

Ho Seok Lee, MD., PhD.¹, Min Kyun Sohn, MD., PhD.², Jongmin Lee, MD., PhD.³, Deog Young Kim, MD., PhD.⁴, Yong-Il Shin, MD., PhD.⁵, Gyung-Jae Oh, MD., PhD.⁶, Yang-Soo Lee, MD., PhD.⁷, Min Cheol Joo, MD., PhD.⁸, So Young Lee, MD., PhD.⁹, Min-Keun Song, MD., PhD.¹⁰, Junhee Han, PhD.¹¹, Jeonghoon Ahn, PhD.¹², Young-Hoon Lee, MD., PhD.⁶, Dae Hyun Kim, MD., PhD.¹³, Young-Taek Kim, PhD.¹⁴, Yun-Hee Kim, MD., PhD.¹⁵, Won Hyuk Chang, MD., PhD.^{13,16}

¹Department of Physical Medicine and Rehabilitation, Chung-Ang University Hospital, Seoul, Republic of Korea

²Department of Rehabilitation Medicine, College of Medicine, Chungnam National University, Daejeon, Republic of Korea

³Department of Rehabilitation Medicine, Konkuk University School of Medicine, Seoul, Republic of Korea

⁴Department and Research Institute of Rehabilitation Medicine, Yonsei University College of Medicine, Seoul, Republic of Korea

⁵Department of Rehabilitation Medicine, Pusan National University School of Medicine, Pusan National University Yangsan Hospital, Yangsan, Republic of Korea

⁶Department of Preventive Medicine, Wonkwang University, School of Medicine, Iksan, Republic of Korea

⁷Department of Rehabilitation Medicine, School of Medicine, Kyungpook National University, Kyungpook National University Hospital, Daegu, Republic of Korea

⁸Department of Rehabilitation Medicine, Wonkwang University School of Medicine, Iksan, Republic of Korea

⁹Department of Rehabilitation Medicine, Jeju National University Hospital, Jeju National University School of Medicine, Jeju City, Republic of Korea

¹⁰Department of Physical and Rehabilitation Medicine, Chonnam National University Medical School, Gwangju, Republic of Korea

¹¹Department of Statistics, Hallym University, Chuncheon, Republic of Korea

¹²Department of Health Convergence, Ewha Womans University, Seoul, Republic of Korea

¹³Department of Physical and Rehabilitation Medicine, Center for Prevention and Rehabilitation, Heart Vascular Stroke Institute, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Republic of Korea

¹⁴Department of Preventive Medicine, Chungnam National University Hospital, Daejeon, Republic of Korea

¹⁵Department of Physical and Rehabilitation Medicine, Sungkyunkwan University School of Medicine, Suwon, Korea

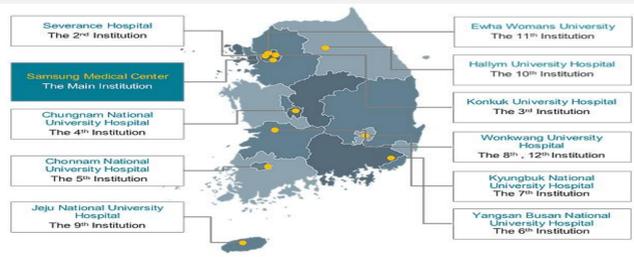
¹⁶Department of Health Science and Technology, Department of Medical Device Management and Research, SAHST, Sungkyunkwan University

Introduction

- Patients surviving ischemic stroke (IS) frequently suffer from cognitive deficits, resulting in disability and morbidity.
- This condition is widely known as vascular cognitive impairment (VCI).
- However, long-term outcomes for post-stroke patients with VCI are not well known. In this study, we aimed to evaluate the 5-year prognosis of IS patients with mild VCI.

Methods

- This study conducted a retrospective analysis of patients surviving IS who were classified as having mild VCI at 6 months after onset, from Korean Stroke Cohort for Functioning and Rehabilitation study, with follow-up for up to 5 years



❖ The Korean Stroke Cohort for Functioning and Rehabilitation (KOSCO)

- VCI was defined using guidelines from Vascular Impairment of Cognition Classification Consensus Study (VICCCS).

- ✓ Core domains for assessment should include executive function, attention and memory, as well as language and visuospatial function.
- ✓ Mild VCI: Impairment in at least one cognitive domain and mild to no impairment in instrumental activities of daily living (IADLs)/activities of daily living (ADLs), respectively (independent of the motor/sensory sequelae of the vascular event).
- ✓ Major VCI: Clinically significant deficits of sufficient severity in at least one cognitive domain (deficits may be present in multiple domains) and severe disruption to IADLs/ADLs (independent of the motor/sensory sequelae of the vascular event).

- Cognitive function was assessed using the Korean Mini-Mental State Examination (K-MMSE), and functional level regarding activities of daily living (ADL) was assessed using Functional Independence Measure (FIM).

- ✓ Cognitive domains utilizing K-MMSE: Orientation to time, Orientation to place, Registration, Attention and calculation, Working memory (Recall), and Language.
- ✓ ADL impairment: A score below 6 in any of the 18 FIM subcategories was classified as indicative of disruption in ADL, as a score of 6 or 7 indicates independence.

