The management of retained Foley catheters

Margarita Hollingsworth, MD,[1] Francisco Quiroz, MD,[2] Michael L. Guralnick, MD[1]

[1]Department of Urology, Medical College of Wisconsin, Milwaukee, WI, USA
[2]Department of Radiology, Medical College of Wisconsin, Milwaukee, WI, USA

HOLLINGSWORTH M, QUIROZ F, GURALNICK ML. The management of retained Foley catheters. The Canadian Journal of Urology. 2004;11(1):2163-2166.

Objective: *To review our experience in managing the uncommon problem of a retained Foley catheter secondary to an inability to deflate the catheter balloon.*
Methods: *A chart review of 13 patients in whom it was not possible to deflate their Foley catheter balloons was performed. We review the various techniques used to deflate their catheter balloons and present a modified algorithm.*
Results: *In 23% of our patients, passive aspiration with a syringe successfully deflated the balloon. In 31% of our patients, cutting the catheter with or without subsequent aspiration successfully deflated the balloon. In 15% of our patients, a wire passed through the balloon port successfully deflated the balloon. Thirty one percent of our patients required more invasive maneuvers with extraluminal balloon puncture either transvaginally, transurethrally, or suprapubically.*
Conclusions: *There are a variety of non-invasive and invasive techniques to manage the problem of an inability to remove a Foley catheter. The urologist should be aware of these options and the appropriate order in which they should be used.*

Key Words: prostatic neoplasms, neoplasm staging, biopsy, prognosis

Accepted for publication November 2003

Address correspondences to Dr. Michael Guralnick, Department of Urology, Medical College of Wisconsin, 9200 W Wisconsin Avenue, Milwaukee WI, 53226 USA

Introduction

The to deflate a Foley catheter balloon is an uncommonly encountered problem in patients

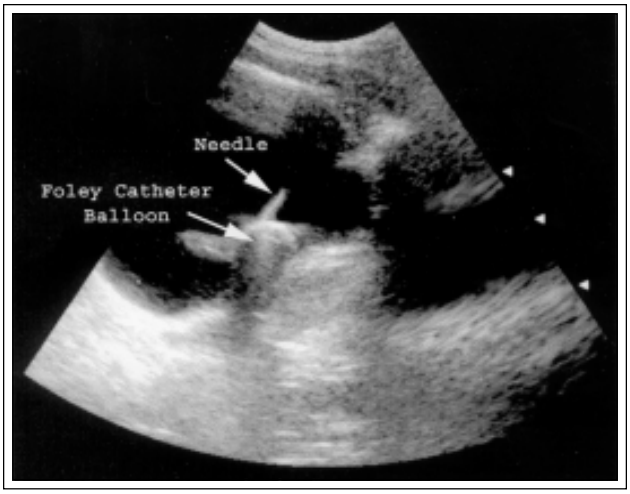

Figure 1a. Ultrasound showing foley catheter and spinal needle.

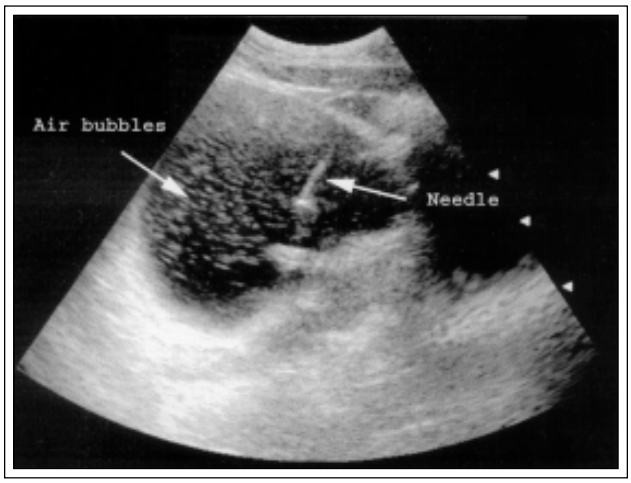

Figure 1b. Air bubbles seen after the balloon is burst with the spinal needle.

