

## Management of Retained Foley's Catheter

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### Abstract

**Background:** This study was planned to analyze the various methods used to manage retained Foley's catheter. **Methods:** A retrospective study was done on 20 patients of retained Foley's catheter at two different centers. **Results:** 9 out of 20 (45%) patients had faults in the valved side port and could be managed by simply cutting it. Two patients were managed by guide-wire insertion into the side port draining the balloon, while one adult patient was managed by mineral oil injection into the side port but developed hematuria. 35% patients needed ultrasound guided trans-abdominal balloon rupture and had no subsequent complications. In one adult female patient, non-deflating balloon could be ruptured by passing a transurethral needle. **Conclusion:** The ideal method used depends on identifying the site of the problem in the side port. Cutting of valved side port channel with or without aspiration, guidewire insertion, chemical injection or rarely extra-luminal balloon rupture techniques are commonly used methods of management.

**Keywords:** Catheterization, Hematuria, Mineral Oil, Urinary Bladder, Urinary Catheterization.

## Introduction

Foley's catheterization is done in approximately 10 to 15 percent of patients admitted in a hospital [1]. Foley's catheters (FC) may lead to urinary tract infection, bladder spasms, urethral injury and encrustations. Retained Foley's catheters (RFC) are often a common occurrence in inpatient surgical ward. Several techniques have been described in literature to manage a non-deflating Foley's balloon. We share our experience with 20 cases of RFC from two centers (Nehru Shatabdi Central hospital, Talcher and Lok Nayak hospital, Delhi) and discuss the methods used in these patients.

## Materials and Methods

A retrospective study was done on 20 patients of RFC at two different centers in last 3 years. 10 adult patients (age > 16 years) from surgery department,

Nehru Shatabdi central hospital, Talcher and 10 paediatric patients (age < 16 years) from Paediatric surgery department, Lok Nayak hospital, Delhi who had been managed as RFC patients formed the study group. These patients had different indications for catheterization of their urethra. All FC used were latex catheters. Their catheter balloon could not be deflated by aspiration of the side port. Cutting of the catheter valve, guidewire insertion into the side port, central venous pressure (CVP) line insertion into the side port, chemical injection and ultrasound guided invasive extraluminal balloon rupture techniques (suprapubic, transperineal, transvaginal, transrectal) were adopted as per the need in an individual case. Patients were followed up for complications and any symptoms. Data regarding age, clinical history and findings and methods used to take out the catheter and complications thereafter were obtained and analysed.

Results

A total of 20 patients (10 adult and 10 pediatric, 85% males) with RFC failing to deflate on aspiration of the side port were seen. In 45% patients (9 out of 20), catheter could be taken out simply after cutting the valve bearing side port just proximal to the valve [Fig.1], signifying that it is a common site to be affected in these cases. 55% patients had problems elsewhere, either in the passage of the side port or the catheter balloon. Only two patients (10%) could be helped by passing a thin guidewire through the side channel [Fig.2]. Guidewire insertion was difficult in pediatric cases as the side channel in their catheter was narrower. CVP line insertion through the side port could not be tried due to cost constraints. Only one patient was tried with mineral oil injection into the side port and this patient had hematuria following catheter removal. Remaining patients (8/20) needed extra-luminal rupture of the Foley's balloon [Fig.3]. This was mostly done under ultrasound guidance from the suprapubic region. In one female adult patient, transurethral rupture of the balloon could be achieved by passing a blunt needle alongside the catheter. In elderly patients, trans-rectal rupture was found difficult due to enlarged prostate. The results of the study are summarized in Fig.4.

Discussion

FC is a type of self-retaining indwelling catheter which may have 2 or 3 ports as per the need. It



Fig.2: Guide wire insertion into the side channel when cutting the valved side port could not deflate the Foley's balloon.



Fig.3: Long needle used to rupture the Foley's balloon under ultrasound guidance.



Fig.1: Retained Foley's due to defective valved side port, successfully removed after cutting the side port.

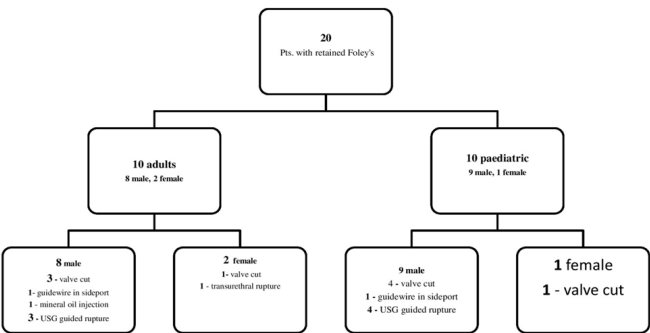


Fig.4: Results of the study showing different methods used in management of retained Foley's catheter.

was first described by Frederic Foley [2]. The self-retaining mechanism consists of an inflatable balloon through a side port which is guarded by a one way valve that resists deflation. To take out the catheter, the balloon has to be deflated completely. While the inflated balloon helps to retain the catheter when needed, a non-deflating balloon becomes the cause of retained catheter, when not needed.

