척수재활

게시일시 및 장소 : 10 월 19 일(토) 08:30-12:30 Room G(3F)

질의응답 일시 및 장소 : 10 월 19 일(토) 11:00-11:30 Room G(3F)

P 3-63

Quantification of Autonomic Dysflexia Severity in Spinal Cord Injuries

Zee Won Seo[1*], Eun-Ho Yu[1], Ju Hyun Son[1], So Jung Kim[1], Myung Hoon Moon[1], Sungchul Huh[1], Hyun-Yoon Ko[1,2†]

Pusan National University Yangsan Hospital, Department of Rehabilitation Medicine[1], Pusan National University School of Medicine, Department of Rehabilitation Medicine[2]

Introduction

Autonomic dysreflexia (AD) occurs in spinal cord injuries (SCI) with a neurological level of injury (NLI) of T6 or above. Previous studies indicated that AD symptoms are strongly affected by NLI, onset duration, and completeness. Clinical assessment of the severity of AD may be necessary, but it is unlikely that a quantitative assessment of the severity of AD is well studied. The aim of the study is to propose a model for the quantification of the severity of AD and to find out relevant factors.

Methods

We retrospectively collected data from 14 SCI patients (12 males and 2 females) with AD defined as an increase in systolic blood pressure more than 20 mmHg. Considering variable situations such as orthostatic hypotension, postprandial hypotension, and tendency of blood pressure (BP) change showing nocturnal dipping and increase at dawn, cystometric capacity was measured in a supine position, in the morning, and 2 hours after meals. The real-time BP was measured using FinometerTM (Fig. 1A). BP was measured from the start of bladder filling to the normalization of BP. The area above 20 mmHg using integration was calculated (Fig. 1B). We also calculated the detrusor overactivity index (DOI) from the urodynamic study (UDS). DOI is defined as the sum of the detrusor pressures at each point of bladder overactivity during the filling phase of UDS divided by the cystometric capacity. Both the area and the maximal BP change during the filling phase were analyzed to determine the relationship between these values and various factors such as DOI, bladder compliance, NLI, completeness, and onset duration using Pearson correlation and Kendall's Tau-b analysis.

Results

Demographics and descriptive data are listed in Table 1. The area showed a strong positive linear correlation with DOI (p=0.002, rho=0.753), however, the maximum change in BP during the filling phase was not significantly associated with DOI. The area also showed a moderately positive statistical correlation with the completeness of SCI (p= 0.032, rho= 0.467) (Table 2).

Conclusion

There are various possible causes of AD, but the most acute symptom is usually caused by bladder filling which is easily experienced in daily life. Since the Finometer has an advantage of easily measuring the BP, the area of the graph appears to be a useful method for quantifying AD in the patients with SCI.

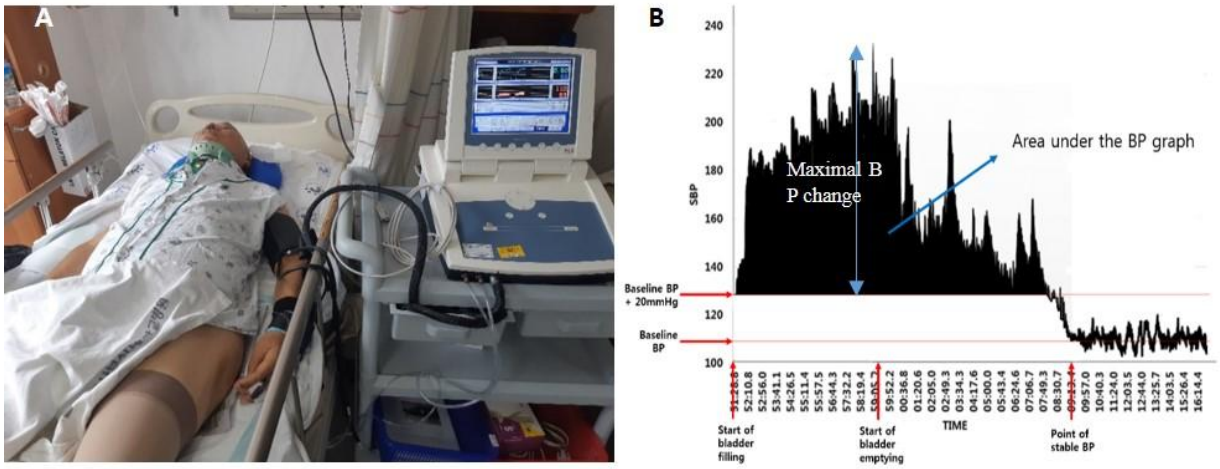

Figure 1. A) Real-time BP measured by connecting a Finometer sensor to the fingertip of the patient B) Area and maximal BP change obtained from the Finometer

Table 1. Demographics and clinical characteristics of the subjects

Variables	Number
Age (years)	49.0 ± 17.0
Gender	
Male	12 (85.7%)
Female	2 (14.3%)
Neurologic level of injury	
C2	1 (7.1%)
C3	4 (28.6%)
C4	4 (28.6%)
C5	2 (14.3%)
C6	1 (7.1%)
C7	0 (0.0%)
C8	2 (14.3%)
AIS	
A	6 (42.9%)
B	3 (21.4%)
C	2 (14.3%)
D	3 (21.4%)
Type of bladder detrusor	
Overactivity	4 (28.6%)
No overactivity	10 (71.4%)

Table 2. Statistical correlation with two values in DOI, bladder compliance, NLI, completeness of SCI and duration of disease

	Factors	DOI (mmHg/mL)	Onset duration (month)	Bladder Compliance (mL/mmHg)	Completeness	NLI
Area (mmHg · min)	rho	0.753	0.347	-0.454	0.467	-0.084
	p-value	*0.002**	*0.225*	*0.103*	*0.032**	*0.693*
Maximal BP change (mmHg)	rho	0.481	0.699	-0.267	0.651	-0.193
	p-value	*0.082*	*0.005**	*0.357*	*0.003**	*0.366*

DOI, Detrusor Overactivity Index; AIS, American Spinal Cord Injury Association Impairment Scale; NLI, Neurologic level of injury; BP, Blood Pressure

*Asterisk means statistically significance ($p < 0.05$)