

## CASE REPORT

### VESICAL CALCULUS AROUND NEGLECTED FOLEY'S CATHETER: CASE REPORT

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#### Abstract

**Background:** Long term bladder catheterization is complicated by bacteriuria, encrustation by mineral salts, stone formation etc. In the presence of an indwelling catheter, the development of bacteriuria is inevitable and the colonization of the catheter with urease producing organisms alkalinizes the urine, promoting the precipitation of calcium phosphate salts and a biofilm of bacteria on the surface of the catheter. Aseptic techniques at catheter insertion and prompt treatment of urinary tract infections will therefore minimize the occurrence of intravesical calculi formation. A review of literature suggests that the longest reported case of retained bladder catheter with intravesical calculus formation is two years. We report two cases of long term indwelling catheter, five years and two years respectively, with intravesical calculus formation around the catheter.

**Case Report:** *Case 1.* A 44 year old man with urethral strictures retained a latex suprapubic Foley's catheter for five years and reported with pericatheter leakage of urine. A stone found to have formed around the catheter was removed at open suprapubic cystolithotomy. *Case 2.* A 61year old man retained his urethral catheter passed for urine retention for two years. He presented in acute retention and a vesical calculus found to be around the catheter was removed at suprapubic cystolithotomy.

**Conclusion:** Long term indwelling catheter usually gets complicated by urethral encrustation and stone formation. Aseptic techniques at urethral catheterization and proper patient education on regular catheter change are required to minimize stone formation around urethral catheter.

**Key Words:** Bladder catheterization, vesical calculi, suprapubic cystolithotomy.

#### Introduction

Urinary catheterization is usually employed to drain the bladder of urine. Transurethral catheterization of the bladder is the preferred means of draining the bladder in bladder outlet obstruction. Suprapubic catheterization of the bladder is used as an alternative to urethral catheterization in cases where there is failure of securing a urethral catheter. Long – term indwelling catheters are frequently complicated by urinary tract infections, pericatheter leakage, balloon non-deflation, encrustation by mineral salts and stone formation. Earlier reports suggest that the longest duration of neglected bladder catheter associated with intravesical calculus was two years. We report two cases of long-term indwelling catheters, five years and two years respectively, with intravesical calculus formation over the catheter.

#### Case Report

##### Case 1

A 44-year-old male underwent suprapubic catheterization for suspected bulbar urethral stricture five years ago. After a few months the catheter stopped draining and there was continuous pericatheter leakage of urine. He did not seek medical attention and the suprapubic catheter remained unchanged over this period of time until his recent admission. *Klebsiella* species were isolated after urine culture and an abdominopelvic ultrasound revealed the presence of a tubular structure within the bladder with a vesical calculus. He underwent open suprapubic cystolithotomy under spinal anesthesia with intact retrieval of stone around the latex Foley's catheter (Figure 1). Voiding cystourethrogram and retrograde urethrogram studies have confirmed the presence of a 3cm complete bulbar urethral stricture. He is awaiting urethroplasty.

##### Case 2

A 61year old man had urethral catheterization with latex Foley's catheter after an episode of acute retention of urine two years ago. He was then lost to follow up and never changed the urethral catheter until his recent admission when he presented in acute retention of urine. The urethral catheter was still in-situ but was not

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draining urine. After failed attempts at removal of the catheter, an abdominal ultrasound was done and it showed a vesical calculus around the urethral catheter. He was relieved of his retention by suprapubic aspiration and underwent open cystolithotomy under spinal anaesthesia with bladder neck incisions to relieve bladder neck stenosis diagnosed intraoperatively. *E. coli* was isolated from urine cultures done.



