Prevalence and Correlative Factors of Poststroke Urinary Incontinence

Piyapat Dajpratham, M.D., Chayanin Wechaputi, M.D.

Department of Rehabilitation Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand.

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ABSTRACT

Objective: To determine the prevalence and pattern changes of urinary incontinence in the first 3 months after stroke. The correlation between urinary incontinence and cognitive impairment, physical impairment and functional disability were also explored.

Methods: One hundred acute stroke patients who had their first ever stroke without urinary incontinence were recruited. Canadian Neurological Scale, Barthel Index, Thai Mental State Examination, and Urogenital Distress Inventory Short Form were administered 3 times, within 7 days, at 1 and 3 months after stroke.

Results: The prevalence of urinary incontinence within 7 days, at 1 month and 3 months after stroke were 34%, 22.1% and 17%, respectively. The incontinence pattern improved 18% at 1 month and 21 % at 3 months. The main type of incontinence found was urge incontinence. The initially incontinent group at 7 days was significantly more aphasic and dysphagic. Urinary incontinence correlated moderately with physical impairment and functional disability across all the three times of evaluations. There was no correlation between urinary incontinence and cognitive impairment.

Conclusion: Urinary incontinence in acute stroke patients improves over time. Urge incontinence is the major problem in the incontinence group. The stroke patients with urinary incontinence have more physical impairments and disability than those with continence.

Keywords: Correlation; prevalence; stroke; urinary incontinence

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Poststroke urinary incontinence is one of the most common sequelae after stroke. Moreover, it plays an important role as a prognostic factor after stroke at different time-points. Many studies have shown urinary incontinence within 10 days after the onset of stroke can predict death at 3, 6 months and 1, 2 years as well as functional disability at the same period.[1-3] Therefore, poststroke urinary incontinence is a strong predictor for short term, medium term and long term functional outcomes after stroke. During the rehabilitation phase, the rehabilitation program is interrupted by urinary incontinence as the patient is concerned about having an accident and not being able to concentrate on the program. They may have to leave the therapy program prematurely, given that the accident occurs.

For the planning of stroke care, information on the prevalence of urinary incontinence is essential. The prevalence of urinary incontinence has been variously reported depending on the time of assessment, the age groups of the patients included in the studies and the definition of urinary incontinence. There were several factors found to be associated with urinary incontinence in stroke patients, such as age > 75 years, dysphagia, visual field defect, motor weakness and functional disability.[3] However, those studies recruited all stroke patients who had continence either before or after stroke. Hence the impact of urinary incontinence occurring after stroke was rather unclear.

Therefore, the objectives of this study were: firstly, to study the prevalence of poststroke urinary incontinence in patients with first stroke with no history of urinary incontinence within 7 days and at 1 and 3 months after the onset of the stroke; secondly, to study the changes in the pattern of continence over time; and, thirdly, to study the factors that are correlated with poststroke urinary incontinence.

Correspondence to: Piyapat Dajpratham
E mail: siptb@mahidol.ac.th

TABLE 1. Comparison of demographic data between patients with incontinence and continence.

Characteristics	Incontinence	Continence	p value
Numbers	34/100	66/100	
Mean age	60.21	59.48	0.808
Gender : Male	18 (52.9%)	38 (57.6%)	
Female	16 (47.1%)	28 (42.2%)	0.676
Hypertension	18 (52.9%)	42 (63.6%)	0.389
Dyslipidemia	11 (32.4%)	31 (47%)	0.201
Diabetes	8 (23.5%)	21 (31.8%)	0.487
Smoking	9 (26.5%)	15 (22.7%)	0.805
Heart diseases	7 (20.6%)	14 (21.2%)	0.625
TIA	0 (0%)	5 (7.6%)	0.163
Dysphagia	18 (52.9%)	7 (10.6%)	<0.001*
Aphasia	23 (67.6%)	5 (7.6%)	<0.001*
Types of stroke			
Infarction	25 (73.5%)	53 (80.3%)	
Hemorrhage	9 (26.5%)	12 (18.2%)	
Unknown	0 (0%)	1 (1.5%)	0.501

