

PHYSIOTHERAPY MANAGEMENT IN INDIVIDUAL WITH SPASTIC STROKE HEMIPARESIS SINISTRA: A CASE REPORT

Amrina Rosada¹, Elif Nur Efendi.,Sst.Ft.,Ftr², Surya Saputro Perdana, S.Fis.M.Sc(PT)³

^{1,2}Physiotherapy Department, Surakarta Muhammadiyah University Jl. Ahmad Yani, Tromol Pos I, Pabelan, Sukoharjo, Surakarta 57169

*Correspondence Author: Amrina Rosada, Email: j130215112@siswa.ums.ac.id

Abstract

Introduction: Stroke is a functional brain disorder in the form of nerve paralysis caused by blood vessel diseases such as bleeding (ischemic) and busted blood vessels (hemorrhagic) in one part of the brain leading to blood flow reduction, brain cells death, and even brain-damage. In clinical appearance, a stroke will cause spasticity and reduction of muscle power and balance as the consequence of brain function degradation. Post-stroke patients with left hemiparesis who undergo stroke disorder because of hypotension should get appropriate medication, such as physiotherapy management.

Case presentation: The subject in this study is a 50-year-old woman, 150 cm in height and 65 kg in weight, who works as a merchant. The patient complained about the stiffness and difficulty in moving the left side of her body since she was hospitalized. The first impression is that the patient was unable to walk and use a walking device. The hand looked clawed, the foot seemed to drop, and the skin of the left side looked drier compared to the other side. Currently, the patient is undergoing a physiotherapy program at Magetan Physiotherapy Clinic thrice a week. The items assessed in this study are muscle power, spasticity, balance for fall risk, range of motion and activity of daily living.

Management and Outcome: The intervention in this case study is physiotherapy programs such as the bobath technique, tactile stimulation, pelvic tilting, mirror therapy, and infrared thrice a week for three weeks. The final evaluation showed muscle power improvement on the left side of the body, improving from 2 to 3; spasticity reduction, proven with an Ashworth scale from 1+ to 1; the activity of daily living ability improved to 60, interpreted as the patient only need minimum help; the balance function also showed minimum risk fall. Meanwhile, there was no significant change in ROM because of muscle weakness.

Discussion: After three weeks research, the subjects showed improvement in left upper and lower extremity spasticity reduction, muscle power and balance enhancement.

Conclusion: It can be concluded from the case that physiotherapy interventions such as bobath technique, pelvic tilting, tactile stimulation, mirror therapy, and infrared positively affect a post-stroke patient with left hemiparesis.

Keywords: spastic stroke hemiparesis, physiotherapy

Introduction

Stroke is a functional brain disorder in the form of nerve paralysis caused by blood vessel disease such as bleeding (ischemic) and busted blood vessel (hemorrhagic) in one part of the brain (Tamburian et al., 2020). Stroke is also the third cause of disability that lead to functional activity dysfunction (Oktarina et al., 2020).

A stroke is caused by blood vessel diseases such as blockage or bust, leading to reduced blood flow. The blood flow reduction will be followed by brain damage and even death. Based on the normal anatomy and pathology, stroke is divided into two, hemorrhagic and ischemic. Hemorrhagic stroke (bleeding), a stroke that happens when the blood vessel is busted, will block the normal blood flow, and the leaked blood will spread to the surrounding area and impact it.

Ischemic stroke (non-hemorrhagic) is a stroke that happens when the blood flow to the brain is stopped because of atherosclerosis (cholesterol plaque accumulation in the blood vessel wall) or blood lumps in the blood vessel that blockage and disrupt the brain blood flow (Purnomo et al., 2018). An individual with a stroke will be in a condition where the ability to move is disintegrated.

The general disability such as paralysis or weakness on one side of the body is the main problem in stroke patients that could differ in daily functional activities (American Academy of Neurology, 2017). The severity depends on which part of the brain was affected, whether the left or right side of the brain, which at other times will determine its changes after a stroke; body part paralysis (hemiplegia) or hemiparesis. Besides hemiplegia or hemiparesis, a condition where that part is powerless, stroke patients will also experience a balance disorder.

