Original Article

Proportion of complications in patients practicing clean intermittent self-catheterization (CISC) vs indwelling catheter

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Abstract

Objective: To compare the complications especially infection in two groups; group-A: those performing clean intermittent self-catheterization (CISC) and group-B: patients with indwelling catheters.

Methods: Comparative study, conducted at Department of Urology, Jinnah Postgraduate Medical Centre, Karachi. A total of 80 patients with ages between 15 - 80 years were studied. There were 40 patients in each group comprising of 35 males and 5 females in group-A and 38 males and 2 females in group-B. Group-A patients were mainly those with neurogenic bladder (n=25) and postoperative cases of stricture. While in indwelling group 35 patients had neurogenic bladder with the remaining (n=5) having benign prostatic hypertrophy. Group-A performed CISC 1-4 times/24 hours depending on the primary disease while in group-B fortnightly catheter change was done under aseptic conditions. Symptomatic infections were taken into consideration in both the groups proven by urine C/S.

Results: Symptomatic infections as pyelonephritis, epididymorchitis and urosepsis occurred in both groups. In group-A 2 (5%) patients developed pyelonephritis as compared to 10 (25%) in group-B (P value 0.01). Epididymorchitis and urosepsis occurred in 1 (2.5%) and 0 patients in group-A while 3 (7%) and 2 (5%) patients in group-B. Statistically significant infection (pyelonephritis) occurred in group-B.

Conclusion: CISC is much safer practice with less complications and infection rate than indwelling catheters (JPMA 56:401;2006).

Introduction

CISC has proved to be the most effective and practical means of attaining a catheter free state in the majority of patients with acute spinal cord lesions.[1] It is also an extremely effective method of treating the adult or child whose bladder fails to empty, especially when efforts to increase intravesical pressure and/or decrease outlet resistance have been unsuccessful.[2]

CISC seems ideally suited to prevent damage to the kidneys from life long problem of recurrent UTIs.[3] It also helps in preventing bladder wall fibrosis, an important cause of detrusor compliance secondary to repeated UTIs. CISC is a simple method of reducing frequency of urethral stricture occurrence after internal urethrotomy.[4] Different types of catheters are used for CISC, but those who use hydrophilic catheters do better.[5] As contrary to the common belief complications with CISC are fewer. Significant bacteriura is present in majority of patients whereas clinical UTIs are low.[6] In some studies frequency of UTI was seen to increase after CISC, raising the need for prophylactic antibiotics.[7] Factors that should be considered before long term CISC is recommended include type of neurogenic bladder, prognosis for recovery, incontinence despite medication, history of urethral trauma, host resistance, physical independence in self catheterization, compliance and patient preference.[8] Some studies have pleaded that CISC should be the preferred option for all spinally injured persons with good hand function.[9] CISC after optical internal urethrotomy can decrease the incidence of urethral stricture.[10]

Since this procedure is often blamed for complications especially infections we conducted a study to determine the efficacy and complications of CISC in comparison to indwelling catheter.

Patients and Methods

This prospective comparative minimally invasive and randomized study was conducted at the Department of Urology and Transplantation, Jinnah Postgraduate Medical Centre, Karachi in the period November 2003 till April 2004. Forty consecutive patients were included in each group. The patients were selected from outpatient department during evaluation for symptoms of bladder outlet obstruction or post-operative cases of stricture urethra or patients referred from various departments of this centre especially neurospinal department.

All patients were asked about chief complaints, history of present illness, past history, history of previous procedures or instrumentation performed on the urinary tract. Co-morbid factors like diabetes, tuberculosis, and

hypertension were assessed. Patients were then examined physically which includes inspection and palpation of abdomen and genitalia to see the presence or absence of urinary retention, urethral discharge, epididymorchitis, periurethral abscess and meatal stenosis. Prostate was assessed by digital rectal examination to determine the size, shape and consistency to rule out malignancy. Neurological examination was also done in cases of neurogenic patients.

In group-A patients (those performing clean intermittent self catheterization) each patient was taught how to perform CISC. 14 - 16Fr red rubber catheter or Nelaton tube was used. Patient washed hands with soap and water as well as the catheter. Catheter was lubricated with lignocaine gel and then inserted. Catheter was taken out when bladder was completely emptied. Patient washed his catheter with water and placed it in a dilute solution of chlorhexidene. Procedure ended with patient washing hands. This procedure was repeated 1-4 times/24 hours depending upon the primary condition requiring CISC. No antibiotics were used routinely.

