinary tract Infections. Antimicrobial Resistance and Infection Control 2014; 3:23.
4. Ikeuerowo SO, Ogunade AA, Ogunlowo TO, Uzodinma CC, and Esho J. The Burden of prolonged indwelling catheter after acute urinary retention in Ikeja- Lagos, Nigeria. BMC Urology 2007; 7: 16.
5. Igawa Y, Wyndale JJ, Nishizawa O. Catheterization: Possible complications and their prevention and treatment. International Journal of Urology 2008; 15: 481-485.
6. Hawary A, Clark L, Taylor A, Duffy P. Enterovesical fistula: a rare complication of urethral catheterization. Advances in urology ID. 591204, 3 pages.
7. Popoola AA, Oseni I, Bamgbola KT, Babeta AL, Toxic catheters and urethral: A concern about types of catheters used in resource-poor countries. African Journal of Urology 2012; 18: 157-160
8. Paul ABM, Simms L, Paul AE, , Mahesan AA, Ramzanali A. a rare cause of Death in a woman: Iatrogenic Bladder Rupture in a patient with an indwelling Foley catheter. Urology Case reports, 2016; 6: 30-32.
9. Huang Y-M, Fu Y-T, Liu H-Y, Hu P. Undeflatable Foley Catheter Balloon caused by a Jelly Plug. Urol ROC, 2000; 11: 105-107.
10. Ho Christopher CK, Khandasam Y, Singam P, Goh EH, Zainuddin ZM. Encrusted and incarcerated urinary bladder: what are the options? Libyan J med 2010; 5: 5686.
11. Shapiro AJ, Soderdhl DW, Stack RS. The 'Fractured Foley': An unusual complication of short-term urethral catheterization. Hospital Physician 2000; 39-40.

12. Mc Gregor TB and Sharda R. Case reports in Urology, Volume 2016, ID 9178645, 3 pages.
13. Hollingsworth M, Quiroz F, Gurdnick ML. The management of retained Foley catheters. The Canadian Journal of Urology, 2004: 11: 1749-1752.
14. Lin T-C, Shieh HL, Lin MS, Chen CT, Wu CS, Lin YC. An Alternative Technique for Deflation of a Non-deflating Balloon in a small Calibre F8 Foley Catheter in Women. JUTA 2009; 20: 32-33.
15. Shapiro AJ, Soderdhl DW, Stack RS. Managing the Non-deflating Urethral Catheter. J Am Board Fam Pract 2000; 13: 116-119.
16. Khan Z, Khan UT, Khan I, Khan TN. A Novel, Safe Way of removing Non-Deflatable Bladder Catheters. Open Journal of Urology, 2012;2:243-245.
17. Lee WMM, Tsui KL, Kam CW. Transabdominal Ultrasound-guided suprapubic puncture of a non-deflating Foley balloon. Hong Kong j.emerg.med, 2005; 12: 42-45.
18. Tyloch JF, Wieczorek AP. The standards of an ultrasound examination of the prostate gland, Part 2. J Ultrason 2017; 17:43-58.
19. Harvey CJ, Pilcher J, Richenberg J, Patel U, Frauscher F. Applications of transrectal ultrasound in prostate cancer. The British Journal of radiology 2012; 85: S3-S17.
20. Yan P, Wang X-Y, Zhang Y. Local anaesthesia for pain control during transrectal ultrasound-guided prostate biopsy: a systematic review and meta-analysis. Journal of pain Research 2016:9.
21. Hiros M, Selimovic M, Spahovic H, Sadovic S, Spuzic-Celic E. Transrectal ultrasound-guided prostate biopsy , periprostatic local anaesthesia and pain tolerance. Bosnian journal of basic Medical Sciences, 2010; 18: 68-72.

22. Wang N, Fu Y, Ma H, Wang J, Gao Y. Advantages of caudal block over intrarectal local anaesthesia plus periprostatic nerve block for transrectal ultrasound-guided prostate biopsy. Pak J Med Sci. 2016; 32: 978-982.
23. Obi A and Nnodi P. Low dose spinal saddle block anaesthesia (with 0.3ml bupivacaine) for transrectal Prostate biopsy- Experience with 120 cases. Journal of Urology, 2014; 191 (49): e 596.
24. Grivan MS, Kumar A, Sen J, Singh K. Comparative Evaluation of periprostatic nerve block and diclofenac patch in transrectal ultrasound-guided prostatic needle biopsy. Nephro-Urol Mon, 2012; 4: 560-564.
25. Carignan A, Roussy J-F, Lapointe V, Valiquette L, Sabbagh R, Peppin J. Increasing risk of infectious complications after transrectal ultrasound-guided prostate biopsies: time to reassess antimicrobial prophylaxis, European Urology 2012; 62: 453-459.
26. Bootsma AMJ, Lagune Pes M, Geerlings SE, Goossens A. Antibiotics prophylaxis in urological procedures: a systematic review. Euro Urol 2008; 54: 1270- 1286.
27. Kam SC, Choi SM, Yoon S, Choi JH, Lee SH, Hwa JS, Chung KH, Hyun JS. Complications of transrectal ultrasound-guided biopsy: Impact of prebiopsy enema. Korean J Urol 2014; 55: 732-736,
28. Walker JT, Singla N, Roehrborn CG. Reducing infectious complications following transrectal ultrasound-guided prostate biopsy: Systematic Review. Rev Urol. 2016; 18: 73-89.

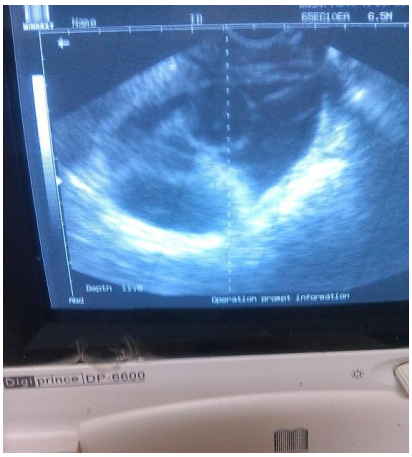

Figure 2

Trans-rectal ultrasound image of the retained catheter balloon demonstrated the needle guide tract.

Figure 1

6.5MHz rectal probe coupled to a needle guide and semi-automatic prostate biopsy gun after covering the probe with condom containing ultrasound jelly was introduced into the rectum