



RESEARCH ARTICLE

A PROSPECTIVE STUDY ON MANAGEMENT OF RETAINED FOLEY CATHETER DUE TO NON-DEFLATING CATHETER BALLOON

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ABSTRACT

Introduction: One of the commonly performed invasive procedures in hospitalized patients is Foley catheterization. Retained Foley catheter due to non-deflating catheter balloon is a known complication though rarely encountered in day to day practice. The current study was conducted to evaluate our experience of managing retained Foley catheter due to non-deflating catheter balloon and review hospital policy to address the problem.

Materials and Methods: This prospective, descriptive study was conducted at Shija Hospitals & Research Institute from 1st November, 2013 to 31st October, 2015 (2 years). All indoor, OPD and casualty patients who were diagnosed as a case of retained Foley catheter due to non-deflating catheter balloon were included in the study population.

Results: 15 male (83.3%) and 3 female (16.7%) patients were managed for Foley catheter retention. Mean duration of catheterization was 11.9 days. Flushing with distilled water and cutting balloon port proximal to inflation valve were successful in 5.6% (n=1) and 23.5% (n=4) cases respectively. Balloon rupture was done in 72.2% (n=13) cases. Transvaginal puncture of catheter balloon was successfully performed in all 3 female patients. Puncture directly to catheter balloon retained at bulbar urethra was done in one case. In all other 9 cases transabdominal ultrasound guided suprapubic puncture of catheter balloon was successfully performed.

Conclusion: Management of retained Foley catheter is challenging. Every hospital should have their own protocol to manage such cases. A good coordination between physician, surgeon and sonologist is often required to overcome the problem.

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INTRODUCTION

One of the commonly performed invasive procedures in hospitalized patients is Foley catheterization. Retained Foley catheter due to non-deflating catheter balloon is a known complication though rarely encountered in day to day practice. Many techniques have been described with the prime concern of the physician in preventing any additional morbidity. The current study was conducted to evaluate our experience of managing retained Foley catheter due to non-deflating catheter balloon and review hospital policy to address the problem.

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MATERIALS AND METHODS

i. Selection and Description of Participants

This prospective, descriptive study was conducted at Shija Hospitals & Research Institute from 1st November, 2013 to 31st October, 2015 (2 years). All indoor, OPD and casualty patients who were diagnosed as a case of retained Foley catheter due to non-deflating catheter balloon were included in the study population. Written informed consent was obtained from all patients and approval for the study was taken from the Institutional Ethical Committee and Scientific Committee.

ii. Technical Information

Non-invasive methods like Flushing with distilled water and cutting balloon port proximal to inflation valve was tried first

followed by invasive method i.e. puncture of catheter balloon (Figure 1). In cases where retained catheter balloon was palpable in male urethra direct puncture of balloon was done with 24 G needle (Figure 2). Transabdominal USG guided suprapubic puncture of catheter balloon was done under local anaesthesia in all other male patients where catheter balloon was not palpated in urethra (Figure 3). In all female patients transvaginal puncture of catheter balloon was done (Figure 4).

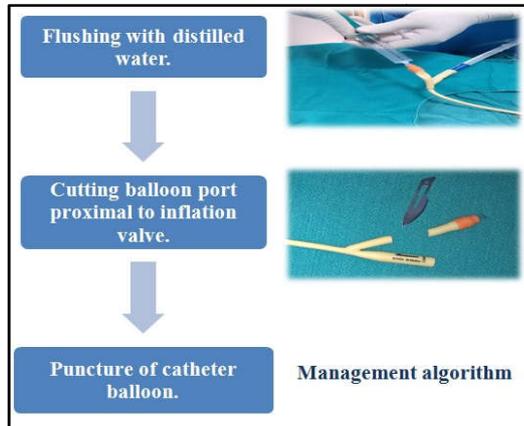


Figure 1. Management algorithm

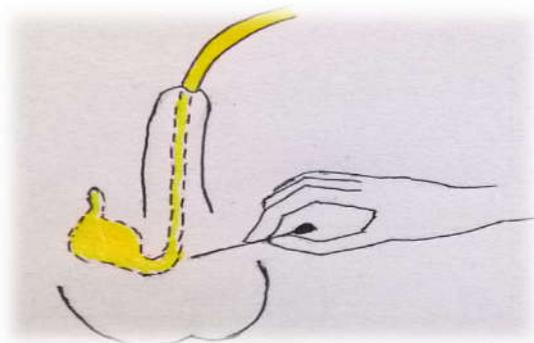


Figure 2. Direct puncture (Z entry of 24 G needle) of catheter balloon palpated in male urethra



Figure 3. Transabdominal USG guided suprapubic puncture of catheter balloon

iii. Statistics

The results of the study were interpreted using SPSS statistical software (version 20.0). Descriptive analysis of data was done

by calculating mean, percentages. Fisher’s exact probability test was used to compare categorical variables among two groups. P value of <0.05 was taken as significant.

