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Article

Effect of Acupuncture Therapy with Tomato Combination on Hemiparesis in Upper Extremity Dextra or Sinistra After Stroke at Griya Acupuncture Indy

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ABSTRACT

The number of non-communicable diseases (NCDs) is getting higher every year, one of which is stroke. Stroke is a disorder characterized by rupture or blockage of cerebral blood vessels which can cause weakness and even paralysis of one side of the body. One of the treatments that can be done is acupuncture therapy which plays a role in repairing cell damage that occurs. In addition to therapeutic treatment, incoming food intake is no less important, tomatoes are one of the horticultural plants that have many benefits for post-stroke repair. This research is to determine the effect of acupuncture therapy with a combination of tomatoes on hemiparesis in the upper extremity dextra or sinistra after stroke at Griya Acupunture Indy. Using Quasi Experimental with two groups pretest-posttest design with Purposive Sampling sampling technique, the sample size was 30 research subjects. Divided into control groups and experimental groups with each group totaling 15 research subjects. MMT scale measurements were taken before and after performing 6 times of therapy. The points used include LI4 Hegu, PC6 Neiguan, LI11 Quci, and LI14 Binao. The result is p= 0.008, which means The results of this study indicate that acupuncture at LI4 (Hegu), PC6 (Neiguan), LI11 (Quchi), and LI14 (Binao), combined with tomato supplementation, is more effective in improving upper extremity muscle strength after stroke compared to acupuncture therapy only.

I. INTRODUCTION

Around 71% of deaths in the world are caused by non-communicable diseases (NCDs). This shows concern, thus encouraging the birth of an agreement on a global strategy for preventing and controlling NCDs. Changes in disease patterns can occur due to the influence of environmental changes, community behavior, demographic transitions, technology economy, and socio-culture. There are 73% of deaths caused by NCDs, 35% of which are due to heart and blood vessel diseases including stroke(1).

Stroke is included in the category of non-communicable diseases (NCDs),

which are diseases that cannot be transmitted but are caused by abnormalities in human organs[2]. Stroke is the third leading cause of disability and death in the world as expressed by Disability Adjusted Life Years lost. A stroke commonly called a brain attack is characterized by abnormallities in the blood vessels of the brain causing blood flow to be disrupted due to blockage or even rupture. The brain works together with the heart and cardiovascular system to carry out body functions assisted by various neurotransmitters and blood cells that affect the brain's metabolic activity [3,4]. When the brain does not receive enough blood supply than it needs, it will experience cell or tissue death. Then, problems will arise in the motor, sensory, and cognitive function systems[5]. Motor disorders that often occur in stroke patients are limited speech, loss of ability to control muscles, paralysis on one side (hemiplegia), or weakness on one side (hemiparesis)[6,7].

Hemiparesis is one of the symptoms often found in post-stroke sufferers caused by injury to the contralateral side of the brain, where 70- 80% of post-stroke sufferers experience hemiparesis[8]. In addition, stroke also carries the risk of prolonged brain damage, long-term disability, and even death depending on the type. There are two types of strokes based on, namely ischemic and hemorrhagic. Both can cause body functions to not work properly[9].

The incidence of stroke continues to increase significantly over time and will continue to increase every year if there are no effective strategic efforts to reduce the number of stroke sufferers. Post-stroke therapy strategies include pharmacological and non-pharmacological therapy[10]. Pharmacological therapy for ischemic stroke can be done with reperfusion and neuroprotection. Therapy that can be done pharmacologically for hemorrhagic stroke includes administering neuroprotectin therapy, osmotic diuretics, anticoagulants, antifibrinolytics, antihypertensives and anti-dyslipidemia [7,8].

In addition, stroke patients can receive non-pharmacological therapy that includes perfusion therapy, occupational therapy, speech therapy, and physical therapy. One method of physical therapy to improve blood flow and increase muscle strength is acupuncture therapy [11,12,13].

Acupuncture therapy is an alternative treatment method that can improve blood vessels and blood flow, as well as repair nerves, and improve body health and muscle strength[10]. Acupuncture is an alternative choice, apart from having mild side effects because it is basically holistic, it also has anti-inflammatory and analgesic effects [14,15].

Acupuncture is used in post-stroke patients to speed up healing, improve the formation of nerve pathways, and smooth blood flow to the brain to improve motor function. Thus, smooth flow will improve blood circulation, regenerate damaged cells, and provide sufficient blood supply to the brain. Therefore, post-stroke hemiparesis patients will experience increased muscle strength [16]. In addition, post-stroke sufferers also need to make healthy lifestyle changes through regular exercise and implementing a healthy diet [10].

Zhong Feng/stroke is a disease with Ben Xu Biao Shi syndrome, which means Zheng Qi/body strength is weak with strong pathogens causing the disease. The weak Zheng Qi in question is the body lacking Qi/energy and Xue/blood and Yin-like material. The Shi in question, namely strong pathogens, is the presence of material that resembles Tan/phlegm and Yu Xue/blood stasis, as well as pathogens that are fire-like, or strong wind.