Each part of FC can be implicated as a cause behind non-deflating Foley's balloon. Reasons for the catheter balloon not deflating could be (i) malfunction of inflation valve due to external trauma, clamping or crystallization when crystallisable fluid like normal saline is used to fill the balloon. (ii) if valve is not at fault, problems may be present in the rest of the side port passage or the balloon. Getliffe *et al.* identified catheter blockage from mineral salt encrustation in as many as 40-50 percent of patients having long term catheterization. The effects of urinary precipitation under alkaline condition compounded by urea-splitting bacteria and the resulting biofilm were found to be important for catheter blockages [3]. Several investigators have discussed and compared the different techniques to deal with this problem [4-6].

Ways to deflate the retained balloon proceed from simple non-invasive methods to invasive ones and from the outer end of the catheter to its inner ballooned end. Initially the catheter is advanced slightly to ensure that it is in the bladder and again aspiration is done to see if the balloon deflates. Following this, the side port is cut just proximal to the inflation valve. If this does not work, the area of obstruction is likely to be along the passage of the side port or at the entrance to the balloon.

A fine gauge guide-wire is inserted through the inflation channel allowing the balloon fluid to drain along it. If the guide-wire goes in easily but fluid does not come out, some investigators have recommended using a 22 G CVP catheter over the guide-wire allowing the balloon to drain as the CVP

tip goes into the balloon [7]. But, these catheters are not cost effective in poor countries and setup like ours. We tried it in only one adult patient but it was not successful to drain the balloon. Ether, chloroform, acetone and mineral oil have all been used in the past to chemically rupture the catheter balloon. They have been found to have 85 to 90 percent success rate [8]. However, they can cause damage to the urothelium and lead to cystitis, bladder contractures, hematuria, bladder rupture and death [9,10]. Among all the chemicals used for this purpose, mineral oil has been found to cause the least damage to the bladder [11]. If urine is present in the bladder when chemicals are used, chemicals get diluted and this lessens their concentration leading to lessened chances of bladder damage [7]. Although we used mineral oil successfully in just one patient, he had hematuria for two days which resolved on conservative treatment. Hyperinflation with air or saline is discouraged due to it being a painful procedure, chances of bladder rupture and need for further treatment in case of retained fragments.

Extra-luminal rupture of the catheter balloon under ultrasound guidance is a safe method with almost no complications despite being invasive [4,12]. Investigators have reported the use of extracorporeal shock wave lithotripsy in such cases having calcified catheter balloons [13]. Transabdominal/ transvaginal/ transperineal/ transrectal approaches can be used as per the ease in an individual patient. In elderly patients when the prostate is significantly enlarged, it is difficult and sometimes impossible to feel the catheter balloon on per-rectal examination and also rupturing it under transrectal guidance becomes difficult. We could rupture the catheter balloon via the suprapubic route under ultrasound guidance in all patients in which this modality was tried. In one female patient, the non-deflating balloon could be ruptured by passing an atraumatic needle alongside the catheter in the urethra. None of our patients having extra-luminal rupture methods had any complications.



Urology consultation for endoscopic balloon puncture is recommended in situations where none of these methods is successful and in cases where some complication is noticed. Cystoscopy is a must to remove any possible retained balloon fragments. We could manage all our patients without any significant complication and cystoscopy was not required in any of our patients. Shapiro *et al.* presented a management algorithm for RFC. His observation was similar to those made in this study [7]. Hollingsworth *et al.* found that 31% of his patients needed cutting of the side port to deflate the balloon while in 15% guide-wire had to be inserted. 31% patients needed invasive extra-luminal balloon puncture techniques [12].

## Conclusion

We conclude that following points should be remembered when using FC and managing RFC: (i) FC, its balloon and the valve in the side channel should be checked before catheterization. (ii) Inflate balloon with distilled water rather than normal saline or any crystallizing fluid that may block the valve or the port. (iii) Record of the amount of fluid used to inflate the balloon is important. (iv) Inspection of the removed RFC is a must to assess if any part is left behind. (v) Bladder should preferably have some urine in cases of chemical rupture so as to dilute the chemical which comes out after destroying the balloon. It is important to wait for the chemical mixed urine to drain completely before re-insertion of a new FC so that it does not get damaged. (vi) Never clamp /crush the catheter as this may compromise the patency of the side channel and result in difficulty in deflating the balloon. It is best to block the main port using a 2 ml syringe rather than clamping the whole catheter. (vii) In RFC, cutting the valved side port takes care of the problems with the side-port valve while extra-luminal rupture techniques under ultrasound guidance are safe methods for cases not responding to non-invasive methods.

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