

Bladder Management Outcome after Spinal Cord Injury: A Prospective Study

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Abstract

Objectives: To assess the mode of bladder management, reasons for stopping intermittent catheterization and complications encountered in bladder management

Design: Prospective follow up study

Setting: Dept. of PM&R of a tertiary center

Methods: Spinal cord injured patients admitted in the unit with at least one-year follow up duration (Total - 479). 124 (25.9%) patients were followed up, mean duration of 23.3 months, of which 48 (38.7%) regained bladder control and were excluded.

Results: At initial admission, seventy-one patients (total n=76) were discharged on clean intermittent catheterization. At follow up, 47 (66.1%) stopped intermittent catheterization; ability to pass urine was the primary reason for stopping it in 33 (63.4%) patients. Reflex emptying was the most favored mode of bladder management in 25 (32.9%) along with intermittent catheterization in 24 (31.5%) patients. Bladder autonomy and catheter free status was achieved by 54 (71%) and 39 (51.3%) patients respectively. 69 (90.7%) patients experienced urinary incontinence and 36 (34.2%) had urinary tract infection. Antibiotics and anti-cholinergics were commonly prescribed adjunctive medications in 26 (34.2%) and 16 (20.1%) patients respectively.

Conclusion: Most patients stopped doing intermittent catheterization and shifted to other modes of bladder management as per their convenience due to poor follow up.

Key words: bladder outcome, bladder autonomy, catheter free, incontinence, intermittent catheterization, spinal cord injury, urinary tract infection.

Introduction

Spinal cord injury is among the important causes of neurogenic bladder dysfunction. The history of modern treatment of neurogenic bladder after spinal cord injury is relatively short but celebrated its 50th birthday after the pioneering work done¹ in 1950's, which gave birth to better understanding of spinal cord injury as a whole and to the urologic part more specifically. These findings lead to a steady decline in the renal related mortality like intermittent catheterization, maintenance of catheter free status, better control of urinary tract infection, and

specialized center for care, long term urinary surveillance and urodynamic testing². But urinary tract complications continue to be prominent cause of concern and morbidity. Factors such as change in bladder physiology over time, insidious nature of renal damage and adoption by persons of bladder management method most convenient to their physical and social needs, all contribute to such morbidity. However, 50 years on, we are still facing with some of the same problems which our distinguished pioneers experienced like finding a suitable bladder management method for each patient, urinary tract infection, incontinence and upper tract damage.

The purpose of the present study was to assess the mode of bladder management used by the patients with spinal cord injury at follow up, along with the reasons for stopping

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intermittent catheterization and the problems and/or complications encountered in performing the bladder management.

Material and Method

The study was conducted in the Department of Physical Medicine & Rehabilitation, Rehabilitation Research and Artificial Limb Fitting Center, SMS Medical College & Hospital, Jaipur, India. Patients with spinal cord injury admitted in the spinal cord injury unit of the department between January 2000 and December 2002 with at least one year follow up duration were eligible for the study. Follow up was done during January to June 2004. Follow up was done in three ways: (1) Patients coming for routine follow up to the department, (2) Letters were sent to remaining patients to come to the department in Jaipur, and (3) Letters were sent to all the remaining patients residing in the six districts surrounding Jaipur, and six sub-divisional headquarters within the Jaipur district (region from where we receive most of our patients) to come to their respective district or sub-divisional hospitals as intimated in the letter for follow up.

All patients were evaluated and information was recorded in the pre-designed format during their earlier admission in the spinal injury unit. As a protocol, all patients of spinal cord injury with neurogenic bladder were started on clean intermittent catheterization. At follow up, clinical interview was undertaken to find out the preferred mode of bladder management, problems/complications encountered in bladder management, and reasons if any, for stopping clean intermittent catheterization. A clinical examination was done according to the guidelines of the International Standards for Neurological Examination and Functional Classification of Spinal Cord Injury³. A single evaluator did all assessments.

Results

Of the total 479 new admissions in the spinal injury unit during the three-year period, 124 (25.9%) were followed up, of which 48 (38.7%) regained bladder control and were excluded from the study. The following observations were based on the remaining 76 patients (Figure 1). The follow up duration ranged from 12-48 months (mean - 23.3 months). Sixty six (86.9%) patients were followed up at the department of which 30 (39.4%) came for routine follow up and 36 (47.3%) were called after sending letters to the unit, remaining 10 (13.1%) were followed up at their corresponding district or sub-divisional hospitals.