*significant at p value < 0.05

MATERIALS AND METHODS

Subjects

One hundred acute stroke patients who were admitted with a first ever stroke with no history of urinary incontinence were recruited at Siriraj Hospital from February to August 2005. The diagnosis of stroke was confirmed radiologically or clinically by neurologists according to the WHO criteria.[4] The history of urinary incontinence was acquired by interviewing the patients and/or their caregivers. The patients who were unconscious were excluded from the study.

Procedure

Prior to the initiation of the study, the Ethics Committee of Siriraj Hospital, Mahidol University approved this study. Informed consents were obtained from the patients and/or their caregivers. There were 4 scales selected to measure in our study. Canadian Neurological Scale was used to quantitatively measure neurological impairment after stroke. Accordingly, its total score was 11.5 points, the more neurological deficit the less point were obtained.[5] Barthel Index was used to measure functional disability, and its total score was 100 points with more functional disability reducing the points obtained.[6] Thai Mental State Examination (TMSE) which is a neuropsychiatric test for standard mental status examination for Thai subjects was used to measure cognitive status; the total score of which was 30 points and it contained six basic subtests concerning orientation, registration, attention, calculation, language and recall. A total score over 23 points is defined as normal mental status.[7] Urogenital Distress Inventory Short Form modified version which provides objective measurement of the symptom distress of urinary incontinence in men and women was administered to acquire the pattern of incontinence.[8] These scales were administered 3 times: within 7 days, at 1 and 3 months after stroke.

TABLE 2. Prevalence of urinary incontinence across 3 time periods.

Time after stroke	Numbers of incontinent patients (%)
Initial (within 7 days)	34 / 100 (34%)
1 month	21 / 95 (22.1%)
3 months	16 / 94 (17%)

Statistical analysis

The stroke patients were divided into 2 groups according to their status of urinary continence. The urinary incontinence in this study was defined as having an indwelling catheter within 48 hours of assessment or losing bladder control for at least once a week.

SPSS program version 11.5 was used in analyzing the data. The prevalence of incontinence was derived from the percentage of stroke patients with incontinence according to the definition. Quantitative and qualitative data were compared by Chi-square test and unpaired t-test respectively. Spearman rank correlation was used to explore the correlation of urinary incontinence and neurological impairment, cognitive function and functional status. The correlation coefficient is significant at 0.01 level (2 tailed). The pattern of continence changes was obtained from Urogenital Distress Inventory Short Form.

RESULTS

Fifty-six males and 44 females with their age ranged from 15-88 years old were recruited in the study. Their mean age was 59.73 years (SD=13.97). The risk factors of stroke found in decreasing order were hypertension, dyslipidemia, diabetes mellitus, smoking, heart diseases and a history of transient ischemic attack (TIA). Cerebral infarction was the most common type of stroke of the subjects. After dividing the patients into the continent and incontinent groups, we compared their age, gender, risk factors, type of stroke and incidence of dysphagia and aphasia between the 2 groups. The incontinent group had dysphagia and aphasia significantly more often than the continent group. There was no significant difference between the 2 groups in age, gender, risk factors and type of stroke. (Table 1)

The prevalence of urinary incontinence within 7 days, at 1 month and 3 months after stroke were 34%, 22.1% and 17%, respectively. There were 5 patients deceased at 1 month and 1 patient deceased at 3 months in the study. (Table 2) There were 18 patients (19%) and 11 patients (12%) who recovered from urinary incontinence to continence at 1 month and 3 months, respectively. However, there were 5 and 6 patients who had continence on the previous assessment, then became incontinence at 1 and 3 months, respectively. Some of them had retained catheters and some of them lost their bladder control.