Balance disorder in stroke patients correlates with the inability of muscle movement, making the balance function degrade (Nisa et al., 2019). Strokes can be caused by obesity, high blood pressure, diabetes, smoking, hereditary, sex, age, and heart disease. The sign and symptoms of a stroke are ataxia and disturbance in visual, verbal, and cognitive function (Primadi, 2019).

Stroke is a disease with various risk factors, better known as multicausal, and consists of unmodifiable and modifiable risk factors. Unmodifiable risk factors are unchangeable

since they have become a characteristic since people are born, such as family history, age, and sex.

Modifiable risk factors are changeable risk factors for the prevention of disease since it is not a fundamental characteristic of a human being and is mainly influenced by habits and lifestyle such as hypertension (high blood pressure), cholesterol, diabetes Mellitus, and smoking. The most found features in stroke patients are hypotonia, muscle power loss, fine motor control disorder, pathological reflex, muscle atrophy, and balance and coordination disorder (Pratama, 2021). Bobath concept involves all body parts, including senses, perception, motoric problems adaptive behavior with customized therapy depending on patients' condition. In the bobath concept, patients and therapists are explored as interactive processes through tactile stimulation and hip movement, for example (Sue et al., 2021).

Tactile stimulation is a sensation through touch and pressure that aims to induce a muscle contraction to stimulate the Golgi tendon and muscle belly. The most myelinated conductor fiber then delivers the impulse from the muscle belly and Golgi tendon. The other proprioceptive impulses from the fascia, joint, and deeper connective tissue receptors are delivered through less myelinated fibers. Tapping, swiping-tapping, and approximation will stimulate proprioceptors in the skin and joint, where the muscle belly will be reacted by sending impulses toward anterior motoneuron and causing brief contraction enhancement.

Mirror exercise is a rehabilitation program depending on and training patients' imaginary motoric function where the mirror will give visual stimulation to brain motoric nerve on ipsilateral or contralateral for hemiparesis limb movement by observing the normal movement. This exercise was conducted by mirroring the affected side from the normal side (Herianto & Anastasia, 2015). Mirror exercise is a therapy for stroke patients that involves the mirror nervous system of the brain.

Case Presentation

The subject in this study is a 50-year-old woman, 150 cm in height and 65 in weight, who works as a merchant. The patient complained about the stiffness and difficulty in moving the left side of her body since she was hospitalized. The first impression is that the patient was unable to walk and use a walking device. The hand looked clawed, the foot

seemed to drop, and the skin of the left side looked drier compared to the other side. Currently, the patient is undergoing a physiotherapy program at Magetan Physiotherapy Clinic thrice a week. The items assessed in this study are muscle power, *spasticity*, balance for fall risk, range of motion and activity of daily living.

Management and Outcome

Muscle Power Evaluation

No	Regio	Movement	MMT Score					
			Dextra			Sinistra		
			T1	T2	T3	T1	T2	T3
1	Shoulder	Flexor	4	4	5	2	2	3
		Extensor	4	4	5	2	2	3
		Abductor	4	4	5	2	2	3
		Adductor	4	4	5	2	2	3
2	Elbow	Flexor	4	4	5	2	2	3
		Extensor	4	4	5	2	2	3
3	Wrist	Flexor	4	4	5	2	2	3
		Extensor	4	4	5	2	2	3
4	Hip	Flexor	4	4	5	2	2	3
		Extensor	4	4	5	2	2	3
		Abductor	4	4	5	2	2	3
		Adductor	4	4	5	2	2	3
5	Knee	Flexor	4	4	5	2	2	3
		Extensor	4	4	5	2	2	3
6	Ankle	Flexor	4	4	5	2	2	3
		Extensor	4	4	5	2	2	3

The assessment resulted in muscle power improvement of left side of the body on the third physiotherapy session, where the score improve from 2 to 3.

