

## PURSUING THE NEED FOR PHYSICAL ACTIVITY IN RECURRENT CVA PATIENTS DURING HOSPITALIZATION: A CASE REPORT

Stepanus Maman Hermawan<sup>1\*</sup>, Hany Wihardja<sup>2</sup>

1. Department of Nursing, Faculty of Medicine and Health Science, Universitas Kristen Krida Wacana, Jakarta 11470, Indonesia
2. Department of Nursing, Sint Carolus School of Health Science, Jakarta 10440, Indonesia

\*E-mail: stepanus.hermawan@ukrida.ac.id

---

### Abstract

Cerebrovascular accident (CVA) is a neurological deficit condition caused by an acute focal injury of the central nervous system by cerebral infarction or intracerebral hemorrhage. CVA patients who do not reduce risk factors after the first attack have an 8.7 times higher risk of CVA recurrence. The effect of a recurrent CVA is six times greater than the risk of a first CVA in the general population of the same age and sex, and nearly half of them remain alive but are physically disabled. This case report illustrates the process of recurrent CVA and disability experienced by a 69-year-old Malay woman, a patient at a private hospital in West Kalimantan. The nursing strategy of two post-CVA physical rehabilitation exercise programs for patients during hospitalization will be explained according to the stages in nursing theory.

**Keywords:** hospitalization, physical activity, recurrent cerebrovascular accident

### Abstrak

*Mengejar Kebutuhan Aktivitas Fisik Pasien CVA Berulang Selama Hospitalisasi: Laporan Kasus. Cerebrovaskuler Accident (CVA) adalah kondisi defisit neurologis karena cedera akut pada sistem saraf pusat disebabkan infark serebral atau perdarahan intraserebral. Pasien CVA yang tidak menurunkan faktor risikonya secara optimal setelah serangan pertama memiliki risiko CVA berulang sebesar 8,7 kali lebih tinggi. Efek dari CVA berulang adalah 6 kali lebih besar dari episode CVA pertama pada populasi umum, dengan usia dan jenis kelamin yang sama, hampir setengah dari mereka tetap hidup tetapi mengalami cacat secara fisik. Laporan kasus ini menggambarkan penyakit CVA berulang dan kecacatan yang dialami seorang wanita Melayu berusia 69 tahun, seorang pasien di Rumah Sakit Swasta, Kalimantan Barat. Strategi keperawatan untuk dua program latihan rehabilitasi fisik pasca-CVA bagi pasien selama hospitalisasi akan dijelaskan sesuai dengan tahapan pada teori keperawatan.*

**Kata Kunci:** aktivitas fisik, CVA berulang, hospitalisasi

---

### Introduction

According to the American Stroke Association (2018), cerebrovascular accident (CVA) is the fifth cause of death and disability in adults. More than 4 million CVA survivors survived with varying degrees of disability. The severity of paresis after a CVA is related to functional capabilities, neurological disorders, and mortality (American Stroke Association, 2018). The most common residual effect after CVA is hemiparesis in the contralateral upper limb, with more than 80% of CVA patients experiencing this

condition acutely and becoming permanently disabled for life (Hatem et al., 2016).

In 2015, the incidence of CVA sufferers in America reached 142,142 deaths, and there was an increase of 5.8% in 2016, and the rest were permanently disabled (American Stroke Association, 2018). In the same year in England, CVA was the second leading cause of death after cancer, heart disease, and respiratory problems and caused nearly 50,000 deaths (Donkor, 2018). In 2018, the prevalence of CVA in Indonesia in a population of 1000 aged over 15

years reached 10.9% (Ministry of Health Republic of Indonesia, 2018).

The main factor in CVA patients being unable to perform daily activities is because their body experiences weakness, decreased muscular endurance, decreased range of motion, sensory disturbance, and body balance problems. Motor impairment is the most common deficit after CVA, which happens as either a direct consequence of the lack of signal transmission from the cerebral cortex or a slowly accumulating process of cerebral injuries or muscle atrophy due to learned disuse (Lui & Nguyen, 2018). Some studies also argue that the above conditions can trigger recurring CVAs due to falls or severe stiffness (Park et al., 2016). The most frequently disrupted physical activity in CVA patients is activities of daily living, such as the ability to eat, bathe, dress up, and move their upper and lower limbs (Whitiana et al., 2017).

CVA patients, families, and medical teams can prevent a permanent motor disability that may occur with post-CVA rehabilitation. The golden time to start post-CVA therapy is 24–48 h after the attack if the condition of the sufferer is stable.

