What is the best choice for chronic urinary retention: indwelling catheter or clean intermittent catheterization?

Qual a melhor escolha para a retenção urinária crônica: sondagem vesical de demora ou cateterismo intermitente limpo?

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ABSTRACT

Objective: The aim of this study was to analyze the advantages and disadvantages of clean intermittent catheterization, comparing to indwelling urinary catheter, in the treatment of chronic urinary retention. Methods: This literature review was carried out in order to highlight the best evidences for the choice between treatments. The extensive literature review was made through PubMed and Cochrane National Library. We selected the main articles published between 1950 and 2007, using urinary retention, indwelling urinary catheter, and clean intermittent catheterization as keywords. Results: Twenty five papers were selected, including three meta-analyses evaluating the long-term complications of clean intermittent catheterization, prophylactic intervention, and catheter types. Most articles discussed complications in patients with neurologic dysfunctions. Conclusion: Clean intermittent catheterization is better than indwelling catheter, as it is related to lower complication rates, both short and long-term. Indwelling catheterization was associated with decreased vesical compliance and bladder calculi, among others.

Keywords: Urinary retention; Catheters, indwelling; Urinary catheterization

INTRODUCTION

The basic functions of the lower urinary tract – defined here as the vesical sphincteral unit or the urinary bladder-urethra set – are to store urine at lower pressure and to eliminate it under voluntary control. These functions can be impaired by anatomical, neurological, or vesical changes. The anatomical changes include those caused by different conditions, such as benign prostate hyperplasia, posterior urethral valve, and stenosis of the urethra.
and urethral meatus. Bladder dysfunctions can be classified as primary or secondary, such as in cases of chronic obstructive processes.

The neurological dysfunction of the lower urinary tract may be caused by any pathologic process that affects the nervous pathways involved in the micturition process. In this context, cerebrovascular accident sequelae, trauma, multiple sclerosis and Parkinson’s disease are included, among others. Secondary neurologic lesions due to external causes are becoming increasingly important, particularly in large urban centers, where their incidence is growing, and presently correspond to 10,000 new cases per year in the United States\(^{(1)}\). The main objectives of the urologic follow-up of such patients are maintenance of the renal function, as renal failure is a major cause of death in this group of patients; prevention and treatment of urinary tract infections; and the well-being of patients\(^{\text{(2-6)}}\).

The treatment of lower urinary tract disorders depends on the cause of dysfunction (anatomic, neurologic, vesical, or combined), the presence of clinical associated diseases, and the general health status of the individual. It also depends on the effects on the upper urinary tract and type of micturition dysfunction (neurologic patients). Independently from eliminating or not the cause of the disease, one of the goals of treatment is to improve the storage and voiding functions of the bladder.

A frequent problem is chronic urinary retention, which is caused by lack of adequate bladder contraction (hypococontractility or absence of contraction). Among the treatment options for this condition, indwelling urinary catheters, clean intermittent catheterization (CIC), and electrostimulation are included. In this article, we analyze the use of CIC introduced by Lapides in 1972\(^{(2)}\). It is mostly used, individually or together with other measures, in patients with neurologic lesions and bladder dysfunction, as well as in those with anatomic obstructions that, due to other reasons, are not candidates to surgical procedure to remove obstruction.

**OBJECTIVE**

To analyze the advantages and disadvantages of the use of CIC as compared to indwelling urinary catheter in the treatment of patients with chronic urinary retention.

**METHODS**

A literature review was carried out to determine the best evidences of the performance of either treatment. The literature search was performed in PubMed and in the Cochrane Library. The keywords used were urinary retention, indwelling urinary catheter, and CIC. Articles published between 1950 and 2007 were selected (Chart 1).

**RESULTS**

The keyword ‘urinaryretention’ retrieved 9,298 articles in PubMed, whereas ‘urinary indwelling catheter’ retrieved 2,993 articles, and ‘clean intermittent catheterization’,
1,092 articles. The search in the Cochrane National Library retrieved five meta-analyses on these issues.

Articles analyzing the benefits and the complications related to the use of indwelling urinary catheter and CIC were selected. Some articles compared these two types of conservative treatments, while others evaluated either one or the other treatment individually.

Out of the 25 selected articles, three were meta-analyses evaluating the long-term complications of the use of CIC, prophylactic measures for catheter management, or catheter types used in CIC. We selected four articles written by the researcher that introduced CIC in the treatment of neurogenic dysfunctions (J. Lapides) Most selected articles discuss the treatment and management of complications in patients with neurologic dysfunctions, such as spinal cord injuries.

