

Original Article

Two New Techniques for Management of Non-Deflating Foley Catheters in Men

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HIGHLIGHTS

- New techniques for removal of Foley catheters with non-deflating balloons are challenging.
- These outpatient techniques are safe, simple, effective, and less invasive.
- They can be used simply in all patients without the need for special instruments or equipment.

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Introduction

Urologists are frequently called upon for the removal of non-deflating Foley catheters. The basic strategy to accomplish removal involves relieving obstruction of the blocked balloon port-channel or puncturing the balloon. The majority of urinary catheters have a distal balloon that is filled with 5-10 ml of sterile water to prevent the catheter from dislodging and falling out (1). Removal of the catheter requires that this balloon be emptied, but occasionally the catheter balloon will fail to deflate (2).

ABSTRACT

Introduction

Implicating two new techniques for removal of Foley catheters with non-deflating balloons.

Methods

Thirty-two male patients with non-deflating Foley catheters were managed by cutting balloon channel along the length of Foley catheters to bypass the possible obstruction in the lumen of the balloon channel and if failed, we introduced a suprapubic needle towards the tip of the index finger, which was introduced transrectally to palpate the bladder neck and push it up and get the balloon punctured.

Results

In 25 of 32 patients the Foley catheters were removed by cutting the balloon channel interruptedly. Seven patients required suprapubic needling to puncture the catheters' balloons for catheter removal.

Conclusions

These outpatient techniques are safe, simple, effective, and less invasive. They can be used simply in all patients without the need for special instruments or equipment.

Keywords: Foley Catheter; Urinary Catheter; Balloon Catheter; Deflating Technique; Non-Deflating

Often the personnel at the emergency department will have removed the deflation port from the catheter in the hope that the balloon will drain because of passive deflation, the water from the balloon being expelled down the inflation or deflation channel of the catheter (3).

Foley catheters are widely used for various reasons of bladder drainage. Major factors predisposing to non-deflating balloons include faulty catheter balloon valves and channels, the use of inflating fluid such as saline or blood-contaminated water that may crystallize

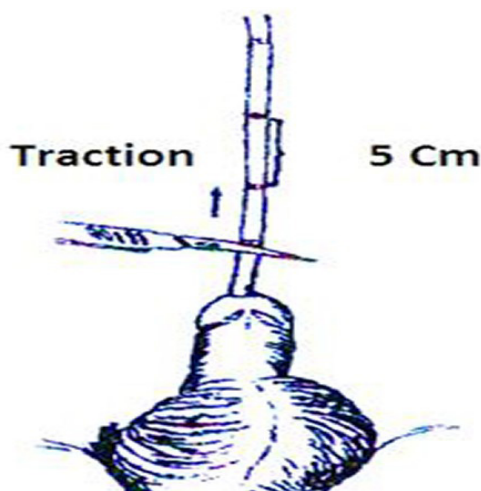


Figure 1. Schematic presentation of cutting balloon channel by knife

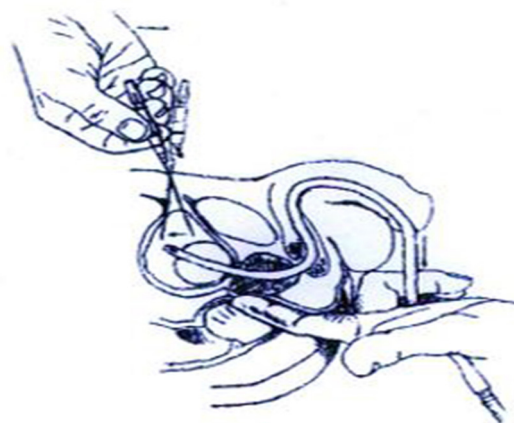


Figure 2. Schematic presentation of uprapubic needling of balloon

which allows debris to block the balloon channel, and long duration of urinary catheterization. The catheter can be associated with urinary tract infection offending pathogens, antimicrobial sensitivity, and complications (4). There are several methods for removing non-deflating Foley catheters including introducing a guide wire into the lumen of the balloon inflation channel and if not possible use of an ultrasound guide for puncturing the balloon (5). In this report, we present two new techniques of retained urinary catheter removal, in which removal of the catheter inflation port has not permitted removal of the catheter.

Methods

The two techniques were used in patients with non-deflating Foley catheters. The patients were referred to or admitted to our hospital for catheter removal. The study protocol was approved by Ethics Committee (IR.TUMS.VCR.REC.1393.750) and followed the rules of the declaration of Helsinki as a Quasi-experimental study. Written informed consent was obtained from all participants. All patients were planned to be managed on an outpatient basis or bedside procedures for removal of non-deflating Foley catheters. The deflation ports of the catheters were already removed in all patients in the hope that the balloon will drain because of passive deflation, but the balloon was not deflated in these patients. For removing the catheters, the precise location of the balloon channel was estimated on each catheter and a small cut was given on the channel by knife with a distance of five centimeters apart starting from the cut end of the deflation port toward the balloon and as reaching close to glans whilst gentle traction is maintained on the catheter. At the same time, we asked the patients to retract their penis while cutting the balloon channel as close as possible to the balloon. The procedure would be successful if a flush of fluid from the channel indicating deflation of the balloon was observed. The physician should take care of

his/her eyes by wearing eyeglasses because a severe flash of fluid may contaminate the eyes (Figure 1).