- Multivariable binomial logistic regression analysis was used to analyze the covariates and identified the associated factors progression to major VCI at 5-year.

Conclusions

- Over a 5-year follow-up period, **13.6%** of patients with mild VCI at 6-month progressed to **major VCI** condition.
- These findings provide valuable information for patients and physicians in managing cognitive impairment in patients with mild VCI following stroke.

Results

- A total of 998 patients were identified as having mild VCI at 6 months after onset. At 5 years after onset, 136 (13.6%) patients progressed to major VCI (K-MMSE, 20.6 ± 5.7). In contrast, 862 (86.4%) patients showed improved cognition or remained classified as mild VCI (K-MMSE, 27.2 ± 3.2) (Figure 1 and 2).

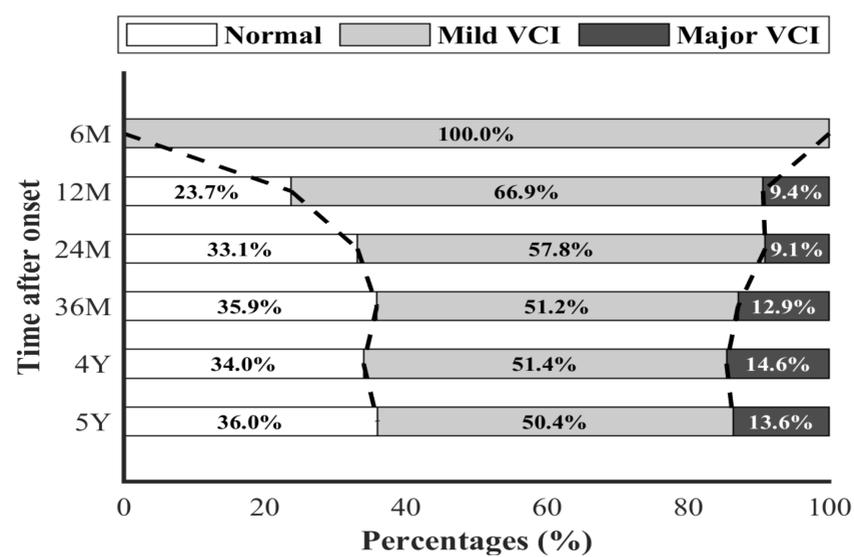


Figure 1. 5-year follow-up of VCI proportions in Mild VCI patients.

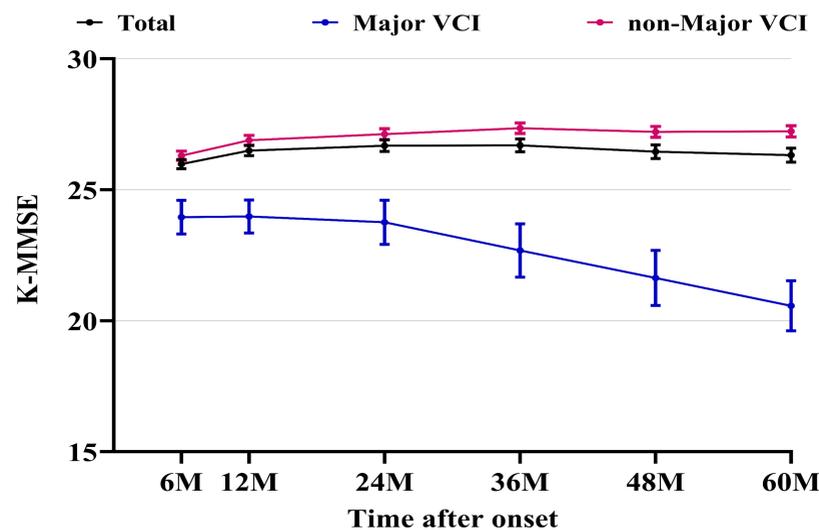


Figure 2. 5-year follow-up of K-MMSE in Mild VCI patients

- In a multinomial logistic regression analysis, older, presence of diabetes and atrial fibrillation, etiology of small vessel occlusion, lower FIM score at 6-month, impairment in the attention and calculation domain of the K-MMSE at 6-month, and longer hospitalization were associated with an increased risk of being classified as having major VCI at 5-year.

Table 1. Logistic regression analysis predicting Major VCI at 5-year.

Variable	OR (95% CI)	p-value
Age	1.09 (1.05 – 1.12)	<0.001
Diabetes	1.84 (1.15 – 2.92)	0.01
Atrial fibrillation	2.33 (1.15 – 4.61)	0.02
Etiology, Small vessel occlusion	2.09 (1.24 – 3.50)	0.01
Level of ADL (FIM), at 6-month	0.90 (0.84 – 0.95)	<0.001
Attention and calculation domain of K-MMSE, impaired, at 6-month	1.76 (1.03 – 3.07)	0.04
Duration of 1 st hospitalization	1.03 (1.01 – 1.05)	<0.001