The scores from the Canadian Neurological Scale and the Barthel Index in the continent group were significantly higher than the incontinent group across all the evaluation times. (Table 3) Urinary incontinence was moderately correlated with physical impairment (rho=0.61-0.65) and functional disability (rho=0.71-0.73) across all the evaluation times. There was no correlation between urinary incontinence and cognitive impairment. (Table 4)

The Urogenital Distress Inventory Short Form was administered to obtain the pattern of urination after stroke. As for the continent group, most of the patients reported no abnormal urination after their stroke. The frequency of urination and urgency of urination were equally reported as 20% initially, 3% at 1 month and 1.5% at 3 months, respectively. As for the incontinent group, most of the patients were aphasic so the Urogenital Distress Inventory

TABLE 3. Comparison of scores from the Canadian Neurological scale, Barthel Index and the Thai Mental State Examination between continent and incontinent groups at 3 time periods.

Time periods	Continence status	Numbers	CNS score	BI score	TMSE score
Initial	Continence	66	8.46 ± 2.20*	65.70 ± 27.95	25.32 ± 4.78
	Incontinence	34	4.23 ± 2.50*	15.38 ± 19.12	24.56 ± 4.22
	p value		0.000*	0.000*	0.651
1 month	Continence	74	9.57 ± 1.99**	88.08 ± 19.69	27.83 ± 12.04
	Incontinence	21	5.73 ± 2.24**	27.88 ± 24.76	20.72 ± 7.27
	p value		0.000**	0.000**	0.252
3 months	Continence	78	10.12 ± 1.82***	93.77 ± 15.09	26.53 ± 4.17
	Incontinence	16	5.22 ± 1.73***	26.13 ± 21.03	23.00 ± 6.08
	p value		0.000***	0.000***	0.164

*, **, *** significant difference between continent and incontinent groups at the same time period with p value < 0.05

Short Form could not be administered. There were 5 patients who were able to answer the questionnaire. The urge incontinence and frequency of urination were also constantly reported among this group but the urge incontinence was more prevalent. (Table 5)

DISCUSSION

The frequencies of urinary incontinence found in this study are similar to what have been found in other studies. In the present study, the prevalence of poststroke urinary incontinence was 34% at 7 days, 22.1% at 1 month and 17% at 3 months. Nakayama reported 36% of 935 acute stroke patients had urinary incontinence and the prevalence decreased to 8% at 6 months. Patel et al. studied 235 patients and found 40% had urinary incontinence at 7-10 days after their stroke which decreased to 19%, 15% and 10% at 3 months, 1 and 2 years after their stroke, respectively. Therefore, the proportion of urinary incontinence in stroke patients decreases over time.

The characteristics of continent and incontinent groups showed no significant difference regarding age, gender, risk factors of stroke and type of stroke. This finding was contradictory to the Copenhagen stroke study which reported the initial incontinent group was older and had DM and other disabling diseases more often than the continent group.[9] In the present study, we excluded stroke patients with a history of urinary incontinence, so our patients were younger and had less disabling diseases than patients in the Copenhagen stroke study. The presence of dysphagia and aphasia was found to be significantly different between the 2 groups. The incontinent group was more dysphagic and aphasic. This finding was similar to the study of Patel who reported that the incontinent group had significant dysphagia and aphasia more often than the continent group. Hence, the incontinent group had more neurological impairment than the continent group.[3]

TABLE 4. Correlative factors of urinary incontinence across 3 time periods.

Time periods	Spearman's rho	CNS	Barthel	TMSE
Initial	Correlation	0.650*	0.714*	0.101
	p value	0.000	0.000	0.411
	N	100	100	68
1 month	Correlation	0.627*	0.717*	0.217
	p value	0.000	0.000	0.078
	N	95	95	67
3 months	Correlation	0.613*	0.725*	0.176
	p value	0.000	0.000	0.162
	N	94	94	65

* Correlation coefficient is significant at the 0.01 level (2 tailed)
CNS = Canadian Neurological Scale, Barthel = Barthel Index, TMSE = Thai Mental State Examination

TABLE 5. Numbers of patients with different patterns of incontinence.