Age ranged from 16-65 years (33.09 +/- 12.56), sex distribution was (Male -66 and Female -10), 65 (85.5%) were residing in rural areas and 63 (82.9%) were literate. At the time of initial admission, 66 (86.8%) patients were

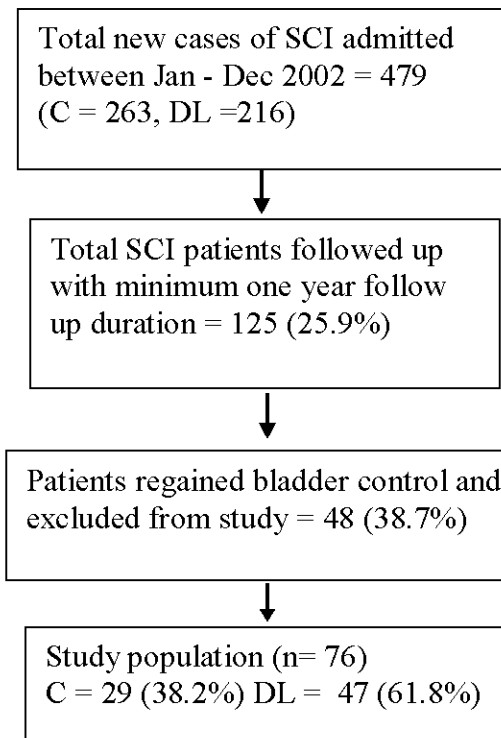


Figure 1: Flow chart showing study population

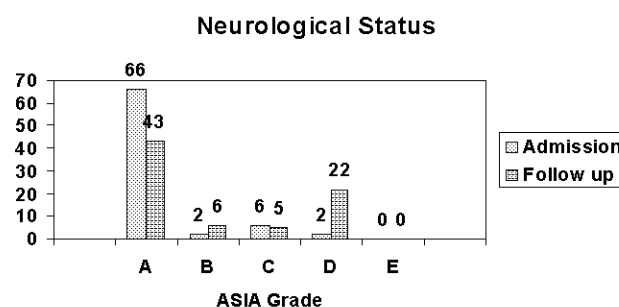


Figure 2: Neurological status on ASIA Grade at admission in spinal unit and at follow up

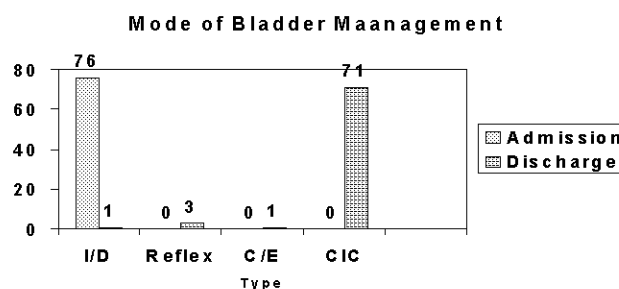


Figure 3: Mode of bladder management at admission

in ASIA grade A (Figure 2). All patients when admitted to spinal unit were on indwelling catheter (Figure 3). The duration of starting intermittent catheterization after admission to spinal unit ranged from 2-90 days (mean 13.5 days). 71 (93.4%) patients were discharged on intermittent catheterization as mode of bladder management from the spinal unit (Figure 3).

At follow up, 47 (61.8%) patients had residual paraplegia and 29 (38.2%) patients had tetraplegia. 43 (65%) patients

were still in ASIA grade A (Figure 2). Reflex emptying was the most common mode of bladder management in 25 (32.9%) followed by intermittent catheterization in 24 (31.5%) patients (Figure 4). Bladder autonomy was achieved by 54 (71%) patients, includes those using self clean intermittent catheterization, reflex emptying and compression evacuation as the preferred mode of bladder management. Catheter free status was achieved by 39 (51.3%) patients. Forty-seven (66.1%) patients stopped doing intermittent catheterization and shifted to other modes of bladder management. Ability to pass urine on their own was the most common reason for stopping intermittent catheterization in 33 (63.4%) patients (Figure 5).

