

Factors Affecting Compliance to Clean Intermittent Catheterization: Retrospective Analysis of 236 Patients

Temiz Aralıklı Kateterizasyona Uyumu Etkileyen Faktörler: 236 Hastanın Retrospektif Analizi

¹ Ahmet HACIİSLAMOĞLU^a, ² Osman ÖZDEMİR^a

^aDepartment of Urology, University of Health Sciences Bakırköy Dr. Sadi Konuk Training and Research Hospital, İstanbul, Türkiye

ABSTRACT Objective: Neurogenic lower urinary tract dysfunction is a condition that occurs due to an underlying neurological problem and clean intermittent catheterization (CIC) is used in its treatment. In this study, we aimed to evaluate the compliance of patients with the use of CIC. **Material and Methods:** The data of 302 patients, who were treated with clean intermittent catheters (self-lubricant, disposable) by the same physician between 2016-2019 were retrospectively analyzed. The patients' age, gender, reasons for using CIC, and the presence of urinary incontinence when CIC was recommended were noted. Patients who discontinued CIC use were questioned when they quit and the reasons for quitting. **Results:** Of the 236 patients included in the study, 54.2% (n=128) were male and 45.8% (n=108) were female. Reasons for using CIC of the patients are multiple sclerosis in 39.8% (n=94), spinal cord lesion in 37.7% (n=89), cerebrovascular disease in 14.4% (n=34), and other reasons in 8.1% (n=19). It was observed that 67.8% of patients still use CIC, 26.7% stopped using CIC within the first year, and 5.5% after one year. The reasons for quitting were social reasons (13.2%), physician recommendation (38.1%), believing that it will not be beneficial (22.4%), and difficulty in using CIC (18.4%). **Conclusion:** Although CIC is the gold standard treatment in neurogenic lower urinary tract dysfunction, the most important factor in the success of treatment is patient compliance.

Keywords: Clean intermitten catheterization; bladder dysfunction; self catheterization

ÖZET Amaç: Nörojenik alt idrar yolları disfonksiyonu, idrar tutamamaya ya da yetersiz mesane boşalmasına neden olabilen, altta yatan nörolojik bir probleme bağlı olarak ortaya çıkan bir durumdur ve tedavisinde kendi kendine temiz aralıklı kateterizasyon (TAK) kullanılmaktadır. Bu çalışmada, hastaların TAK kullanımına uyumunu değerlendirmeyi amaçladık. **Gereç ve Yöntemler:** 2016-2019 arasında aynı doktor tarafından temiz aralıklı kateter (kendinden kayganlaştırıcı, tek kullanımlık) tedavisi başlanan 302 hastanın verileri retrospektif olarak incelendi. Hastaların yaşı, cinsiyeti, TAK kullanma nedenleri ve TAK önerildiğinde idrar kaçırma varlığı not edildi. TAK kullanımı bırakan hastaların ne zaman bıraktıkları ve bırakma nedenleri soruldu. **Bulgular:** Çalışmaya dâhil edilen 236 hastanın %54,2'si (n=128) erkek, %45,8'i (n=108) kadındı. TAK kullanma nedenleri hastaların %39,8'inde (n=94) multipl skleroz, %37,7'sinde (n=89) omurilik lezyonu, %14,4'ünde (n=34) serebrovasküler hastalık ve %8,1'inde (n=19) diğer nedenlerdi. Hastaların %67,8'inin hâlâ TAK kullanmaya devam ettiği, %26,7'sinin ilk 1 yıl içinde, %5,5'inin ise 1 yıldan sonra TAK kullanımını bıraktığı gözlemlendi. Bırakma nedenleri sosyal nedenler (%13,2), doktor tavsiyesi (%38,1), fayda sağlamayacağını düşünme (%22,4) ve TAK kullanmada güçlük (%18,4) idi. **Sonuç:** Nörojenik alt üriner sistem disfonksiyonunda TAK altın standart tedavi olmasına rağmen tedavinin başarısındaki en önemli faktör hasta uyumudur.