DISCUSSION

Why using intermittent catheterization?

In the 1970s, Lapides and Diokno presented for the first time objective results relative to the use of CIC in the treatment of patients with neurogenic micturition dysfunction and voluntary bladder voiding disability. Based on the observation that chronic bladder distention and micturition under high pressure caused progressive kidney function deterioration in those patients, the authors performed a study on that method. According to Lapides, urinary infection was directly related to high storage pressure. Therefore, urinary pathway handling per se should not pose any problems, provided pressure increase was prevented[3-5].

After this first description of the method, several other studies demonstrated its efficacy not only in neurologic patients, but also in other groups presenting bladder voiding dysfunction[6-8]. This method has since been widely applied in Urology, allowing the development of several types of urinary derivation, including orthotopic ileal neobladder and the treatment of complex bladder voiding disorders.

Indwelling urinary catheterization problems

Before the pioneering study of Lapides, the only treatment option in those cases was indwelling urinary catheterization. Its use in the treatment of neurogenic bladder was first described by Talbot et al., in 1959[9]. These authors observed that this measure prevented the functional deterioration of the upper urinary tract in patients with bladder dysfunction in an average follow-up of 12 months. The other option, suprapubic drainage (cystotomy) was advocated by MacDiarmid et al. as an efficient and safe alternative; however, it requires the permanence of an indwelling urinary catheter[10].

Independently of the treatment used, the goal is to allow adequate urinary drainage, preventing the deterioration of the kidney function and repeated infections. The individual’s well-being and social characteristics should be respected.

Patients treated with indwelling urinary catheterization may present discomfort due to the continuous presence of the catheter and external collection bag. Its permanence may cause urethra stenosis and urethral cutaneous fistula caused by ischemia and malpositioning (Figures 1 and 2). The catheter must be fixed to the body according to the bulbar urethra curvature, which is the most frequent site of the aforementioned complications. The presence of paraphimosis is common in patients with indwelling urinary catheter[10-13].

Figure 1. Bulbar urethra stenosis secondary to indwelling urinary catheterization

Figure 2. Urethral cutaneous fistula (note indwelling urinary catheterization)
Advantages of intermittent catheterization

When catheterization is used, an essential assumption is catheter management by patients or their family. An advantage is that patients do not require the use of an external collection bag. However, there is the risk of lesions caused by false urethral pathway.

The first issue to be discussed refers to the presence of asymptomatic bacteriuria in patients with catheters. Increased intravesical pressure causes ischemia, and consequent structural cell damage. And cell lesions eventually favor the establishment of urinary tract infection.

Several studies show that the presence of asymptomatic bacteriuria is not related to the progressive deterioration of the upper urinary tract in the long run. Its incidence in patients with catheter ranges between 70 and 98%. On the other hand, the frequency of symptomatic urinary tract infection affects 10 to 35% of patients, and it is higher in those with indwelling urinary catheter as compared to those submitted to CIC\(^{(6,8,14-15)}\).

Indwelling urinary catheters behave as intravesical foreign bodies, thereby increasing the incidence of bladder and kidney calculi, with the presence of repeated cystitis and vesical fibrosis in the long term. These factors increase the incidence of urinary tract infection in chronically catheterized patients. Asymptomatic bacteriuria is not directly related to infection and should not be treated. In in-patients, the incidence of urinary tract infection is approximately 50%, and it is higher in patients with indwelling urinary catheter as well. Therefore, at least from the standpoint of urinary infection, the use of CIC seems to better than indwelling urinary catheters\(^{(16-19)}\).

Weld and Dmochowski, in 2000, published a study carried out with 313 patients with spinal cord lesion analyzing the urologic complications according to treatment. The following factors were evaluated: presence of symptomatic lower urinary tract infection, bladder and kidney stones, urethral stenoses, secondary vesicoureteral reflux, and renal function deterioration. The group of patients treated with CIC presented significantly lower complication rates as compared to those treated with indwelling urinary catheter. Overall complication rate was 27% in patients treated with CIC, whereas in the group treated with indwelling urinary catheter, the rate was 53%, during a five-year follow-up\(^{(12)}\).