Spasticity Evaluation

Region	T1		T2		T3	
	DX	SN	DX	SN	DX	SN
Shoulder	0	1+	0	1+	0	1
Elbow	0	1+	0	1+	0	1
Wrist	0	1+	0	1+	0	1
Hip	0	1+	0	1+	0	1
Knee	0	1+	0	1+	0	1
Ankle	0	1+	0	1+	0	1

This patient showed spasticity or stiffness on the left side of the upper and lower extremity, the approach for this problem is bobath method with Bobath training by activating the abdominal muscles, pelvic floor muscles, lumbar extensor muscles, hip muscles, ankle (dorso flexion and plantar flexion) muscles, and also trunk flexor, extensor and rotator muscles. After 3 sessions of physiotherapy, there was a decrease in spasticity where the initial result was 1+ and became 1 in the last session.

ADL Evaluation (Barthel Index)

RESULT	T1	T2	T3
	55	55	60

The activity of daily living (ADL) evaluation using Barthel Index has shown improvement from 55 into 60 after three physiotherapy sessions with interpertration of needs minimum help.

Balance Evaluation (Berg Balance Scale)

RESULT	T1	T2	T3
	7	7	11

Decreased of the balance function was improved using Pelvic tilting & Weight-Shift

Training. Pelvic tilting was done by moving the pelvis forward and backward in supine position with both knees in 90 degrees flexion, then the patient was instructed to hold the movement for 8 seconds. After third therapy, Moderate Fall Risk result is obtained as the final result.

Evaluasi ROM

Shoulder	Sinistra	Dextra
Extension – Flexion	-	50 – 0 – 140
Abduction – Adduction	-	170 – 0 – 70
Elbow	Sinistra	Dextra
Flexion – Extension	0 – 0 – 100	0 – 0 – 150
Wrist	Sinistra	Dextra
Flexion – Extension	-	50 – 0 – 60
Hip	Sinistra	Dextra
Extension – Flexion	-	15 – 0 – 125
Abduction – Adduction	-	45 – 0 – 15
Knee	Sinistra	Dextra
Flexion – Extension	-	0 – 0 – 130
Ankle	Sinistra	Dextra
Flexion – Extension	-	20 – 0 – 45

Decreased ROM on the left side of AGA and AGB the action is done by therapy with Mirror Therapy The action trains the motor imagination of the imagery patient where the mirror will provide a visual stimulus to the brain, with some ROM movements. It was concluded that after 3 treatments on the left side there was no significant change in ROM because there was still spasticity and decreased muscle strength.

Discussion

After three weeks research, the subjects showed improvement in left upper and lower extremity spasticity reduction, muscle power and balance enhancement.

Bobath concept involves all body parts, including senses, perception, motoric problems adaptive behavior with customized therapy depending on patients' condition. In the bobath concept, patients and therapists are explored as interactive processes through tactile stimulation and hip movement, for example (Sue et al., 2021).

Tactile stimulation is a sensation through touch and pressure that aims to induce a muscle contraction to stimulate the Golgi tendon and muscle belly. The most myelinated conductor fiber then delivers the impulse from the muscle belly and Golgi tendon. The other proprioceptive impulses from the fascia, joint, and deeper connective tissue receptors are delivered through less myelinated fibers. Tapping, swiping-tapping, and approximation will stimulate proprioceptors in the skin and joint, where the muscle belly will be reacted by sending impulses toward anterior motoneuron and causing brief contraction enhancement.

Mirror exercise is a rehabilitation program depending on and training patients' imaginary motoric function where the mirror will give visual stimulation to brain motoric nerve on ipsilateral or contralateral for hemiparesis limb movement by observing the normal movement. This exercise was conducted by mirroring the affected side from the normal side (Herianto & Anastasia, 2015).

Mirror exercise is a therapy for stroke patients that involves the mirror nervous system on cerebral cortex, helping the healing process of hand and mouth motoric function. This therapy is aimed to improve functional state that is easy to use and only need brief time without burdening the patient (Olivia, 2017).