In group-B patients (those with indwelling catheter), catheter as well as the drainage bag was changed fortnightly by a nursing staff under aseptic conditions. 16Fr two-way Foley's catheter, which was made up of latex and coated with silicone, was used. Antibiotics were also not used routinely.

Urine analysis and culture was performed at the start of the study and one monthly thereafter in both the groups. In case of symptomatic infection urine D/R and culture was done. Growth of bacteria was considered significant when >102 CFU/ml. Infection was then treated accordingly on outpatient or inpatient basis depending upon the severity of disease. The hypothesis were tested by > test of proportion and P value of <0.05 was taken as significant. Relative descriptive statistics were reported. All calculation were done by SPSS version 10.

Results

In the period between November 2003 to April 2004, 80 patients were included in this study with 40 in each group. The age ranged between 15 to 80 years with a mean age of 33.85 $\pm$ 12.16 in group-A (CISC group) and 47.1 $\pm$ 12.46 in group-B (indwelling catheter group).

Pattern of presentation is shown below:

In group-A there were 35 (87.5%) males and 5 (12.5%) females whereas in group-B 38 (95%) were males and 2 (5%) females.

In Group-A (CISC) twenty-five (62.5%) had neurogenic bladder while 15 (37.5%) patients had benign prostate hyperurophy, who were not operated due to high surgical risk.

Table. Symptomatic infections.

Symptomatic Infections	Group			
	CISC	Percentage	Indwelling	Percentage
Pylenophritis	2	5%	10	25%
Epididymorchitis	1	2.5%	3	7.5%
Urosepsis	0	0	2	5%

In Group-B (Indwelling catheter group) Thirty-five (87.5%) had neurogenic bladder while 5 (12.5%) patients had benign prostatic hypertrophy, who were not operated due to high surgical risk .

Symptomatic infections like, Pyelonephritis, Epididymorchitis, Urosepsis occurred in both groups as shown in table. In CISC group 2 patients (5%) developed Pyelonephritis while 10 (25%) in indwelling group ($p<0.01$). Epidymorchitis occurred in 1 (2.5%) and 3 (7.5%) in group-A and B respectively. None of the patients in group-A (CISC) had urosepsis while 2 (5%) patients in indwelling catheter group required admission for in hospital treatment of urosepsis.

Out of 22 patients with symptomatic infections E-coli was the most frequently isolated pathogen (54.5%), followed by proteus (18.18%), Klebsiella (13.64%), Pseudomonas (9.1%) and Staph-auerus in 1 (4.5%). Nitrofurantoin and Fosfomycin were the drugs with least resistance i.e. 10% each, while Ciprofloxacin with 30% and Co-Amoxacillin in 45% patients.

Discussion

Since its introduction by Lapides and colleagues (1972), Clean (but not sterile) intermittent catheterization has earned general recognition in the management of spinal cord injury patients as well as others. Although never rigorously compared with indwelling urethral catheterization, CISC has been shown to decrease lower tract complications by maintaining low intravesical pressure and reducing the incidence of stones.[11] CISC also appears to reduce complications associated with an indwelling catheter such as UTI, fever, bacteraemia and local infections such as epididymitis and prostatitis.

In motivated patients compliance of performing CISC is quite good. The present study represents only six months follow up in which there were no dropouts. In their mean 5year follow up of 40 patients on intermittent catheterization at the time of discharge, Maynard and Glass[12] found that 80% continued to perform intermittent catheterization.

The assertion that intermittent catheterization is a superior method of bladder management has not gone

unchallenged. One study that is often cited as evidence that a catheter free state confers no advantage in terms of long-term complications is the retrospective study of 57 patients in Veterans Administration Medical Centre.[13] With a mean follow up of 12 years, the authors found no difference in renal or bladder calculi, pyelonephritis or urosepsis, gross haematuria, urethral or penile erosion, or urethral stricture in patients managed with or without a chronic indwelling catheter. However, the 25 catheter free patients in this study included only 11 patients managed by intermittent catheterization. Thirteen were managed by spontaneous voiding or condom catheter and one was status post urinary diversion. Because no subgroup analysis was done, this study does not allow a valid comparison of intermittent catheterization to management by an indwelling catheter.