The same authors also evaluated bladder compliance in these patients. The results allowed the author to conclude that CIC is a protecting factor for bladder compliance in patients with spinal cord lesion. The patients treated with indwelling urinary catheter presented a significant reduction of bladder compliance. It must be noted that compliance change is one of the factors of poor prognosis as to renal function loss\(^{(13)}\).

Weld et al. evaluated kidney function changes in patients with spinal cord injuries treated with CIC, indwelling urinary catheter, and bladder emptying maneuvers, for an average period of 18 years. The results showed that patients treated with indwelling urinary catheter presented higher creatinine levels, lower creatinine clearance, and higher incidence of secondary vesicoureteral reflux as compared to those patients submitted to CIC and bladder emptying maneuvers\(^{(19)}\).

Koyanagi et al. compared the use of CIC and suprapubic cystotomy in the treatment of quadriplegic patients. During a mean follow-up of nine years, they observed that patients treated with suprapubic cystotomy presented high incidence of bladder and kidney calculi, with 3 and 65%, respectively, whereas in patients submitted to CIC, the incidence was 1 and 30%, respectively. On the other hand, patients with catheterization presented higher incidence of urinary tract infections (26%) as compared to the cystotomy group (12%).

None of the groups studied presented renal function deterioration\(^{(11)}\). These results are conflicting, as several studies have shown that CIC is more efficient and safer as compared to indwelling urinary catheters\(^{(6,8,12-13,20)}\).

Another frequently discussed issue is the use of antibiotic prophylaxis in patients treated with indwelling or intermittent catheters. There are objective evidences that antibiotic prophylaxis is not beneficial, as it reduces only the incidence of asymptomatic bacteriuria. However, an increase in antibacterial resistance has been observed. Some authors advocate that this increased resistance may happen simultaneous in several bacterial species, as cultures from these patients usually show multibacterial infections, and the collecting bag would harbor these microorganisms, allowing the transfer of resistance plasmids. The incidence of symptomatic urinary tract infection is higher in patients that regularly use antibiotic prophylaxis\(^{(5,16-18,21)}\).

As to the use of antibiotic prophylaxis and to a meta-analysis published by Neil in 2005, the results are inconclusive. The use of different types of catheters, with or without antiseptic substances, does not seem to change the outcome, when the presence of urinary tract infection is analyzed\(^{(22-23)}\).

Intermittent catheterization technique

Another issue that needs to be discussed is the need to use sterile catheters or not in patients submitted to catheterization. Apparently, there is no need to use sterile catheters, as the cost rises, and the incidence of asymptomatic bacteriuria and urologic complications is catheter management by patients or their family. An advantage is that patients do not require the use of an external collection bag. However, there is the risk of lesions caused by false urethral pathway.

The first issue to be discussed refers to the presence of asymptomatic bacteriuria in patients with catheters. Increased intravesical pressure causes ischemia, and consequent structural cell damage. And cell lesions eventually favor the establishment of urinary tract infection.

Several studies show that the presence of asymptomatic bacteriuria is not related to the progressive deterioration of the upper urinary tract in the long run. Its incidence in patients with catheter ranges between 70 and 98%. On the other hand, the frequency of symptomatic urinary tract infection affects 10 to 35% of patients, and it is higher in those with indwelling urinary catheter as compared to those submitted to CIC\(^{(6,8,14-15)}\).

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inherent to the procedure is similar when patients reuse catheters\(^\text{24-29}\). In the meta-analysis published by Moore in 2007, the author did not show any conclusive results as to the use of sterile or reusable catheters\(^\text{26}\).

From the practical perspective, the implementation of intermittent catheterization requires an excellent physician-patient relationship, a multidisciplinary team, a highly motivated and oriented patient, as well as close monitoring in the beginning of the treatment in order to prevent complications.

The use of indwelling urethral or suprapubic catheters is a therapeutic alternative in cases of urinary retention or when the patient or caretakers are unable to handle the catheter.

CONCLUSIONS

CIC presents some advantages as compared to indwelling urinary catheters. The frequency of urologic complications related particularly to changes in bladder compliance is lower, and consequently, there is a lower degree of renal function deterioration. In addition, CIC provides comfort to patients and their caretakers, thereby favoring biopsychosocial well-being.

We believe that catheterization should be the first choice in the treatment of patients with chronic urinary retention, except when it cannot be implemented (quadriplegic patients with no one to assist them, urethral stenosis, or lack of manual dexterity) or for short periods of time. Cases of resistance to the method may be easily overcome after careful information on its advantages.

REFERENCES