with indwelling urinary catheters. When it does happen, one tries to approach the problem with the least invasive method of deflation. However, one must be prepared for more invasive techniques should simpler methods fail. There are reports dating back to the early 1970's outlining different approaches to removing a Foley catheter due to an undeflatable balloon. Some of the techniques involve injecting toxic substances such as ether or chloroform into the balloon to burst it.[1] Unfortunately, these compounds can cause cystitis and may no longer be available in many hospitals. Other reports involve invasive devices such as the harpoon device to remove the balloon.[2] Daneshmand et al[3] proposed an algorithm for the removal of retained catheters. We recently encountered a series of patients in whom the nursing staff was unable to remove urethral Foley catheters. We present our experience in removing these catheters and discuss the management of retained Foley catheters, including a modification of the algorithm proposed by Daneshmand et al.[3]

Methods

Between May 2002 and January 2003, we encountered 13 incidents of retained Foley catheters. We reviewed the charts and management of the catheters in these patients.

Results

Eleven males and two females were included in this review. All catheters were latex catheters filled with 10 ml of sterile water as supplied in the catheter kit (Bard). Twelve of the 13 were 16 F 2-way catheters while one was a 20 F 2-way catheter. Eleven catheters were placed peri-operatively for non-urologic surgery. Two were placed on the wards by the medicine service. All were left indwelling for no more than 7 days.

In all cases, an attempt was made to aspirate the fluid from the balloon port using a 10 ml syringe. In 3 of the 13 cases, the balloon deflated with prolonged attachment (30 minutes or more) of the syringe to the balloon port without active aspiration. One catheter was removed by cutting the catheter with resultant drainage of the balloon fluid. In 3 out of 13, the balloon fluid was aspirated by transecting the side arm balloon port and then inserting an angiocatheter needle or twin-pak cannula, into the balloon channel. One patient had the balloon drained by passing the stiff end of a .025 inch guidewire into the balloon channel and puncturing the balloon. Another patient had the balloon port cut and a .025 guidewire inserted into the balloon port and left in place overnight, with the wire acting as a wick for the water to drain out. The balloon deflated in a couple of hours and the catheter was removed. Four of the 13 patients required extraluminal balloon puncture – one with a needle placed alongside the catheter transurethrally, one by transvaginal puncture of the balloon with traction on the catheter, and two by ultrasound-guided percutaneous suprapubic puncture with a spinal needle Figure 1a and Figure 1b. In all cases, the catheter was removed without any loss of rubber from the balloon.

Discussion

A Foley catheter balloon is inflated and deflated by using a syringe to press against a piston valve in the balloon port. Upon removal of the syringe, the piston returns to its resting position which prevents the inflow or outflow of fluid. Normally the balloon fluid is aspirated in a few seconds. However, if there is an obstruction anywhere along the channel or malfunction of the valve itself, the fluid will not be able to be aspirated and the catheter is retained. Debris and salts can be deposited in the balloon or in the channel if one uses other fluids such as normal saline or urine to fill the balloon. The salts can precipitate and block the channel.

A variety of methods for removing a retained Foley catheter have been described. These range from simply cutting the balloon port to endoscopic removal of the catheter. There have been numerous reports of instilling various substances into the balloon to purposely rupture it. These include ether, mineral oil, chloroform, carbon tetrachloride or toluene.[1,4,5-8] However, these substances can cause a severe chemical cystitis resulting in irritative symptoms and a fibrotic or necrotic bladder. In extreme cases, patients have required supravesical diversion or augmentation cystoplasty, and even nephroureterectomy in a patient with undiagnosed reflux.[4,6,8] Because of these serious complications, many urologists have abandoned these techniques for safer methods and many hospitals no longer stock these chemicals.

One would thus obviously like to use the least invasive approach if possible. We noted in 23% of our patients that prolonged attachment of the syringe to the balloon port without active aspiration was successful in deflating the balloon. This was serendipitously found when the nurse had left the syringe attached to the balloon port while waiting for the urology resident to arrive to manage the inability to deflate the balloon. By the time the urology resident arrived (often after 20 minutes), the syringe had filled with the water and the catheter was easily removed. Presumably, the constant pressure exerted by the syringe on the piston valve allowed for the pressure within the balloon itself to gradually force out the fluid. By not aspirating with the syringe at the same time there is no coaptation of the walls of the balloon channel which otherwise would prevent flow.