Nurses have an important role as educators, motivators, and promoters of patient health when hospitalized (Theofanidis, 2016). This role can support the patient to have motivation for recovery and have a high quality of life. Patients with recurrent CVAs often face situations of despair and depression due to the disability experienced. The hospitalization period is the right time for nurses to combine their roles to improve patients' physical function to increase their desire to have a better lifestyle with repetitive exercises (Hillis & Tippett, 2014).

This case report aimed to describe the application of nursing knowledge and practice on a recurrent CVA patient. Care must prioritize holistic care in terms of the biological, psychological, and spiritual aspects of the patient. Interventions conducted in the case of patients

with recurrent CVAs are focused on an interpersonal approach so that commitment can be formed in exercises to be guided by nurses. Nurses also become a support system by helping fulfill basic human needs during hospitalization.

## **Case Illustrations**

Mrs. B, a 69-year-old Malay woman, was diagnosed with ischemic CVA. She has a high cholesterol level and hypertension for more than 13 years. Her computed tomography brain scan on February 11, 2019, showed evidence of infarct recurrence in the left occipital-parietal region. She presented with a progressive right upper and lower limb weakness, slurred speech, and right-sided facial weakness. Further history revealed that she had one previous episode of CVA in the past 3 years with similar findings, although she had fully recovered from this episode and had no disabilities.

The results of further investigation with her son found that Mrs. B likes to eat salty foods and rarely exercises, and this lifestyle continued after the first CVA episode. She was discharged on Captopril 5 mg daily, but sometimes, she forgot to take her medication when she went out for a day.

On February 10, Mrs. B came to the hospital after experiencing difficulty in lifting a spoon and swallowing food at breakfast. She immediately cried and called her son to drive her to the hospital. The patient was treated quickly in the emergency department because she already had a previous medical record. The patient was then referred to the inpatient unit for recovery. In the emergency department, the patient was given antihypertensive medication, antiplatelet therapy, Ringer's lactate fluid infusion, and a urine catheter was inserted to solve urinary incontinence.

**Existing Condition.** On examination, she could not walk independently. She was oriented to time, place, and person but had slurred speech.

Her body mass index was 30 kg/m<sup>2</sup>, blood pressure 150/80 mmHg, and pulse rate 74 beats per minute with regular rhythm and good volume. Her lower limb reflexes were brisk, but foot sensation was not intact with motoric power of 4/5 in the right upper and lower limbs. There were no signs of peripheral neuropathy.

This hospitalization had made Mrs. B depressed. She had poor sleep at night and had loss of appetite due to swallowing difficulties. Mrs. B repeatedly complained that she was sad because she was unable to move her right hand independently. She sometimes cannot feel the sensation if someone touched her right hand. Mrs. B also coughed more frequently when drinking or eating biscuits. She said that she did not experience any of these in the first CVA episode, so the recurring CVA made her depressed.

An interview with family found that Mrs. B became more reserved and closed. She seemed to cry when she was alone or when bathed by nurses. She only wanted to talk to her son and the nurse who cared for her from the beginning in the inpatient room.

**Assessment.** Her laboratory tests are shown in Table 1. Her electrocardiogram result was normal.

**Implementation.** For 3 weeks, from February 14 to March 6, 2019, the nursing team did two post-CVA exercises, namely, strengthening and shaker exercises. The goal of the nursing team was to maximize the physical activity abilities of post-CVA patients. This improvement in physical function was crucial because it supports the quality of life and emotional status of

patients after a CVA episode. The intervention phase was divided into two, namely, the preparation and implementation stages.

In the preparation phase, nurses provided health education about the function of the exercise and the objectives to be achieved. The nurse team then built patients' commitment to do the exercises regularly. In the implementation stage, Mrs. B did strengthening exercises three times a day for a week for 5 to 10 min combined with shaker exercises 5 days a week for 5 min.

**Outcome.** After 3 weeks, the review showed that the muscle stiffness was better. Mrs. B can move her right upper and lower limbs when instructed by the nurse, but she was still unable to resist pressure when applied to the right lower limb. The patient also showed improved swallowing function so that she never experienced a cough or aspiration while eating.