Anahtar Kelimeler: Temiz aralıklı kateterizasyon; mesane disfonksiyonu; kendi kendine kateterizasyon

Neurogenic lower urinary tract dysfunction (NLUTD) is defined as urinary tract dysfunction due to a defined neurological disease. NLUTD may cause incontinence or inadequate bladder emptying due to outlet obstruction, impaired detrusor contractility, or poor compliance. Urinary tract infections (UTIs), urinary system stone diseases, high storage pressures,

and upper urinary system disorders may occur due to the inability to empty the bladder. Clean intermittent catheterization (CIC), first defined by Lapides, has been used as the gold standard in NLUTD in the last decade. Lapides has described this procedure via a sterile disposable catheter or a clean reusable catheter.¹ This procedure aims to empty the bladder

Correspondence: Ahmet HACIİSLAMOĞLU

Department of Urology, University of Health Sciences Bakırköy Dr. Sadi Konuk Training and Research Hospital, İstanbul, Türkiye

E-mail: ahmett_hio@hotmail.com



Peer review under responsibility of Journal of Reconstructive Urology.

Received: 19 May 2022

Received in revised form: 13 Jul 2022

Accepted: 01 Aug 2022

Available online: 16 Aug 2022

2587-0483 / Copyright © 2022 by Türkiye Klinikleri. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

completely and to increase the function of the inadequate bladder in order to prevent urinary tract complications. If the procedure is performed by the patient, it is defined as intermittent self-catheterization (ISC). In our study, we aimed to examine the continuity of CIC use of patients who were recommended and trained by the same physician and to examine the reasons for discontinuation of CIC use.

MATERIAL AND METHODS

The study was conducted in accordance with the principles of the Declaration of Helsinki. After the approval of the Bakırköy Dr. Sadi Konuk Training and Research Hospital Non-Interventional Clinical Researches Ethics Committee (date: December 9, 2019, no: 2019/516), the data of 302 patients who were given CIC (self-lubricating, disposable) treatment by the same physician between 2016 and 2019 were retrospectively analyzed. Routine controls of patients were planned every 6 months and full urinalysis, creatinine, urinary ultrasonography, and postvoiding residual urine volume are evaluated in the follow-up of the patients. The presence and type of urinary incontinence were questioned in all patients. If a change in their condition was considered, urodynamic studies were planned. In this study, patients who did not come to follow up were reached by phone, and these patients were called for control. 35 patients who could not be reached by phone, 14 patients who refused to come to the clinic despite being contacted by phone, and 17 patients who did not want their data to be used were excluded from the study. A total of 236 patients who came for follow-up or whose information could be accessed were included in the study. The patients' age, gender, reasons for using CIC, and the presence of urinary incontinence when CIC was recommended were noted. Patients who discontinued CIC were questioned about when they quit and the reasons for quitting.

STATISTICAL ANALYSIS

Statistical analysis was performed using Number Cruncher Statistical System 2007 (Kaysville, Utah, USA) program. Descriptive statistical methods (mean, standard deviation, median, frequency, percentage, minimum, maximum) were used while eval-

uating the study data. The suitability of the quantitative data to normal distribution was tested with the Shapiro-Wilk test and graphical analysis. The Kruskal-Wallis test and the Bonferroni-Dunn test for paired comparisons were used in the comparison of three and more groups that did not show normal distribution. Pearson chi-square test and Fisher-Freeman-Halton test were used to compare qualitative data. Statistical significance was accepted as $p < 0.05$.

RESULTS

Of the 236 patients included in the study, 54.2% (n=128) were male and 45.8% (n=108) were female. The ages of the patients ranged from 18 to 78 years, with a mean age of 41.41 ± 12.37 years. Reasons for using CIC of the patients are multiple sclerosis in 39.8% (n=94), spinal cord lesion in 37.7% (n=89), cerebrovascular disease in 14.4% (n=34), and other reasons in 8.1% (n=19). When the status of continuing to use CIC is examined; It was observed that 67.8% (n=160) were still using it, 26.7% (n=63) quit in the first year, and 5.5% (n=13) quit after one year. As the reasons for quitting; Social reasons were 13.2% (n=10), physician recommendation 38.1% (n=29), disbelief in the benefit of 22.4% (n=17), inability to use 18.4% (n=14), and other reasons were 7.9% (n=6). It was observed that 57.2% (n=135) of the cases had urinary incontinence (Table 1). There was no statistically significant difference between age distributions and gender according to the use of CIC ($p > 0.05$). There was no statistically significant difference between continuing to use CIC and the reasons for using ISC ($p > 0.05$). There was a statistically significant difference between continuing to use CIC and the status of urinary incontinence ($p = 0.006$; $p < 0.01$). In the group with urinary incontinence, the rate of continuing to use CIC was higher than in the group without urinary incontinence. On the other hand, CIC quitting rates were lower than the group without incontinence (Table 2).