Types of incontinence	Initial	At 1 month	At 3 months
Urge	3 / 5	4 / 5	3 / 5
Frequency	2 / 5	3 / 5	1 / 5

The scales used in this study were different types of quantitative measurement. The higher score of these scales indicated less neurological impairment according to the Canadian Neurological Scale, less functional disability according to the Barthel Index and less cognitive impairment according to the Thai Mental State Examination. The incontinent group had significantly more neurological impairment and functional disability than the continent group. Urinary incontinence was correlated moderately to neurological impairment and functional disability, respectively. However, the occurrence of strokes did not contribute to urinary incontinence per se. Stroke related cognitive and language deficits were other contributing factors. Gelber found normal urodynamic study in stroke patients who had urinary incontinence with some other deficits namely aphasia, cognitive impairment and severe functional impairment.[10]

The pattern of urination after stroke with continence was mostly unchanged. Detrusor hyperreflexia with uninhibited bladder contraction is the most common urodynamic finding following a stroke, resulting in symptoms of frequency and urgency of urination.[11-13] In the incontinent group, the urge incontinence was also found in a majority of cases. However, because only patients in the incontinent group were able to answer the Urogenital Distress Inventory Short Form, ability to extrapolate this finding to the general population was limited.

This study has clearly shown that stroke patients with urinary incontinence had more physical impairment and functional disability; therefore, they might not reach independent function and need long-term care. The rehabilitation professionals have to consider this issue in their rehabilitation plans. The caregivers and family must be involved early in the rehabilitation program and be well prepared for the long-term care.

To date, our knowledge on the physical impact of urinary incontinence in stroke patients is well established. However, there was no comparison of the outcome between patients who had pre-stroke urinary incontinence and poststroke urinary incontinence. We still do not know if the patients in both groups would have had the same outcome. Also, the impact of poststroke urinary incontinence on psychological well being and quality of life of patients, as well as their caregivers, has not been extensively explored. In order to provide good quality of

care, further studies are crucially important to answer these questions.

CONCLUSION

Poststroke urinary incontinence improves over time. Urge incontinence is the major problem in the incontinent group. The incontinent group is found to be more aphasic and dysphagic than the continent group. Poststroke urinary incontinence is correlated with the degree of neurological impairments and functional disability.

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REFERENCES

1. Gariballa SE. Potentially treatable causes of poor outcome in acute stroke patients with urinary incontinence. Acta Neurol Scand 2003; 107: 336-40.
2. Wade DT, Hewer RL. Outlook after an acute stroke: urinary incontinence and loss of consciousness compared in 532 patients. Q J Med 1985; 56: 601-8.
3. Patel M, Coshall C, Rudd AG, Wolfe CD. Natural history and effects on 2- year outcomes of urinary incontinence after stroke. Stroke 2001; 32: 122-7.
4. WHO Task Force on Stroke and other Cerebrovascular Disorders. Stroke 1989: recommendations on stroke prevention, diagnosis and therapy: report of the WHO Task Force on Stroke and other Cerebrovascular Disorders. Stroke 1989; 20: 1407-31.
5. Cote R, Battista RN, Wolfson C, Boucher J, Adam J, Hachinski V. The Canadian neurological scale: validation and reliability assessment. Neurology 1989; 39: 638-43.
6. Wade DT, Collin C. The Barthel ADL index: a standard measure of physical disability. Int Disabil Stud 1988; 10: 64-7.
7. Train the brain forum committee. Thai mental state examination (TMSE). Siriraj Hosp Gaz 1993; 45: 359-74.
8. Coleman J. Urinary incontinence after stroke: evaluation and behavioral treatment. Topics in Geriatric Rehabilitation 2003; 19: 60-83.
9. Nakayama H, Jorgensen HS, Pederson PM, Raaschou HO, Olsen TS. Prevalence and risk factors of incontinence after stroke: the Copenhagen stroke study. Stroke 1997; 28: 58-62.
10. Gelber DA, Good DC, Laven LJ, Verhulst SJ. Causes of urinary incontinence after acute hemispheric stroke. Stroke 1993; 24: 378-82.
11. Borrie MJ, Campbell AJ, Caradoc-Davies TH, Spears GF. Urinary incontinence after stroke: a prospective study. Age Ageing 1986; 15: 177-81.
12. Tsuchida S, Noto H, Yamaguchi O, Itoh M. Urodynamic studies on hemiplegic patients after cerebrovascular accident. Urology 1983; 21: 315-8.
13. Linsenmeyer TA, Zorowitz RD. Urodynamic findings in patients with urinary incontinence after cerebrovascular accident. Neuro Rehabil 1992; 2: 23-6.

