



EFFECTIVENESS OF ELECTRICAL STIMULATION AND EXERCISE THERAPY TO INCREASE FUNCTIONAL ACTIVITY IN POST-STROKE PATIENTS HEMIPARASE DEXTRA (HEMORRHAGIC): A CASE REPORT

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Abstract

Introduction: A Stroke is defined as the sudden death of cells in localized areas due to inadequate blood flow, caused by blood vessel constriction (ischemic) or rupture (hemorrhagic). The purpose of this study is to determine the effectiveness of giving electrical stimulation at a faradic current frequency of 100 Hz and exercise therapy to increase functional activity in the case of post-stroke hemiparesis Dextra (hemorrhagic) patients.

Case Presentation: The patient in the study was a 72-year-old man with a history of hypertension and typed 2 diabetes, complaining of weakness in his right hand and leg.

Management and Outcome: Given therapy in the form of electrical stimulation with a faradic current frequency of 100 Hz and exercise therapy as much as three times. Functional activity was measured using the Barthel Index, muscle strength was measured using Manual Muscle Testing (MMT), and spasticity was measured using the Ashworth Scale.

Discussion: After being given therapy, it obtained results in increased muscle strength measured by Manual Muscle Testing (MMT) on the regio wrist from T1: 1 to T3: 2. The Spastic decrease measured by the Ashworth Scale on the regio wrist field of motion flexion-extension finger T1: 4 to T3: 3, functional activity of the patient did not experience the increase measured using the index Barthel total score T1: 40 to T3: 40 with the interpretation of severe dependence, requires further intervention to get an increase in Bethel index score.

Conclusion: Giving therapy in the form of Electrical Stimulation faradic current frequency of 100 Hz and Exercise Therapy during 3x meetings is ineffective for increasing functional activity. However, it effectively increases muscle strength in the regio wrist Dextra.

Keywords: Post Stroke, *Electrical Stimulation (ES), Functional Activity.*



Introduction

A stroke is defined as the sudden death of cells in a localized area due to inadequate blood flow, the cause of which is due to narrowing (ischemic) or rupture of blood vessels (hemorrhagic)[2]. Most post-stroke conditions are disrupted functional activity, whether it is a hemorrhagic or ischemic stroke that can cause brain damage. They will affect cognitive, motor, sensory, psychic, and communication functions [3]. According to the Indonesian Stroke Foundation report, the incidence of strokes in Indonesia per year reaches about 2.5%[1]. Risk factors for stroke include hypertension, diabetes, age, and an unhealthy lifestyle [8].

Physiotherapy has various modalities for overcoming post-stroke, one of which is electrical stimulation, involving electrical stimulation of motor neurons that play an active role in the muscles, as a result of which muscles contract and can increase the scope of joint motion so that the functional activity of patients increases[9]. Giving exercise therapy can increase muscle strength to restore motor function in post-stroke patients[7]. Based on the background of the above problems, the researchers want to know the effectiveness of electrical stimulation (ES) and exercise therapy to increase functional activity in post-stroke cases.

Case Presentation

A 72-year-old man who is a farmer complained when he woke up feeling weakness in his right hand and leg. The patient has a history of hypertensive disease and types 2 diabetes. On the examination, there was muscle weakness, increased muscle tone, and decreased functional activity, a total score of 40 with an interpretation of severe dependence

Management and Outcome

The measuring instruments used in this patient were Index Barthel to measure functional activity, with a score of 0-20 (total dependency), a score of 21-40 (severe dependence), a score of 41-60 (moderate dependence), a score of 61-90 (light dependency), and 91-100 (independent). For the measurement of functional activity, Index Barthel was more effective than the Scale Utrecht for Evaluation of Rehabilitation (USER)[10]. MMT measured muscle strength with a score of 5 (normal/can fight maximum resistance), score 4 (can fight gravity and can fight minimum resistance/light), score 3 (can fight gravity), score 2 (there is tonus, cannot fight gravity), score 1 (there is tonus/contraction of the tonus), score 0 (no tonus). Ashworth Scale to measure Spastic with a score of 0 (no increase in muscle tone). A score of 1 (increased muscle tone, characterized by minimal resistance at the end of the ROM when in motion Flexion Extension). A score of 2 (the slight increase in muscle tone, characterized by the stop movement in the middle of the ROM and followed by



minimal resistance throughout the ROM rest). A score of 3 (increased muscle tone is more noticeable throughout most ROMs, but joints are still easy to move). A score of 4 (increased muscle tone is very apparent throughout the ROM, passive movement is challenging to do). A score of 5 (stiff joints or extremities or rigid on Flexion and Extension movements).