Acupuncture points are specific locations where Qi from the Zhang Fu organ is transmitted to the body's surface through the meridians. This allows the body to receive stimulation from external sources caused by acupuncture therapy [5]. This research is to determine the effect of acupuncture therapy with a combination

of tomatoes on hemiparesis in the upper extremity dextra or sinistra after stroke at Griya Acupunture Indy.

II. METHODS

This study uses a Quasi Experimental research design with a quantitative approach which is a study that has experimental and control groups, but does not fully control several external variables that can affect the study. The population in this study were all subjects who visited Griya Acupunture Indy. Based on the results of a preliminary study at Griya Acupunture Indy in September 2023, there were 62 post-stroke subjects with hemiparesis in

the right or left upper extremities.In this study, the sample was determined as many as 30 samples based on the inclusion and exclusion criteria at Griya Acupunture Indy with a purposive sampling data collection technique. Univariate and bivariate analysis teststo find outchanges in muscle strength in the right or left upper extremities before and after treatment using the Mann-Whitney test.

III. RESULT

Based on the results of a preliminary study conducted at Griya Indy Acupuncture, it was found that the population suffering from hemiparesis in the right or left upper extremities after stroke was 62 research subjects. There were 30 research subjects in this study who met the inclusion and exclusion criteria which were divided into two groups, namely the experimental group and the control group with 15 research subjects in each group. In the experimental group, acupuncture therapy was carried out by pricking at the LI14 Binao, LI11 Quchi, LI4 Hegu and PC6 Neiguan points with a combination of tomatoes consumed every day, while the control group was given acupuncture therapy by pricking at the LI14 Binao, LI11 Quchi, LI4 Hegu and PC6 Neiguan points. Therapy was carried out 6 times with a therapy frequency of 2 times a week. Measurement of the mobility scale of the right or left upper extremity movement was carried out before the intervention was given (pretest) and after the intervention was given (posttest).

The data obtained during the research data collection process is shown in the form of data that includes univariate analysis discussing the characteristics of the research subjects including age, gender, how many attacks have occurred previously, the time span of the patient experiencing complaints, namely upper extremity muscle weakness after stroke, upper extremity movement mobility before and after intervention, as well as bivariate analysis that includes changes in the scale of upper extremity movement research subjects after 6 therapy interventions. The results of the study which included univariate analysis are as follows:

Table 1. Distribution of research subjects by age

Age (Years)	Control group (N=15)		Experimental group (N=15)	
	N	%	N	%
35-40	0	0	1	6.7
41-45	1	6.7	0	0
46-50	2	13.3	1	6.7
51-55	6	40.0	4	26.7
56-60	3	20.0	4	26.7
61-65	3	20.0	5	33.3

Table 1 shows that the highest frequency based on the age of the research subjects in the control group was at the age of 51- 55 years, which was 6 (40.0%) subjects, while it was The age of 61-65 years, which was 5 (33.3%) subjects. The mean value based on age in the control group and the experimental group was in the age range of 51-55 years.

Based on table 2, it shows that the highest frequency of stroke attacks experienced previously in the control and experimental groups was that both experienced one attack, namely 6 (40.0%) and 8 (53.3%) subjects respectively, while the lowest frequency in the control group was

2 attacks, namely 4 (26.7%) subjects and in the experimental group was 3 attacks, namely 2 (13.3%) subjects. Value mean based on the frequency of stroke attacks experienced by the control group and the experimental group, 1.93 and 1.60 or 2 each stroke attacks.

Table 2. Frequency Distribution of Research Subjects Based on the Frequency of Stroke Attacks Experienced

Attack (Times)	Control group (N=15)		Experimental group (N=15)	
	N	%	N	%
1	6	40.0	8	53.5
2	4	26.7	5	33.3
3	5	33.3	2	13.3

The scores before therapy in the control group was at score 0, namely 6 (40.0%) subjects with an average of 0.93 or scale 1 (contraction is only known on palpation) and in the experimental group there were scores 1 and 2 as many as 5 (33.3%) subjects with an average of 1.80 or scale 2 (muscles are only able to move joints, cannot resist gravity), while the highest frequency of MMT scores after therapy in the control group was at score 0 as many as 5 (33.3%) subjects with an average of 1.27 or scale 1 (contraction is only known on palpation) and in the experimental group there was at score 4 as many as 6 (40.0%) subjects with an average of 2.93 or scale 3 (muscles are able to move joints, are able to withstand gravity, but cannot receive loads).

Table 3. MMT Statistics

Group	Category	Mean	SD	Min	Max
Control group	Before	0.93		0	3
	After	1.27		0	3
Experimental group	Before	1.80		0	3
	After	2.93		1	4

Before proving and testing the research hypothesis, a normality test is needed to determine whether the data is normally distributed or not. This test is carried out before conducting a parametric statistical test. The requirement for a parametric statistical test is that the data must be normally distributed. Data normality test is a method to test data normality, where the data is normally distributed or not so that it can be used in parametric tests. In this study, the research subjects numbered 30 subjects or less than 50 subjects, so the test was used Shapiro Wilk.