DISCUSSION

Recurrent urinary tract infections as a result of incomplete emptying or residual urine accumulation, and urinary incontinence or vesicoureteral reflux due

TABLE 1: Distributions of descriptive characteristics.

		n (%)
Age (Year)	Minimum-Maximum (Median)	18-78 (39.5)
	Mean±SD	41.41±12.37
Gender	Male	128 (54.2)
	Female	108 (45.8)
Reasons for using CIC	MS	94 (39.8)
	Spinal cord lesion	89 (37.7)
	CVD	34 (14.4)
	Other	19 (8.1)
Current status of CIC usage	Still using	160 (67.8)
	Quit in the first year	63 (26.7)
	Quit after the first year	13 (5.5)
Reasons for quitting CIC	Social reasons	10 (13.2)
	Physician recommendation	29 (38.1)
	Disbelief in the benefit	17 (22.4)
	Inability to use	14 (18.4)
	Other	6 (7.9)
Urinary incontinence	Yes	135 (57.2)
	No	101 (42.8)

SD: Standard deviation; CIC: Clean intermittent catheterization; MS: Multiple sclerosis; CVD: Cerebrovascular disease.

to high intra-bladder pressure are caused by NLUTD and the gold standard treatment method in NLUTD is CIC.² CIC use has always encountered resistance from patients. There are studies showing that this rate is higher in women and women find it uncomfortable to use CIC.^{3,4} In our study, the rate of using CIC was 45.7%. In other studies on CIC quit rates, these rates were reported as 66% and 36%.^{5,6} In another study with a follow-up period of approximately 4 years, the rate of CIC use was found to be 57.7%.⁷ In another

study, which included children and had an average follow-up period of 9.9 years, long-term compliance was reported as 82%, and this study claimed that the high compliance rates in CIC use were due to the continuous participation of an experienced nurse and the sensitivity of families.⁸ In our study, patients who were diagnosed and trained by a single physician were included in the study, and the rate of CIC use was found to be 67.5%, which was higher than in the literature. We think that training and follow-up by a single physician are effective in achieving a higher compliance rate.

There are studies showing that CIC use is more successful in the long term. In these studies, CIC usage rates of up to 80% were reported in 5-10 years of follow-up.⁹⁻¹² In the studies in the literature, no relationship was found between the disease and continuing to use CIC. In our study, no statistical difference was found in terms of disease and continuing to use CIC. The most common reasons for CIC quitting are difficulty in use and UTIs. In our study, the rate of UTIs could not be determined due to the patients being out of follow-up. According to the answers given to the question of why not use it, another physician's recommendation (38.1%), disbelief (22.4%), inability to use it (18.4%) and social reasons (13.2%) were in the foreground.

There is no information in the literature on the status of urinary incontinence and CIC quitting. In our study, it was found that the rate of CIC use was

TABLE 2: Evaluations related to CIC usage.

		Current status of CIC usage			p value
		Still using (n=160)	Quit in the first year (n=63)	Quit after the first year (n=13)	
Age (Year)	Minimum-Maximum (Median)	19-78 (39)	18-69 (44)	19-66 (41)	^a 0.810
	Mean±SD	41.46±12.36	41.51±12.46	40.23±12.99	
Gender; n (%)	Male	92 (71.9)	32 (25.0)	4 (3.1)	^b 0.139
	Female	68 (63.0)	31 (28.7)	9 (8.3)	
Reasons for using CIC; n (%)	MS	58 (61.7)	29 (30.9)	7 (7.4)	^c 0.681
	Spinal cord lesion	62 (69.7)	23 (25.8)	4 (4.5)	
	CVD	27 (79.4)	6 (17.6)	1 (2.9)	
	Other	13 (68.4)	5 (26.3)	1 (5.3)	
Urinary incontinence; n (%)	Yes	101 (74.8)	31 (23.0)	3 (2.2)	^b 0.006**
	No	59 (58.4)	32 (31.7)	10 (9.9)	

^aKruskal-Wallis test; ^bPearson chi-square test; ^cFisher-Freeman-Halton test; **p<0.01; SD: Standard deviation; CIC: Clean intermittent catheterization; MS: Multiple sclerosis; CVD: Cerebrovascular disease.

higher in patients with urinary incontinence (74.8%). We think that this is caused by the continence provided by antimuscarinic drugs given in addition to CIC treatment in patients with urinary incontinence.