**Figure 1:** Stone around the latex Foley's catheter

## Discussion

Urethral catheterization with indwelling bladder catheter is a commonly performed procedure done to relieve urine retention. Common complications include bacteriuria, trauma to the urothelium, creation of false tracts and dislodgements<sup>1</sup>. Encrustation by mineral salts, stone formation, pericatheter drainage are often complications of long-indwelling bladder catheters<sup>2</sup>. In the presence of an indwelling catheter, the development of bacteriuria is inevitable and the most important risk factor for its occurrence is the duration of catheterization. Bacteriuria occurs at an incidence of approximately 10% per day<sup>2</sup>.

There are two populations of bacteria in the bacteriuric urinary bladder, (a) planktonic growth, those bacteria growing in suspension in the urine and (b) biofilm growth (layers of organisms on infected indwelling catheters)<sup>3</sup>. A microbiologic study of bacteriuria in patients with chronic indwelling urethral catheters showed polymicrobial concentrations of microorganisms such as *Providencia stratii*, the most abundant, followed by *Proteus mirabilis*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Morganella morganii* etc<sup>4</sup>. The role of microorganisms and other constituents of urine in the formation of encrustations around catheters was studied among elderly women with long term urinary catheter use in whom the catheters were changed every two weeks. It was noted that patients with prolonged colonization with *Proteus mirabilis* and *Providencia stratii* which are urease producing organisms formed encrustations. These patients also excreted lesser amounts of magnesium, urea and phosphate in the urine<sup>5</sup>.

It has been shown that when all-silicone, silicone-coated latex, hydrogel-coated latex, hydrogel/silver-coated latex and nitrofurazone silicone catheters were inserted into bladder models containing *P. mirabilis* and alkaline urine, the alkaline pH rapidly precipitates the formation of a microcrystalline foundation layer of calcium phosphate on the surface of the catheter. Bacterial colonisation of the foundation layer followed subsequently forming a biofilm of bacteria and calcium phosphate salts on the surface of the catheter<sup>6</sup>. The calcium and magnesium salts were deposited on the luminal surfaces along the full length of catheters but occurred most extensively just below the eye-holes.

Although all catheters get encrusted over time, the more silicone coated catheters are significantly more resistant to encrustation than those which are of less silicone coating<sup>7</sup>. Bacteria in the surface biofilm secrete an extra-cellular polysaccharide matrix of bacterial glycocalyxes. The patient's urinary protein and salts complex with this matrix, leading to encrustation of the catheter lumen. The alkaline medium provided by the urease producing organisms which colonize the catheter promotes precipitation of struvite (magnesium-ammonium-sulfate), and apatite (calcium-phosphate) crystals resulting in catheter encrustation and bladder stones<sup>8,9</sup>.

When the catheter is obstructed by encrustation and stone formation, patients may present with urine retention or there may be pericatheter urine leakage<sup>10</sup>. Encrustation of urethral catheter and stone formation can be minimized by aseptic catheter insertion and sterile continuous closed drainage systems, which minimize the introduction of microorganisms into the bladder. Frequent catheter change, at least every three weeks is advocated to minimize encrustations<sup>2</sup>. *Proteus mirabilis* is very sensitive to the biocide triclosan, hence, in patients in whom long term indwelling catheterization is required, inflation of the balloon with triclosan minimizes encrustation<sup>11</sup>. Periodic balloon deflation and re-inflation to break overlying encrustations and bladder irrigation with an acidic solution is also advised for long term indwelling catheters<sup>12</sup>. The elimination of *P. mirabilis* by antibiotic therapy as soon as it appears in the catheterized urinary tract could improve the quality of life for many patients<sup>13</sup>.

## Conclusion

Long term indwelling catheter is commonly complicated by urethral encrustation and subsequent stone formation. Adequate patient education on good catheter hygiene and the need for regular change of catheter is essential for all patients who will require indwelling bladder catheters. The need for indwelling catheters can be reduced in most patients by early management of the cause of urine obstruction. We recommend that all-silicone, or at least, silicone coated catheters are used for patients who require indwelling catheters as they are more resistant to encrustation than latex catheters.

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