บทคัดย่อ

ความชุกและปัจจัยที่เกี่ยวข้องกับอาการกลั้นปัสสาวะไม่ได้ในผู้ป่วยโรคหลอดเลือดสมอง

ปิยะภัทร เดชพระธรรม พ.บ., ชญานิน เวชภูติ พ.บ.

ภาควิชาเวชศาสตร์ฟื้นฟู, คณะแพทยศาสตร์ศิริราชพยาบาล, มหาวิทยาลัยมหิดล, กทม.10700, ประเทศไทย.

วัตถุประสงค์: เพื่อศึกษาความชุก ปัจจัยที่เกี่ยวข้อง และระดับความสามารถของผู้ป่วยโรคหลอดเลือดสมองที่กลั้นปัสสาวะไม่ได้ในช่วงเวลา 3 เดือนแรกหลังเกิดโรค พร้อมทั้งติดตามดูแบบแผนของการกลั้นปัสสาวะที่เปลี่ยนไปในช่วงเวลา 3 เดือน

วิธีการ: ทำการสัมภาษณ์ผู้ป่วยโรคหลอดเลือดสมองครั้งแรกหรือผู้ดูแล โดยใช้แบบทดสอบ Barthel Index, Canadian Neurological Scale, Thai Mental State Examination และ Urogenital Distress Inventory Short Form ที่ระยะเวลาแรกรับภายใน 7 วันแรก ที่เวลา 1 เดือน และ 3 เดือน

ผลการศึกษา: ผู้ป่วยโรคหลอดเลือดสมองจำนวน 100 คน เป็นชาย 56 คน หญิง 44 คน อายุเฉลี่ย 59.73 ปี พบความชุกของการกลั้นปัสสาวะไม่ได้ในระยะเวลา 7 วันแรก 1 เดือน และ 3 เดือน เท่ากับ 34%, 22.1% และ 17% ตามลำดับ และมีปัญหา urge incontinence มากที่สุด อาการกลั้นปัสสาวะไม่ได้นี้มีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติกับอาการกลืนลำบาก ความบกพร่องด้านภาษา ระดับความสามารถในการช่วยเหลือตนเอง และความบกพร่องของร่างกาย แต่ไม่มีความสัมพันธ์กับพื้นฐานประชากร ปัจจัยเสี่ยงของการเกิดโรคหลอดเลือดสมองและสมรรถภาพสมอง

สรุป: ความชุกของการกลั้นปัสสาวะไม่ได้ในผู้ป่วยโรคหลอดเลือดสมองลดลงตามลำดับในช่วงเวลา 3 เดือน การกลั้นปัสสาวะไม่ได้มีความสัมพันธ์กับความบกพร่องของร่างกาย และความสามารถในการช่วยเหลือตนเอง โดยพบปัญหาด้าน urge incontinence มากที่สุด