## Discussion

Mrs. B was diagnosed with ischemic CVA, and she had a high cholesterol level and hypertension for more than 13 years. She presented with a progressive right upper and lower limb weakness, slurred speech, and right-sided facial weakness. Further history revealed that she had a prior CVA episode in the past 3 years with similar findings, although she had fully recovered from this episode and had no disabilities. CVA is the leading cause of disability in adults and has the highest diagnostic rate in long-term care (Johnson et al., 2016). High mortality due to CVA causes significant morbidity in patients who survived a CVA due to a post-CVA paralysis condition. The most impacted disability is a

Table 1. Laboratory Results of the Respondent in February 2019

Investigation	Result
Total cholesterol	220 mg/dL
HDL cholesterol	98 mg/dL
LDL cholesterol	159 mg/dL
ECG	Normal

HDL, high-density lipoprotein; LDL, low-density lipoprotein; ECG, electrocardiogram.

decrease in functional ability and muscle strength. The case of Mrs. B shows that the patient had a recurrent CVA, and in this second CVA episode, there is a right hemiparesis. Cahyati et al. (2013) argued that hemiparesis in the upper limb can make patients experience various limitations so patients become dependent on others for activity. This caused the sadness and depression experienced by Mrs. B.

For many individuals who have experienced a CVA, muscle weakness is the most prominent impairment. The intervention used by the nursing team to optimize hemiparesis recovery experienced by Mrs. B was muscle and physical exercise. This exercise is done to prevent stiffness, deformity, and permanent disability. Approximately 20% of all post-CVA patients in America use walking aids because post-CVA rehabilitation is not optimal (Maguire et al., 2012). Mrs. B's strengthening exercise was performed for 5 to 10 min, as many as 3 days a week for 3 weeks, and conducted according to her condition, whether she can be on her own or with the help of a nurse.

Strengthening exercises aim to reduce pain and maintain muscle strength, and they include two core exercises, namely, hamstring and quadriceps (Ada et al., 2013). The results of repetitive exercises can also increase muscle strength and confidence in dealing with the weaknesses experienced. Muscle strength and limb blood flow will increase because of the increase in the amount of oxygen delivered to the capillary extremities through hemoglobin and red blood cells (Ada et al., 2013).

After 3 weeks of training, Mrs. B showed better muscle strength of the right hand and leg. She can move her right upper and lower limbs when instructed by the nurse, but she was still unable to withstand pressure when applied to the lower limbs. A study explained that optimal results can be obtained after 6 months of repetitive training (Ada et al., 2013). In addition to muscle strength, the quality of patients' daily activities can also improve.

Another disability experienced by Mrs. B was right-sided facial weakness due to speech slurring and swallowing difficulties. A Mayo Clinic study showed that 60% of CVA patients with long-term home care experience dysphagia (Rudberg et al., 2015). Central nervous system deficits, local structural lesions, or CVAs can cause dysphagia. Patients with dysphagia can usually only be identified after the patient has aspiration (Shaker & Geenen, 2011).

The appropriate treatment of dysphagia can be determined by the type of aspiration in the patient. There are three types of aspirations, namely, predeglutitive aspiration, which occurs when a patient is chewing in preparation to swallow food; intradeglutitive aspiration, which occurs when food traverses to the pharynx; and postdeglutitive aspiration, which occurs after a swallow is finished (Shaker & Geenen, 2011). Mrs. B's case experienced predeglutitive aspiration characterized by coughing at the beginning of the entry of food or drink. She also had difficulty swallowing food.

The intervention of nurses to improve the patient's swallowing ability was oropharyngeal exercise, namely, shaker exercise or shaker maneuver. This exercise significantly strengthens the suprahyoid muscles that experienced weakness. The movements practiced in this exercise are repetitive movements of raising the head to look at the toes, lowering the head back to the bed, and repeating the steps 30 times in 60 s (Shaker & Geenen, 2011). This exercise must also be adapted to the patient's condition and can be evaluated using the swallowing performance scale so that the changes in the swallowing force of the patient can be assessed (Rudberg et al., 2015).

In the case of Mrs. B, the shaker exercise was performed within 3 weeks, and a decrease in the frequency of coughing during eating and drinking indicated an increase in swallowing ability. The shaker exercise is easy to learn and possible to perform, but a relationship of trust is needed because the patient and trainer must have the

same goals and motivation so that the exercise is done with commitment (Kang et al., 2012).

Another risk factor for CVA in Mrs. B's case is hypercholesterolemia. Nurses should play the role of a health educator for patients and families to overcome this. Drug and non-drug treatments can reduce hypercholesterolemia. Nurses must provide education about the risk factors for hypercholesterolemia that can and cannot be controlled for effective management (Feldman et al., 2015).