Physiotherapy intervention given to a patient was in the form of ES and exercised therapy. Es administration with a Faradic current frequency of 100 Hz for 15 minutes twice a week.[5]. Es installation with patient supine lying on their backs with two ped Es in pairs in the hands Dextra with pronation position in the brachialis muscle and flexor muscle carpi Ulnaris purposed to stimulate the movement of the palmar flexion and flexion fingers. The initial position of the patient's Dextra hand was grasped. 2 other ped Es in pairs on the feet Dextra with origo muscle peroneus Brevis and Insetio tuberosity os metatarsal, the initial position of the patient's Dextra legs tends to inversion. The exercise therapy provided included PNF and Strengthening Exercise. PNF with a time of 8x calculation, 3x reps, with the position of the patient's supine lying, instructed to perform flexion-extension shoulder movement, flexion-extension elbow, flexion-extension hip, flexion-extension knee, dorsal plantarflexion ankle, assisted by therapists. Strengthening Exercise with Straight Leg Raise (supine lying patient position, ask the patient to remove the sore leg and lower slowly/Flexion hip with 8x calculation, 3x reps. Hand Exercise (the position of the patient sitting, instruct the patient's healthy finger to grasp a weak finger and move upwards and sides/Flexion, ablation, shoulder reduction with 8x count, 3x reps)

Result

Table 1 Muscle strength with MMT

SHOULDER			
Bidang Gerak	Dextra		
	T1	T2	T3
Fleksi	2	2	2
Ekstensi	2	2	2
ELBOW			
Fleksi	3	3	3
Ekstensi	3	3	3
WRIST			
Palmar Fleksi	1	1	2
Dorsal Fleksi	1	1	2
Finger Fleksi	1	1	2
Finger Ekstensi	1	1	2
KNEE			
Fleksi	3	3	3



Ekstensi	3	3	3
ANKLE			
Plantar Fleksi	2	2	2
Dorsi Fleksi	2	2	2

Based on the table above, muscle strength measurement using MMT obtained an increase in the Regio wrist from T1: 1 to T3: 2 after being given ES Faradic current frequency of 100Hz and exercise therapy.

Table 2 Spastic using the Ashworth Scale

SHOULDER			
Field of Motion	Dextra		
	T1	T2	T3
Flexion	3	3	3
Extension	3	3	3
ELBOW			
Flexion	2	2	2
Extension	2	2	2
WRIST			
Palmar Flexion	3	3	3
Dorsal Flexion	3	3	3
Finger Flexion	4	4	3
Finger Extension	4	4	3
KNEE			
Flexion	2	2	2
Extension	2	2	2
ANKLE			
Plantar Flexion	4	4	4
Dorsi Flexion	4	4	4

Based on the table above, spasticity measured with the Ashworth scale obtained results on the Regio wrist field of motion of flexion and extension of T1:4 after being given ES faradic current frequency of 100Hz and exercise therapy. There was a decrease in T3: 3.



Table 3 Functional Activities using the Barthel Index.

No	Rated Activities	Score		
		T1	T2	T3
1.	Eat (Feeding) 0 = Incapable 5 = Need help to cut, apply butter, etc. 10 = Independent	5	5	5
2	Bathing 0 = Dependent 5 = Independent	0	0	0
3	Grooming 0 = Need help with personal care 5 = independent in facial, hair, teeth, shaving (tools available)	5	5	5
4	Dressing 0 = Dependent 5 = Partially assisted 10 = Independent (including pee, zipper, belt wear, etc.)	5	5	5
5	Bowel 0 = Incontinence or catheter use and uncontrolled 5 = sometimes incontinence 10 = Continence (regular)	5	5	5
6	Urination (Bladder) 0 = Incontinence or catheter use and uncontrolled 5 = sometimes incontinence 10 = Continence (regular)	5	5	5
7	Toileting 0 = Dependent 5 = Needs help but can do some things on your own 10 = Independent	5	5	5
8	Transfer (Bed to chair and back) 0 = Unable, no balance of sitting 5 = Main assistance (1 or 2 physical persons) to sit 10 = Small assistance (verbal or physical) 15 = Independent	5	5	5
9	Mobility 0 =Immobile (unable) 5 = using a wheelchair 10 = Walking with the help of one person (verbal or physical) >50 years 15 = Independent (even if using aids such as sticks)	5	5	5
10	Stairs 0 = Incapable 5 = Need help (verbal, physical, need tools) 10 = Independent	0	0	0
Total score		40	40	40



Based on the table above, the measurement of functional activity using Index Barthel given the modality of physiotherapy ES Faradic current frequency of 100Hz and exercise therapy, during the 3x meeting obtained results, no increase in the score is still in the category of heavy dependence.

Discussion

Based on research conducted by Ganesh *et al.* [5], the administration of Faradic current Eletical Stimulation with a frequency of 50-100Hz is effective for post-stroke patients for 15 minutes twice a week. The study explained that es faradic current is short-circuited and used a frequency of 50-100Hz with a pulse duration of 0.1-1ms. The contraction of muscles and nerves can increase blood supply to the muscles, decrease spasticity in post-stroke patients, and was widely applied in stroke rehabilitation.

In this article, a patient was also given exercise therapy such as PNF and strengthening exercise. PNF exercise therapy was in the form of therapeutic exercises that were very effective at increasing muscle strength and improving the physical function of post-stroke patients [4]. PNF giving also aimed to decrease muscle tone and spasticity in post-stroke patients [6]. Strengthening exercise played a role in improving muscle strength and the recovery of motor function in post-stroke patients [7]

This article requires further intervention to see or prove that the administration of ES Faradic's current frequency of 100Hz can increase functional activity measured by index Barthel. The researchers found unsatisfactory results that there was no increase in available activity.

Conclusion

After physiotherapy intervention in post-stroke cases, three times using modalities such as Electrical Stimulation and Exercise Therapy. It obtained the results of decreased spasticity in the Regio wrist, increased muscle strength in the Regio wrist, and no increase in functional activity due to the limitations of researchers. Long-term research is needed to get the expected results.

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