Table 4. Test of Data Normality

Variable	Category	N	Shapiro Wilk (sign)
Control group	Before	15	0.014
	After	15	0.048
Experimental group	Before	15	0.019
	After	15	0.012

Based on table 4 it shows that the results of the normality test on the control group data before the intervention were 0.014, and after the intervention were 0.048, while the experimental group data before the intervention were 0.019 and after the intervention were 0.012. The results of the normality test show that the data is <0.05 so that the data is not normally distributed. Parametric statistics are used on the condition that the data is assumed to be normal, while the data above shows that the data is not normally distributed, so the parametric test cannot be performed.

Table 5. Mann-Whitney U Test

Variable	*Mann-Whitney U*	Z	p
MMT	50.50	-2.64	0.008

Table 5 shows the test values Mann- Whitney U Test on MMT (Manual Muscle Testing) which is 50.50, while the statistical value of the Z Test obtained a value of -2.64 with a value of Sig. < 0.05 which is 0.008. If the value p< 0.05 then Ha can be accepted and H0 is rejected, whereas if the valuep > 0.05 then H0 is

accepted and Ha is rejected. The data above shows the p= 0.008 which means p <0.05, then it means that Ha is accepted, which means that there is an influence of acupuncture therapy with a characteristics.

IV. DISCUSSION

Stroke can be triggered early on by an unhealthy lifestyle such as eating fast food, consuming alcohol, overwork, lack of exercise, excessive stress, drugs and smoking which can cause increased blood flow to the point of accumulation of dirt in the blood vessels. An unhealthy lifestyle that has formed since early or young will pose a risk with advancing age[20].

The increase in the frequency of stroke sufferers with increasing age is related to the degeneration process, where all organs of the body experience a decline in function, including the blood vessels in the brain, which can increase the risk of stroke. The risk of stroke doubles after 55 years, of all strokes that occur, two out of three sufferers are aged 65 years. However, that does not mean that strokes only occur in the elderly because strokes can attack all age groups[20]. Based on the data analysis, ishows that the average results of MMT measurements in the control group before the intervention were 0.93 and after the intervention were 1.80, while the average results of MMT measurements in the experimental group before the intervention were 1.27 and after the intervention were 2.93.

The average decrease in MMT before and after the intervention in the control group showed a figure of 0.87, while in the experimental group it showed a figure of 1.66, so that the results show that the average decrease in MMT in the experimental group, namely the acupuncture therapy group, was 0.87.LI14 Binao, LI11 Quchi, LI4 Hegu and PC6 Neiguan with tomato combination were greater than the control group or the LI14 Binao, LI11 Quchi, LI4 Hegu and PC6 Neiguan acupuncture therapy group.

The role of acupuncture therapy it self in stroke patients, it is used to improve or speed up healing, reduce if there is viscosity in the brain and stimulate factors that help nerve cells, so that it can improve blood circulation and can repair damaged brains[21,22]. Tomatoes play a role in increasing the body's resistance, where tomatoes contain compounds such as lycopene and vitamins such as vitamins A, B and C. Each vitamin has an important role in improving the recovery of post-stroke sufferers[16,23].

This study showed that there was an effect of acupuncture therapy with a combination of tomatoes on changes in upper extremity muscle strength post stroke, the role of acupuncture in post-stroke patients can improve or accelerate healing by forming new nerve pathways, improving motor function of the body, reducing viscosity in the brain and stimulating factors that help nerve cells, and improving blood circulation, so that with smooth blood circulation it can repair damaged cells and provide sufficient blood supply to the brain. So, it can help the brain to function properly in the damaged parts. As a result, stroke patients will have stronger muscles[21,22].

This is reinforced by the daily consumption of tomatoes, where tomatoes are horticultural plants that contain many compounds such as solanine alkaloids, saponins, malic acid, citric acid, bioflavonoids including lycopene, and ß- carotene, protein, fat, minerals, histamine, and vitamins A, B and C including vitamin B9 (folic acid)[16,23].

When a stroke occurs, hyperhomocysteinemia or increased homocysteine levels caused by folic acid deficiency can cause neurological disorders. Folic acid plays an important role in the homocysteine process, high levels of folic acid are negatively correlated with homocysteine levels in the body. Decreased homocysteine levels are associated with improved neurological function[23].

Therefore, the use folic acid therapy is thought to have good potential in reducing homocysteine levels so that it can prevent more extensive neurological damage and can improve functional. In addition, the role of lycopene found in tomatoes can also repair blocked blood vessels, so it can smooth blood circulation. The vitamins contained in tomatoes are also not important, such as vitamin C, where vitamin C plays a role in increasing the body's resistance to avoid the risk of repeated attacks and speed up recovery[24].

V. CONCLUSION

The results of this study indicate that acupuncture at LI4 (Hegu), PC6 (Neiguan), LI11 (Quchi), and LI14 (Binao), combined with tomato supplementation, is more effective in improving upper extremity muscle strength after stroke compared to acupuncture therapy only.

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