When this fails, it is generally recommended to cut the side arm of the catheter.[3] If the balloon fluid effluxes, then one has identified the valve itself as the culprit and the catheter can be removed. We found this to be successful in 8% of our patients. If this fails, then the obstruction must be more proximate to the balloon. We found that by placing an angiocatheter needle or twin-pak cannula into the cut side arm, we were able to aspirate the balloon fluid in 23% of patients. Others have tried inserting a wire into the balloon channel to either unblock debris in the channel, or even puncture the balloon.[1,4] We found that this worked in 15% patients. Gulmez et al, found this only worked in 2/50 catheters but nevertheless we believe it is worth an attempt as the next options are more invasive.[5]

When the above measures are unsuccessful, direct puncture of the balloon with a needle will be required. This can be performed transurethrally,[2] transvaginally,[9] and suprapubically.[3,5] We have tried all three approaches with success. In females, the catheter is placed on traction to bring the balloon to the bladder neck and then a needle is passed either transurethrally or transvaginally to puncture the balloon. In males, percutaneous suprapubic puncture of the balloon is performed either under fluoroscopic[10] or ultrasound guidance.[3,11] We agree with Daneshmand et al that ultrasound-guided suprapubic puncture is the easiest and safest method.[3] The bladder can be distended with saline through the catheter and the balloon easily visualized ultrasonographically. The suprapubic area is prepped and infiltrated with local anesthetic and then a spinal needle (18-22 gauge) inserted percutaneously under ultrasound guidance to puncture the balloon (Figure 1a and Figure 1b). This was required in two of our patients and was successful and well tolerated. Once the catheter had been removed, it was thoroughly inspected to ensure that there were no fragments left in the bladder. This lack of fragmentation is supported by the study of Gulmez et al, who noted no fragments when a Foley balloon is deflated by way of a needle compared to using ether, over-inflation, or ureteral stylet.[5] If there is any doubt, cystoscopy should be performed to remove any possible pieces.

One of the authors (MLG) has had experience in one patient in whom ultrasound guided suprapubic puncture was unsuccessful. This was in a neurogenic patient with an indwelling Foley catheter for 3 weeks and all the aforementioned methods failed to deflate the balloon. At the time of ultrasound guided suprapubic puncture, the ultrasonographer noted that when the needle touched the balloon it was rigid and the ultrasound image suggested calcification. An