The preponderance of evidence indicates that intermittent catheterization, particularly when combined with diligent efforts to control bladder pressure, affords a much lower rate of urologic complications that is usually associated with either an indwelling catheter or reflex voiding; in comparing the complication rate in 22 women managed by intermittent catheterization with those in 13 managed by urethral catheter drainage. This study is note worthy for the author's stated efforts to maintain bladder storage pressures less than 30cm H2O. Bennett and colleagues[14] also reported a significantly lower incidence of complications in women managed by intermittent catheterization as compared with either catheter drainage or spontaneous voiding with use of incontinence padding. Chai and colleagues[15] attributed the low complication rates in their series to their efforts to maintain low-pressure storage. The low complication rates observed in series like these are clearly superior to the complication rates that attend chronic indwelling catheter drainage. Likewise, patients managed by intermittent catheterization had lower incidence of hydronephrosis, reflux and kidney stones than patients managed by either reflex voiding or crede maneuver.[16]

Jacobs and Kau:fi:nan[17] reported on 19 veterans with SCI managed by an indwelling catheter for a mean of 21 years. Abnormal upper tracts on NP (hydronephrosis, stones, pyelonephritic scarring, or absent kidney due to nephrectomy) were found in 76%. Major complications requiring ho'spitalization (pyelonephritis, stones, need for nephrectomy, haemorrhagic cystitis, bladder cancer, and serious urethral complications) occurred in 96%. The rate of major complications was 0.25 per year. Other series have shown similar complications. Dewire and colleagues[13] reported a comparably high incidence of complications. It has been reported that regular use of oxybutynin in patients with an indwelling catheter may preserve bladder compliance and reduce the incidence of hydronephrosis.[19] Similarly, some authors have recommended daily clamping of the catheter for 2 hours to maintain bladder capacity.[20] However, neither measure has been validated by prospective studies.

In a series of 13 women managed by chronic Foleys drainage for a mean of 7 years, McGuire and Savastano[21] reported development of a nonfunctional urethra in 54% and urethral erosion in 46%. This was in addition to other complications, including IVP changes (54%), autonomic dysreflexia (54%), stone recurrence (100%), urine leakage (92%), and febrile UTI (92%). In a series of 22 patients with catheter drainage for a mean of almost 17 years, Bennett and colleagues[14] found a similarly high incidence of urethral incompetence (9 patients), as well as other complications, including hydronephrosis (6 patients), reflux (10 patients), and bladder stones (16 patients). When severe urethral incompetence occurs in a woman with an indwelling urethral catheter, surgical intervention is usually required to provide effective drainage and eliminate leakage.

In our study we compared the two groups simultaneously and only statistically significant difference was of increased infection rate in the indwelling catheter group i.e. 25% versus 5% prevalence of pyelonephritis. Other complications were more or less similar. But our study was of a very short duration and the period of catheterization is the leading risk factor for the development of UTIs. Catheter associated bacteriura are usually asymptomatic.[22]

There is also statistically significant difference between the ages of the two groups i.e. CISC having mean age of 33.85 $\pm$ 12.16 while that of indwelling group is 47.1 $\pm$ 12.46 years.

As our study mainly constituted patients with neurogenic bladders i.e 25 (62.5%) in CISC while 35 (87.5%) in the other, this may be accounted for higher incidence. of upper tract infection in group-B as no urodynamic evaluation was done and differentiation could not be made on history and examination basis regarding spasticity or flaccidity of bladder. Hence no medications like parasympatholytics were used to prevent highpressure transmission upwards. Also co-morbid factors like diabetes, hypoproteinaemia were not considered which could affect the outcome of proportion of infections.

We found that the main organism causing catheter associated urinary tract infection was Ecoli, which was also found by Wazait et al[23] in their study. The organisms showed high resistance to Ciprofloxacin (35%) in contrast to UK based study[26] as due to overwhelming injudicious use of quinolones. Our study showed Nitrofurantoin and Fosfomycin as having least resistance (10% each), which indicates their use empirically in catheter associated UTIs.

Conclusion

Clean intermittent self-catheterization is a procedure, which is gaining fame for its safety, independence and lower infection rate as compared to indwelling catheter. Complication rate is low and almost same in both groups with statistically significant occurrence of acute pyelonephritis in group-B.

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