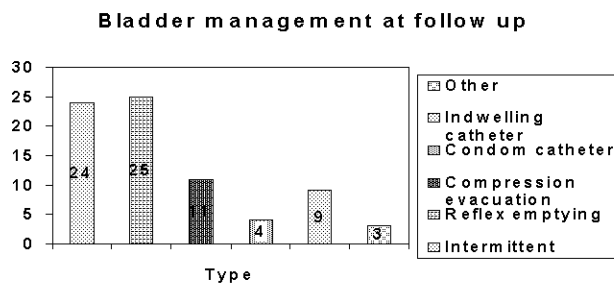


Figure 4: Mode of bladder management at follow up

Reasons for stopping intermittent catheterization

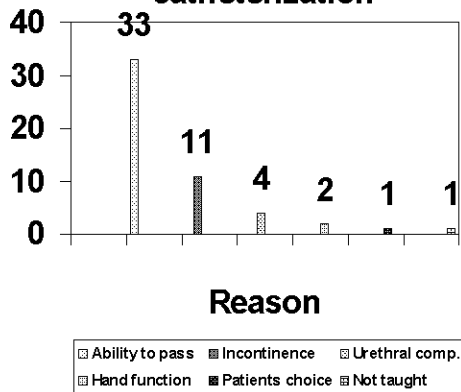


Figure 5: Reasons for stopping intermittent catheterization at follow up

Incontinence was experienced by 69 (90.7%) patients. Among them, urge type of incontinence was most common in 34 (49.2%) patients followed by overflow in 12 (17.3%), stress in 6 (12.2%), both urge & stress in 3 (4.3%), and both overflow & stress type in 11 (22.4%) patients. Anti-cholinergic medications were required by only 16 (23.2%) patients of those having incontinence, while rests were able to manage by restricting fluid intake and timely evacuation. Complications in bladder management were encountered by 37 (48.68%). Among them, fever with chills suggestive of urinary tract infection was the most common complication encountered in 26 (70.2%) patients. Other commonly seen complications

were burning micturition in 9 (24.3%), orchitis and vesical calculus in 1 (2.7%) patient each. Adjunctive pharmacological therapy was required in 32 (42.1%), and surgery in 1 (1.3%) patient. Antibiotics were most frequently needed medications in 26 (34.2%) and anti-cholinergics in 16 (21.0%) patients.

Discussion

All patients when admitted to the spinal unit were on indwelling per-urethral catheter drainage. This finding is different from other study by De Vivo et al⁴ because, in our set up, all patients were first admitted in orthopedic / neurosurgical wards for acute management of skeletal trauma, while neglecting bladder management. Clean intermittent catheterization was started as soon as possible after admission to the spinal unit. Seventy-one (93.4%) patients when discharged from the spinal unit were using clean intermittent catheterization. This higher rate of intermittent catheterization in our study as compared to other studies^{4,5} was due to the protocol followed at our unit, in which all patients were taught intermittent catheterization due to unavailability of the urodynamic system and intermittent catheterization being the safest mode of bladder evacuation allowing complete and timely emptying. In 48 (67.7%) patients, intermittent catheterization was started within two weeks of the admission. Early initiation of intermittent catheterization regimen was also advocated by other authors as it helps in more number of patients becoming catheter free at an earlier stage in follow up⁶.

The definitive choice of voiding method is made within two years of the spinal cord injury⁷. Reflex emptying was the most common mode of bladder management at follow up in 25 (39.2%) patients; they were mostly tetraplegics in ASIA grade C/D who were able to pass urine presuming normal bladder function but had no control. Clean intermittent catheterization was the second most common mode in 24 (31.5%) patients; these patients were paraplegics with ASIA grade A lesion and lower motor neuron type of paralysis. Compression evacuation was performed by 11 (14.5%) patients; all of who were paraplegics and were able to pass by abdominal straining presuming near normal bladder function and no need for catheterization. Continuous bladder drainage was needed for 13 (17.0%) patients due to associated complications. The low usage of supra-pubic and condom drainage in our study as compared to De Vivo et al⁴ was due to lower acceptability of supra-pubic catheter at our center because of the invasive ness. In regard to number of patients using clean intermittent catheterization at follow up, our findings were comparable to the observations made by other authors^{5,8}. The lower success rate of continuation of intermittent catheterization as compared

to other studies^{9, 10, 11, 12} might be due to the fact that tetraplegics in our study with good neurological recovery stopped intermittent catheterization and shifted to reflex emptying ignoring the side effects of high detrusor pressure and back pressure changes.

Bladder autonomy was achieved by 54 (71%) patients at follow up, which was comparable to the observations made by other authors^{13, 14}. Majority of them were performing reflex emptying and intermittent catheterization. Catheter free status was found in 39 (51.3%) patients which is low as compared to other studies^{15, 16} but same as observation made by De Wire et al¹⁷. Catheter free patients were either quadriplegics performing reflex emptying or paraplegics doing compression evacuation. Both of these procedures were harmful but patients chose them as per their convenience without medical supervision.