Eating patterns and physical activity can determine the body's cholesterol levels. Food consumed undergoes a metabolic process and produces adenosine triphosphate (ATP), which is the energy source for physical activity. ATP formation is adjusted based on the body's needs so not all food is directly converted into ATP, and some are stored in the form of cholesterol. More physical activities performed increase ATP needs and will cause the least cholesterol formation. Mrs. B has several risk factors that cannot be controlled such as the age of 69 years and the gender of women who are more prone to increase LDL compared with men after menopause. Nurses can work closely with nutritionists to determine fatty foods that should be avoided to reduce patients' LDL cholesterol levels.

More than 30% of CVA patients require assistance with daily living, and approximately 15% require care in assisted-living facilities such as a nursing home. Strengthening exercise and shaker maneuver were performed to speed up the rehabilitation process of Mrs. B and prevent permanent disability. Disabilities can inhibit patients from performing physical activities that can ultimately make them more stressed to the condition after a recurrent CVA (Duncan, et al., 2011).

The rehabilitation time is crucial for nurses to avoid decreased muscle strength and progressive nerve sensations in the limbs. Therapeutic programs for CVA cases are usually divided into three: the acute, subacute, and chronic phases

(Department of Health & Human Services USA, 2014). In ischemic CVA, rehabilitation in the acute phase is the best choice because the rehabilitation program is simple and prevents permanent body disability.

Physical activity is essential to improve and maintain physical fitness. In the case of Mrs. B, muscle rehabilitation and oropharyngeal strength training are important so that the patient has a high quality of life despite having had a CVA. Disability in patients can also trigger stress and depression, which are risk factors for CVA recurrence (Willey et al., 2010). Physical inactivity contributes to low physical fitness observed after CVA, so the role of nurses in the rehabilitation process is essential for patients.

Nurses caring for CVA patients involve multitasking as the condition itself is complex and challenging (Theofanidis, 2016). The role of the nursing profession simultaneously for 24 h with patients is critical because it can be a key relationship that is trusted by the patient. Rehabilitation should start as early as possible after CVA, and nurses in CVA rehabilitation should be reassured of the importance of their therapeutic role in encouraging and assisting patients to persevere activating their affected sides as nurses are with the patient longer than any other healthcare professionals.

## Conclusion

Mrs. B was a patient who had a recurrent CVA, a type of ischemic CVA caused by hypercholesterolemia. The patient had a history of hypertension and risky lifestyle such as eating salty food. The physical finding obtained from the patient was paralysis in the right body including her face. The patient also experienced slurred speech, asymmetrical mouth, frequent coughing when eating, and difficulty swallowing so her appetite decreased.

Nurses are recommended to pay attention to the most appropriate time and practice for patients' rehabilitation period during hospitalization. The

key to improving the quality of life of post-CVA patients is to maintain their ability to perform physical activities, so nurses must play their roles as educators, motivators, and promoters. The nursing management in the acute phase of CVA patients is useful so that CVA does not progress and disability is limited.

Therefore, nurses must consider the golden hour and essential aspects of care for CVA patients to promote faster recovery and improve long-term prospects. However, nurses in CVA recovery, in particular, are key players in the wider rehabilitation team. Caring and motivating patients to achieve optimal recovery are the important things of rehabilitation programs.

## Acknowledgement

The authors would like to thank the head nurse of the Fransiskus Medical Ward in St. Antonius Hospital for allowing us to manage the patient case.

## References

Ada, L., Dean, C.M., & Lindley, R. (2013). Randomized trial of treadmill training to improve walking in community-dwelling people after stroke: The AMBULATE trial. *International Journal of Stroke*, 8 (6), 436–444. doi: 10.1111/j.1747-4949.2012.00934.x

American Stroke Association. (2018). *American Stroke Association progress report*. Retrieved from [https://www.strokeassociation.org/-/media/stroke-files/about-the-asa/asa-20th-annual-report-ucm\\_498858.pdf?la=en](https://www.strokeassociation.org/-/media/stroke-files/about-the-asa/asa-20th-annual-report-ucm_498858.pdf?la=en)

Cahyati, Y., Nurachmah, E., & Hastono, S.P. (2013). Perbandingan peningkatan kekuatan otot pasien hemiparese melalui latihan range of motion unilateral dan bilateral. *Jurnal Keperawatan Indonesia*, 16 (1), 40–46. doi: 10.7454/jki.v16i1.18

Department of Health & Human Services USA. (2014, September). *Post-stroke rehabilitation*. Washington, D.C.: NIH Publication,

Department of Health & Human Services USA. Retrieved from <https://catalog.ninds.nih.gov/pubstatic/14-1846/14-1846.pdf>