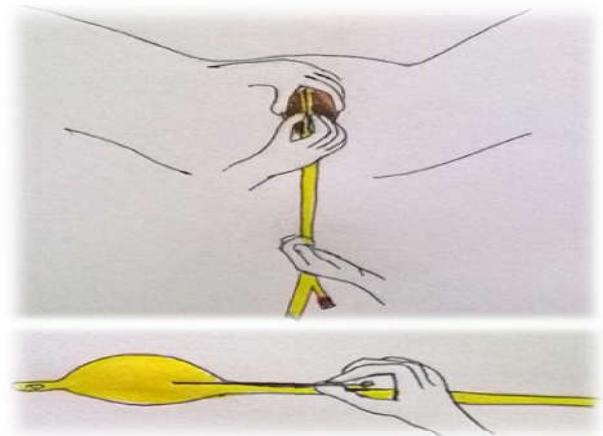


Figure 4. Transvaginal puncture of catheter balloon

RESULTS

From 1st November, 2013 to 31st October, 2015 total 6300 Foley’s catheterization were done at SHRI, out of these 16 catheters (0.25%) were retained due to non-deflation of catheter balloon. We got 2 more cases referred from other hospital. So, total number of cases was 18. Majority (50%) of patients were from ICU (Figure 5).

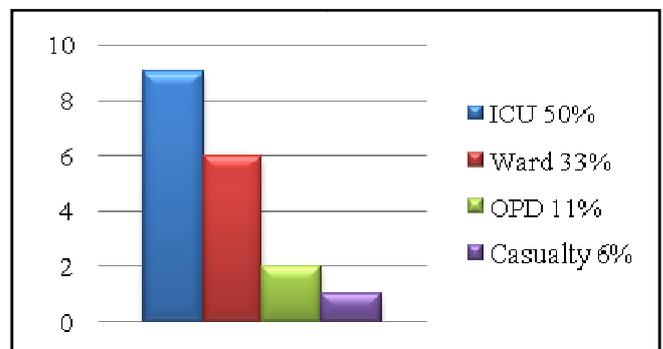


Figure 5. Distribution of patients

15 male (83.3%) and 3 female (16.7%) patients were managed for Foley catheter retention. Mean duration of catheterization was 11.9 days. Puncture of catheter balloon was done in majority (n=13, 72.2%) of cases (Table 1). Success rate of puncture to catheter balloon was significantly higher than flushing with distilled water and cutting balloon port proximal to inflation valve (P value < 0.001). No procedure related complication was noticed. USG of urinary bladder was performed in every case where puncture of catheter balloon was done. In every case we were able to retrieve Foley catheter successfully, without retention of fragments of balloon. In majority (72.2%) of cases the reasons for retention of Foley catheter were unidentified (Table 2).

Table 1. Success rates of various methods

Method	Used in	Succeed in	Failed in	Success rate (%)
Flushing with distilled water	18	1	17	5.6
Cutting balloon port proximal to inflation valve	17	4	13	23.5
Puncture directly to catheter balloon retained at bulbar urethra	1	1	0	100
Transabdominal ultrasound guided suprapubic puncture of catheter balloon	9	9	0	100
Transvaginal puncture of catheter balloon	3	3	0	100

Table 2. Reasons for retention

Reason for retention	Number of cases	%
Malfunction of inflation valve	4	22.2
Kinking within bulbar urethra	1	5.6
Unidentified	13	72.2
Total	18	100

DISCUSSION

The non-deflating balloon is a rare problem but can pose as a highly technical dilemma for the clinician (Luce *et al.*, 2005). Any part of the Foley catheter can be implicated as a potential cause of the non-deflating balloon. Factors predisposing to non-deflating balloons include malfunction of the inflation valve, external clamping and crushing, kinking, obstruction by solute crystallization or debris deposition etc (Carr, 1995; Hamilton *et al.*, 2006). Various methods have been described in literature for managing non-deflating balloon. Hyperinflation with air or saline should be avoided because of the painful nature of the procedure, risk of bladder rupture, and need for further treatment as a result of retained balloon fragments. Several chemicals have been used to dissolve the balloon wall and thereby allow its deflation. Ether, chloroform, acetone, and mineral oil are among the agents most commonly used (Murphy and Wood, 1993; Chin *et al.*, 1984). Unfortunately, exposure of the bladder urothelium to these chemicals can result in chemical cystitis, bladder contractures, hematuria and bladder rupture (Thomas *et al.*, 1994). Passage of guide wire / central venous catheter through inflation channel and perforation of balloon via balloon tract (Lin *et al.*, 2009) have been described by some authors with variable results. Transrectal route for percutaneous balloon puncture can be done under guidance of transrectal sonography. But the limitations of this procedure are need of prophylactic antibiotic and an enema. Transabdominal ultrasound guided suprapubic puncture of catheter balloon is an easy method (Daneshmand *et al.*, 2002) and most of the doctors are well versed of transabdominal ultrasound. It can be done by attending physician himself in emergency situation when ultrasonologist is unavailable (Moffat *et al.*, 1985). It is less painful than transrectal balloon puncture and can be done at bedside. Ultrasound guided puncture has another advantage of detecting any retained balloon fragment in bladder during the procedure itself. Transvaginal puncture of catheter balloon can be safely done in female patients. This technique involves inserting a spinal needle through the anterior vaginal wall while the catheter is held on traction, positioning the balloon at the bladder neck (Kleeman, 1983). Free fragment formation is a potential complication of managing such cases. Gülmez *et al.* (1996) found burst with needle as most effective method with 100% success rate and 0% free fragment formation rate. The balloon can be ruptured with fine needle under ultrasound guidance but it should not have been inflated to more than 50%

of its volume to prevent leaving loose fragments in the bladder (Hamdi, 1995).

Conclusion

Management of retained Foley catheter is challenging. Non-invasive methods like Flushing with distilled water and cutting balloon port proximal to inflation valve should be tried first followed by invasive method i.e. puncture of catheter balloon. Every hospital should have their own protocol to manage such cases depending upon available resources and expertise. A good coordination between physician, surgeon and sonologist is often required to overcome the problem.

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Conflicts of interest

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