If still not succeeded, we used another technique by putting the patient in frog-leg position, while gentle traction of the catheter to maintain the catheter balloon just close to bladder neck at the midline. With the left index finger, we then did transrectal palpation of bladder neck at midline, and with the other hand, we inserted a 16-gauge intravenous cannula needle suprapubic at midline 2 centimeters above pubic symphysis (maintaining the left index finger in place and pushing the balloon upwards which simultaneously moves the balloon closer to the puncture site) towards the tip of the left index finger in the rectum. One must try to puncture the balloon by moving the needle at the sagittal axis in the midline. If the patient is obese one can use a lumbar puncture needle instead since it is longer than an intravenous cannula. By using transrectal finger palpation of the balloon we can obtain better targeting of the needle tip towards the non-deflated balloon getting the help of the position sensation and mindful three-dimensional mapping (Figure 2). Usually, the balloon will burst with an audible pop. After removing the catheter, it is inspected closely for missing pieces of balloon rubber.

Results

Out of 32 patients who were managed by the above-mentioned methods, in 25 patients (78%) Foley catheters were removed only by cutting the balloon channels stepwise along the length of the catheters. Seven patients (22%) were managed by suprapubic needling (Table 1). None of the patients required any accessory producer or equipment for catheter removal and all patients were managed at the hospital on the bed or in the outpatient department. None of the patients were sent to the operation room or required ultrasonography for catheter

Table 1. Numbers of Patients Catheters Removed by the Two Techniques

	Catheter removed by cutting balloons channel	Catheter removed by suprapubic needling	p-value
Number (present)	25 (78%)	7 (22%)	0.001
Mean age (SD) years	58.3±4.6	61.7±6.3	0.31
Smokers	8 (32%)	4 (33%)	0.47
Alcohol	1 (4%)	0 (0%)	0.21
History of chronic catheterization	10 (40%)	8 (66%)	0.11

removal. All patients were managed with or without new catheterization upon removal of the non-deflating balloon catheter.

Discussion

Urologists should be familiar with a variety of techniques available for the removal of non-deflating Foley catheters. Attempts should begin with the least invasive technique and progress in a stepwise fashion to more invasive methods (1, 3, 6). By cutting the balloon channel close to the penis we have tried to a by-pass twenty-eight centimeters of the balloon port and the distance of the balloon channel from the last cut on the catheter is only 6 ±2cm till the balloon, which gave rise to catheter deflation in 25 patients (78%). There was no need for using a guide wire or ureteral catheter which is not available everywhere (7-9).

These Patients are usually old debilitated and are continuously catheterized for a long time and are having preexisting bacteriuria with decreased immunity (10, 11). Using invasive methods may lead to septicemia and death (12). We have not observed any complications by using these techniques.

Moreover, comparing with other studies which required ultrasonic guided balloon puncturing, either trans-abdominally, or trans-rectally we did not require any radiologic assistance for puncturing the catheters' balloons (13). Despite previous studies, none of the patients required operation room facilities for the application of invasive endoscopic techniques for catheter removal (14). These methods are better than dissolving the catheter balloon which has the possibility of chemical cystitis (9, 15). Over-distending catheter balloons with water are also combined with the risk of free fragmentation. We did not discuss the removal of the non-deflating Foley catheter in females because it can be removed easily by several methods e.g. pre-catheter urethral route and trans-urinary drainage lumen puncturing of the balloon (3, 16).

We believe that holding an index finger transrectal at the bladder neck will give more perfect three-dimensional imaginations for targeting the tip of the suprapubic intravenous cannula towards the bladder neck and moving it sagittally to puncture the balloon which is fixed at the internal urinary meatus.

Conclusions

Based on our experiences, we recommend that, if the balloon cannot be deflated by cutting interruptedly along the catheter, it will be helpful to remove it by trying to puncture the balloon supra publicly by a needle while the index finger is pushing the balloon upwards. These methods are safe, simple, effective, and do not require any special types of equipment or chemicals. They are less invasive and can be done on an outpatient basis.

Authors' contributions

All authors contributed equally.

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Conflict of interest

All authors declare that there is not any kind of conflict of interest.

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There was no founding.

Ethics statement

The study protocol was approved by Ethic Committee (IR.TUMS.VCR.REC.1393.750) and followed the rules of declaration of Helsinki. A written informed consent was obtained from all participants.

Data availability

Data will be provided by the corresponding author on request.

Abbreviations

SD Standard deviation

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