47 (66.1%) patients stopped using intermittent catheterization and shifted to other modes of bladder management. Our observation was comparable to the findings made by Perakash & Giroux⁸ but had a much lower success rate of continuation than reported by many authors^{10, 11, 12}. This can be due to the fact that in our set up intermittent catheterization was started in most of the patients after admission to spinal unit and most of them discontinued it later. Ability to pass urine without using an invasive device (catheter) was the most common reason for stopping intermittent catheterization^{9, 11, 12} in 33 (63.4%) patients. Incontinence was rated as the second important reason for stopping intermittent catheterization in 11 (21%) patients, as reported by other studies^{11, 14}. Although, incontinence being the most common reason for stopping intermittent catheterization is also reported⁸. Local urethral complications in 4 (7.6%), inappropriate physical status in 2 (3.8%), and patient's choice in 1 (1.9%) were other infrequent reasons for stopping intermittent catheterization^{9, 10, 11}. Reflex emptying was the most common mode of bladder management in patients who stopped intermittent catheterization followed by compression evacuation, indwelling catheter and condom drainage^{4, 5, 12}.

Urinary tract infection was the most common complication experienced by 26 (34.2%) patients, also reported by authors^{5, 8, 9, 11}. Fever with chill was the predominant symptom in most of the patients⁸, incidence being less in patients doing intermittent catheterization as compared to those using other modes of bladder management. Burning micturition was the second most frequent complication in 9 (11.8%) patients but was more common in patients not using intermittent catheterization. This finding is not reported in western literature, as burning micturition is more common in tropical region due to hot climate producing concentrated urine. Bladder calculus

and epididymo-orchitis were other complications encountered in 1 (1.3%) patient each. The low incidence of lithiasis in our study as compared to other study by Gallien et al¹² was due to the fact that renal ultrasound was not routinely performed in our patients due to unavailability of the ultrasound machine at our unit. The low incidence of epididymo-orchitis was also reported by other authors^{8, 9, 11} and in our study can be due to the reason that data about complications is based upon recall by the patients, as most of them never came for regular follow up. No urethral stricture, false passage or meatal stenosis was noted in our patient population. This is also reported by Webb et al¹¹ and in our study can be due to lesser number of patients in our study with shorter follow up duration, as most of these complications occur much in the later stages.

Sixty-nine (90.7%) patients suffered various types of incontinence; urge type being the most common in 34 (44.7%) patients. High incidence of incontinence was also reported by other authors^{11, 18, 19}. Overflow and stress type of incontinence was more common in patients doing intermittent catheterization and urge type in those not using it. Most of the 53 (76.8%) patients were able to manage incontinence by restriction of fluid intake and timely evacuation. Patients using intermittent catheterization experienced much lesser complications as compared to those not using it. The occurrence of complications was linked to the bladder management method; patients using intermittent catheterization having statistically significant lesser complication rate as compared to those on indwelling catheter and no higher as relative to all other modes of bladder management^{5, 12}.

Adjunctive pharmacological therapy was required by 32 (41.1%) patients. Antibiotics were the most frequently used medication in 26 (34.2%) patients. This finding is comparable to observation made by Lapides et al²⁰. Antibiotics were prescribed for urinary tract infection, mostly by general physicians in the nearby treating hospitals; as the patients were unable to come for follow up to the spinal unit. 16 (20.1%) patients were using anticholinergic medications for the management of incontinence. This is similar to that reported by other authors^{18, 19} but with different success rate in each study. Urological surgery was performed in only 1 (1.3%) patient in our study for removal of bladder calculus. This low incidence of surgery was also noted by other authors^{15, 16} and can be due to non-performance of renal ultrasound, lesser number of patients and shorter follow up duration in our study. None of the patient underwent over-distension therapy, bladder augmentation or surgery for incontinence in our study.

There were several limitations in our study. All the patients were started on intermittent catheterization empirically

due to unavailability of urodyanmic system. Follow up rate was less, in spite of efforts to contact all the patients eligible for the study by post. Follow up was done either at our department or at the peripheral hospitals due to which follow up ultrasound examination was not conducted. This may lead to under reporting of the upper tract changes, calculi, or other structural changes in the urinary tract. The complications reported in the study were based on recall by the patients, as not much data was available due to poor follow up rates. All these are genuine problems faced in managing any long term illness with residual disability in developing countries due to lack of adequate facilities and poor social support.

Conclusion

This follow study was conducted to determine the long term bladder management outcome of spinal cord injured patients managed at a tertiary center in a developing country. Most of the patients stopped doing intermittent catheterization and shifted to other modes of bladder management as per their convenience due to poor follow up. The study highlights the difficulties faced in the management of spinal cord injury due to limited resources and facilities available. Despite fifty years of intensively promoting the correct bladder management of neurogenic bladder, many studies including ours, make us aware of how far the clinical reality can stand away from the ideal situation created in the ideal setting as many patients who were advised clean intermittent catheterization from the beginning change to different modes of evacuation as per their convenience later on. It invites reflection and urges continuous action. It makes us realize that work is seldom ever finished but need be continued, repeated and improved.

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