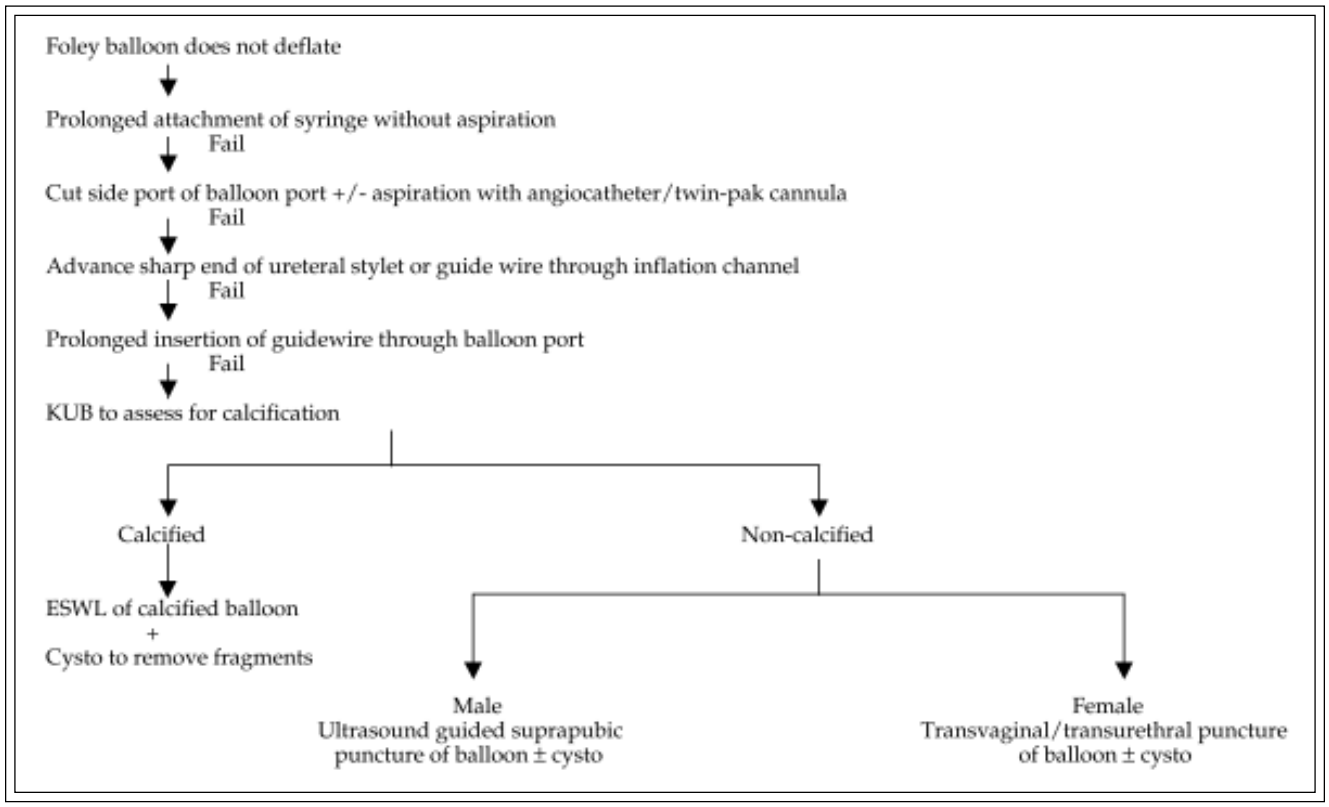

Figure 2. Algorithm for removal of retained Foley catheter (modified from Daneshmand et al)[3].

x-ray confirmed that the catheter balloon had become completely encrusted with calcification. The patient then had ESWL of the balloon which resulted in fragmentation, and cystoscopy was performed to remove all the pieces.

In their review, Daneshmand et al proposed an algorithm for managing patients with retained Foley catheters.[3] Based on our experience, we have made slight modifications to this algorithm Figure 2.

References

1. Chin PL, Singh RK, Athey G. Removal of retained urinary catheters. *Br J Urol* 1996;56:185-187.
2. O'Flynn KJ, Thomas DG, Hardy A. Harpoon device for removal of obstructed balloon catheters. *Br J Urol* 1992;69:217-218.
3. Daneshmand S, Youssefzadeh D, Skinner EC. Review of techniques to remove a foley catheter when the balloon does not deflate. *Urol* 2002;59:127-129.
4. Gattegno B, Michel F, Thibault Ph. A serious complication of vesical ether instillation: ether cystitis. J of Urol 1988;139:357-358.
5. Gulmez I, Ekmekcioglu O, Karacagil M. A comparison of various methods to burst Foley catheter balloons and the risk of free-fragment formation. *Br J Urol* 1996;77:716-718.
6. Kamat NN. Methods of bursting Foley catheter balloons. *Br J Urol* 1997; 80:192.
7. Khanna S. Preliminary results with toluene for retained urinary catheters. *Eur Urol* 1991;19:169-170.
8. Lebowitz RL, Effmann EL. Ether cystitis. *Urol* 1978;12:427-428.
9. Kleeman FJ. Technique for removal of Foley catheter when balloon does not deflate. *Urol* 1983;21:416.
10. Moisey CU, Williams LA. Self-retained balloon catheters – a safe method for removal. *Br J Urol* 1980;52:67.
11. Moffat LE, Teo C, Dawson I. Ultrasound in management of undeflatable Foley catheter balloon. *Urol* 1985;26:79.