Dobkin, B.H. (2005). Rehabilitation after stroke. *The New England Journal of Medicine*, 352 (16), 1677–1684. doi: 10.1056/NEJMcp043511

Donkor, E.S. (2018). Stroke in the 21st century: A snapshot of the burden, epidemiology, and quality of life. *Stroke Research and Treatment*, 3238165. doi: 10.1155/2018/3238165

Duncan, P.W., Sullivan, K.J., Behrman, A.L., Azen, S.P., Wu, S.S., Nadeau, S.E., Dobkin, B.H., Rose, D.K., Tilson, J.K., Cen, S., & Hayden, S.K. (2011). Body weight supported treadmill rehabilitation after stroke. *New England Journal of Medicine*, 364 (21), 2026–2036. doi: 10.1056/nejmoa1010790

Feldman, D.I., Blaha, M.J., Santos, R.D., Jones, S.R., Blumenthal, R.S., Toth, P.P., & Martin, S.S. (2015). Recommendations for the management of patients with familial hypercholesterolemia. *Current Atherosclerosis Report*, 17 (1), 473. doi: 10.1007/s11883-014-0473-6

Hatem, S.M., Saussez, G., Faille, M., Prist, V., & Dan, B. (2016). Rehabilitation of motor function after stroke: A multiple systematic review focused on techniques to stimulate upper extremity recovery. *Frontiers in Human Neuroscience*, 10, 442–441. doi: 10.3389/fnhum.2016.00442

Hillis, A.E., & Tippett, D.C. (2014). Stroke recovery: Surprising influences and residual consequences. *Advance in Medicine*, 3. doi: 10.1155/2014/378263

Johnson, W., Onuma, O., & Sachdev, S. (2016). Stroke : A global response is needed. *Bulletin World Health Organization*, 364. doi: 10.2471/BLT.16.181636

Kang, J., Park, R., Lee, S., Kim, J., Yoon, S., & Jung, K. (2012). The effect of bedside exercise program on stroke patients with dysphagia. *Annals of Rehabilitation Medicine*, 36 (4), 512–520. doi: 10.5535/arm.2012.36.4.512

- Lui, S.K., & Nguyen, M.H. (2018). Elderly stroke rehabilitation: Overcoming the complication and its associated challenges. *Current Gerontology and Geriatrics Research*, 1–9. doi: 10.1155/2018/9853837
- Maguire, C., Sieben, J.M., Erzer, F., Goepfert, B., Frank, M., Ferber, G., Jehn, M., Schmidt-Trucksäss, A., & de Bie, R.A. (2012). How to improve walking, balance and social participation following stroke: a comparison of the long term effects of two walking aids--canes and an orthosis TheraTogs--on the recovery of gait following acute stroke: A study protocol for a multi-centre, single blind, randomised control trial. *BMC neurology*, 12 (1), 1–9. doi: 10.1186/1471-2377-12-18
- Ministry of Health Republic of Indonesia. (2018). *Hasil utama riskesdas 2018*. Ministry of Health Republic of Indonesia.
- Park, G., Im, S., Lee, S., & Pae, C. (2016). The association between post-stroke depression and the activities of daily living/gait balance in patients with first-onset stroke patients. *Psychiatry investigation*, 13 (6), 659–664. doi: 10.4306/pi.2016.13.6.659
- Rudberg, I., Bergquist, H., Andersson, M., Dotevall, H., Horváth, S., & Finizia, C. (2015). Shaker exercise rehabilitation in head and neck cancer and stroke patients with dysphagia: A pilot study. *Journal of Cancer Science and Clinical Oncology*, 2 (2), 302–310. doi: 10.15744/2394-6520.2.302
- Shaker, R., & Geenen, J.E. (2011). Management of dysphagia in stroke patients. *Gastroenterology & Hepatology*, 7 (5), 308–310. PMID: 21857832
- Theofanidis, D. (2016). Nursing interventions and rehabilitation activities for stroke patients. *Journal of Nursing and Care*, 5 (3), 2–4. doi: 10.4172/2167-1168.1000e131
- Whitiana, G.D., Vitriana, & Cahyani, A. (2017). Level of activity daily living in post stroke patients. *Athea Medical Journal*, 4 (2), 261–266.
- Willey, J.Z., Disla, N., Moon, Y.P., Paik, M.C., Sacco, R.L., Boden-albala, B., Wright, C.B. (2010). Early depressed mood after stroke predicts long-term disability: The Northern Manhattan Stroke Study (NOMASS). *American Heart Association Journal*, 1, 1896–1900. doi: 10.1161/STROKEAHA.110.583997