One of the limitations of our study is that patients without follow-up were reached by phone and the results were obtained in this way. We may have overlooked problems such as UTIs and urethral stricture, which are the most important obstacles to CIC use. In addition, the fact that we could not take note of the results of unfollowed patients when they did not use CIC stands out as the deficiency of our study.

CONCLUSION

Although CIC is the gold standard treatment method in the treatment of NLUTD, one of the most important factors in the success of this treatment is patient compliance. Close follow-up of patients who are recommended CIC treatment, knowing the factors af-

fecting treatment compliance, and preventing problems that cause treatment discontinuation to play a key role in the management of the existing disease and treatment success.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

All authors contributed equally while this study preparing.

REFERENCES

- Lapides J, Diokno AC, Silber SJ, Lowe BS. Clean, intermittent self-catheterization in the treatment of urinary tract disease. *J Urol.* 1972;107(3):458-61. [[Crossref](#)] [[PubMed](#)]
- Weld KJ, Dmochowski RR. Effect of bladder management on urological complications in spinal cord injured patients. *J Urol.* 2000;163(3):768-72. [[Crossref](#)] [[PubMed](#)]
- Yavuzer G, Gök H, Tuncer S, Soygür T, Arıkan N, Arasil T. Compliance with bladder management in spinal cord injury patients. *Spinal Cord.* 2000;38(12):762-5. [[Crossref](#)] [[PubMed](#)]
- Timoney AG, Shaw PJ. Urological outcome in female patients with spinal cord injury: the effectiveness of intermittent catheterisation. *Paraplegia.* 1990;28(9):556-63. [[Crossref](#)] [[PubMed](#)]
- Perkash I, Giroux J. Clean intermittent catheterization in spinal cord injury patients: a followup study. *J Urol.* 1993;149(5):1068-71. [[Crossref](#)] [[PubMed](#)]
- Dahlberg A, Perttilä I, Wuokko E, Ala-Opas M. Bladder management in persons with spinal cord lesion. *Spinal Cord.* 2004;42(12):694-8. [[Crossref](#)] [[PubMed](#)]
- Afsar SI, Yemisci OU, Cosar SN, Cetin N. Compliance with clean intermittent catheterization in spinal cord injury patients: a long-term follow-up study. *Spinal Cord.* 2013;51(8):645-9. [[Crossref](#)] [[PubMed](#)]
- Faure A, Peycelon M, Lallemand P, Audry G, Forin V. Pro and cons of transurethral self-catheterization in boys: a long-term teaching experience in a pediatric rehabilitation centre. *Urol J.* 2016;13(2):2622-8. [[PubMed](#)]
- Chai T, Chung AK, Belville WD, Faerber GJ. Compliance and complications of clean intermittent catheterization in the spinal cord injured patient. *Paraplegia.* 1995;33(3):161-3. [[Crossref](#)] [[PubMed](#)]
- Hill VB, Davies WE. A swing to intermittent clean self-catheterisation as a preferred mode of management of the neuropathic bladder for the dextrous spinal cord patient. *Paraplegia.* 1988;26(6):405-12. [[Crossref](#)] [[PubMed](#)]
- Maynard FM, Glass J. Management of the neuropathic bladder by clean intermittent catheterisation: 5 year outcomes. *Paraplegia.* 1987;25(2):106-10. [[Crossref](#)] [[PubMed](#)]
- Gallien P, Nicolas B, Robineau S, Le Bot MP, Duruffe A, Brissot R. Influence of urinary management on urologic complications in a cohort of spinal cord injury patients. *Arch Phys Med Rehabil.* 1998;79(10):1206-9. [[Crossref](#)] [[PubMed](#)]