Post haemorrhagic condition will cause reduction in left upper and lower extremity range of motion, hyposensory disorder, spasticity or stiffness, muscle power reduction on upper and lower left extremity, and balance disturbance

Muscle power is the ability of a single or muscle group in resulting contraction and power after maximum effort dynamic or statically. A maximum muscle contraction will give muscle power. Strong muscle are defined as muscle with good ability to contract and relax, if the muscle is strong enough then balance and activity of daily living will be favorable as well. The improvement of Body Mass Index will affecting muscle power, hence if the muscle is weak and body mass is higher then there will be balance problem in standing or

walking (Abdurachman, 2016).

Static balance is the ability to maintain body in static position or motionless. The balance disturbance correlates with the inability to swift weight and decreased ability in moving the muscle. With the existing problem, post-stroke patient will find difficulties in undergoing their functional activities since well-balanced ability is needed in daily activities. In physiotherapy management of stroke patients, dinamic balance is also needed in order to let the patient move safely. Dinamic balance will let the patient in a stable condition on a moving platform.

Conclusion

The research that was conducted on post-stroke patients at the Magetan Physiotherapy Clinic has shown significant improvements. The physiotherapy management in the form of Bobath, Tactile Stimulation, Pelvic tilting & Weight-Shift Training, Infra Red, Mirror Therapy which was carried out in three sessions resulted in improvement of left upper and lower extremity ROM, sensory function, muscle power, and balance. The management also reduced spasticity in left upper and lower extremities.

References

- Abdurachman, D. (2016). Indahnya Seirama Kinesiologi Dalam Anatomi. Dalam Katalog Nasional Perpustakaan (Isu kinesiologi anatomi). Malang: Inteligencia Media
- Akademi Neurologi Amerika. 2017. Speak Up. Institut Nasional Gangguan Neurologis dan Stroke
- Heriyanto, Hendri & Anastasia Anna. (2015). Perbedaan Kekuatan Otot Sebelum dan Sesudah Dilakukan (Terapi Cermin) Pada Pasien Stroke Iskemik dengan Hemiparesis di Rsup Hasan Sadikin Bandung. Jurnal Keperawatan Respati. Vol II nomor 1 Maret 2015
- Nisa, Q., & Maratis, J. (2019). Hubungan Keseimbangan Postural Dengan Kemampuan Berjalan Pada Pasien Stroke Hemiparesis. Jurnal Fisioterapi, 19(2), 83–89.
- Oktarina, Nurhusna, Kamariyah, Sri Mulyani. 2020. Edukasi Kesehatan Penyakit Stroke Pada Lansia
- Olivia, Ghea Rizki (2017). Pengaruh latihan mirror therapy terhadap kekuatan otot pada pasien stroke dengan hemiparese di Wilayah Kerja Puskesmas Kota Banjarmasin. Universitas Muhammadiyah Banjarmasin.
- Permadi, 2019. Fisioterapi Manajemen Kompresif Praktlinik. Buku Kedokteran. 2019. Hal 104
- Pratama, 2021. Pengaruh Pemberian Pelatihan Tugas Ganda Terhadap Penurunan Risiko Jatuh Pada Kasus Stroke Iskemik. Jurnal Sosial Humaniora Terapan. Volume 3 No 2, Januari-Juni 2021P-ISSN 2622-1764E-ISSN 2622-1152. Diakses Tanggal 23 Agustus 2021. <https://doi.org/10.7454/Jst.V3i2.130>
- Sue Et All, 2021. Konsep Bobath & Praktik Klinis Dalam Neurologis. Buku Kedokteran. 2020. Hal 4-146
- Tamburion, Budi Tarmady Ratag, Jeini Ester Nelwan. 2020. Hubungan antara Hipertensi, Diabetes Melitus, dan Hiperkolesterolemia dengan Kejadian Stroke Iskemik. Jilid 1 Nomor 1, Januari 2020