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EFFECT OF EARLY MOBILISATION TRAINING ON GROSS MOTOR FUNCTION AND FUNCTIONAL OUTCOME IN HEMI PARETIC STROKE PATIENTS

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Abstract

Objective: Stroke rehabilitation is designed to help the stroke victim to overcome the disability resulting from brain damage and to enable him or her at physical, psychological, social levels despite the disability that remains after all spontaneous recovery from brain damage is ceased. Early administration of physical rehabilitation following acute stroke may improve the functional mobility of patient, so who they can be discharged home (or) rehabilitation setting earlier. In acute stroke, most of the hospitals enforce the patient to be in bed rest for prolonged days. The purpose of this study to evaluate the effect of early mobilization training on gross motor function and functional outcome in hemi paretic stroke patients.

Design and setting: The study design is pre and post test experimental study. Pre test was taken with Motor assessment scale for gross motor function and barthel index scale for functional outcome. Subjects were randomly allocated 2 groups. Patients in Group 1 received conventional physical therapy with mobilization training started after a week of stroke onset. And Patients in Group 2 received Conventional physical therapy with early mobilization training started within 24- 48 hours of stroke onset for 2 weeks. Post test was taken after 2 weeks with the same outcome measures. The study was done in Masterskill college of Nursing and Health.

Subjects: 20 ischemic acute stroke subjects. Group I: 10 subjects (mobilization started after a week of stroke onset).Group II: 10 subjects (mobilization started within 24-48 hours of stroke onset).the sampling technique is

based on purposive sampling technique. Both male and female genders were included (age 40 to 60 years of age group. Medically stable patients, able to react to verbal comments.

Outcome Measurement: Motor assessment scale and Barthel index scale were used for evaluating outcome measurement. Pre-test and post-test values of the study was collected and assessed for variation in improvement & their results will be analyzed using Independent 't' test and paired 't' test.

Results: Comparing the pre and post test means there is a significant difference exist between early mobilization training started within 24-48 hours and mobilization training after a week following stroke on functional outcome in hemiparetic stroke subjects.

Conclusion: Our results demonstrate that early mobilization had a beneficial and not a harmful effect in the acute stage stroke subjects. Thus this may a simple and effective invention, which will improve the gross motor function in acute stroke subject.

Key words: Gross motor function, barthel index scale and motor assessment scale, early mobilistaion patients

1. Introduction

The World Health Organization (WHO) defines stroke as a "rapidly developing clinical signs of a focal/global disturbance of cerebral function, with symptoms lasting more than 24 hours or longer, or leading to death, with no apparent causes other than vascular origin."

Stroke is defined as a loss of functioning brain tissue, with an accompanying disability, such as weakness, paralysis, blindness, (or) speech impairments[1,11]. Stroke is triggered by deprivation of blood to part of brain.

The brain is functionally active due to rapid blood flow on the physiological basis of circulation in the body. The most common causative factor which disturbs the brain after trauma is of vascular origin where the protective Mechanism of brain fails resulting in permanent damage

Stroke is the third leading cause for the death in this world. Stroke as a neurological illness has third longest stay for rehabilitation. It is one of the leading causes for severe handicap in the world.

This can be due to ischemia caused by thrombosis or embolism or due to hemorrhage. Most commonly occur ischemic which accounts for 85% and hemorrhage is 50%. The effects of stroke are variable and may include impairment in motor and sensory system, emotion, language, perception, cognitive function and also indirect complications.

Stroke rehabilitation is a programme designed to help the stroke victim to overcome the disability resulting from brain damage and to enable him or her at physical, psychological, social levels despite the disability that remains after all spontaneous recovery from brain damage is ceased.

Early administration of physical rehabilitation following acute stroke may improve the functional mobility of patient, so who they can be discharged home (or) rehabilitation setting earlier. In acute stroke, most of the hospitals enforce the patient to be in bed rest for prolonged days.

In the older studies they have used bed rest in acuter stroke, and conventional therapy with in the bed, like passive movements and stretching. But recent years researches have used rehabilitation programmed of out of bed activities based on task specific exercise to improve the motor function.

Acute stroke rehabilitation may improve the functional mobility of patient and it is depends on patient's medical stability, physical functioning and active participation in rehabilitation programme.

Early Mobilization is defined as outcome of bed activity and the word 'early' is defined as the first week after onset of stroke and symptoms[5,] and 'very early' as within 24 to 48 hours after symptom onset.

Acute stroke patients are at very high possibility of developing complication[5,6], resulting from immobility which may report for up to 51% of deaths in first 30 days after ischemic stroke with over 62% complication happening in first week. Complication for instance spasticity, pressure sore, depression, reconditioning and infection. This made the negative effect on functional outcome and barriers to most favorable recovery. Motor impairment after stroke typically affects the control of movement in corona lateral side of body[56], this impairment which can be regarded as a loss or limitation of function in muscle control or movement or limitation in mobility. So patients are activated as

early as possible post onset, with medically stable and starting rehabilitation procedures in acute stroke can allow to assist neurological recovery, prevents the complication and improves long term outcome and quality of life. The purpose of this study this study is to analyze the effect of early mobilization based on motor relearning programme for gross motor function and functional outcome in acute stroke subjects there by promoting the functional independence and quality of life.

2. Methodology

The study design is done on pre and post test experimental study design. The study population were acute MCA hemi paretic stroke patients .20 ischemic acute stroke subjects were divided into 2 groups .Group I -10 subjects (mobilization started after one week of stroke onset) and group II – 10 subjects (mobilization started within 24-48 hours of stroke onset).the inclusion criteria for study is based on age group 0f 40-60 years of age ,middle cerebral artery ischemic stroke of both genders ,admitted within 24-48 hours of symptom onset ,medically stable and able to react to verbal commands.

2.1 Procedure:

A written consent was taken from patients who fulfilled the inclusion criteria. Pre test was taken with Motor assessment scale for gross motor function and barthel index scale for functional outcome. Subjects were randomly allocated 2 groups. Patients in Group 1 received conventional physical therapy with mobilization training started after a week of stroke onset. And Patients in Group 2 received Conventional physical therapy with early mobilization training started within 24- 48 hours of stroke onset for 2 weeks. Post test was taken after 2 weeks with the same outcome measures.

2.1.1 Conventional Therapy: Group I Procedure

2.1.1.1 Electrical stimulation:

Electrical stimulation was given to upper and lower limb muscles with Faradic current and pulse duration at 1 ms ,frequency at 50HZ with pulse amplitude at sufficient enough to achieve desired strength of contraction.

The muscle of Triceps, wrist and finger extensors and dorsifelxors of ankle are given electrical stimulation.

Number of contraction based on response of muscle in order to avoid muscle fatigue.

2.1.1.2 Stretching: Manual passive stretching for the Muscles of Biceps, triceps, long flexors of forearm, hamstring, and café with Holding time -15 sec and Repetition of 5 times.

2.1.1.3 Normalization of tone:

Slow sustained stretching of biceps and wrist flexors, hamstrings and calf. Upper limb weight bearing in long sitting position.

2.1.1.4 Range of motion exercises:

Passive movements and active assisted exercise given for upper and lower limb muscles**.**

2.1.2 Early mobiliziation Training: Group II Procedure

2.1.2.1 Mobiliziation

Mobilization as a form of exercise consists of getting out of bed, standing and walking based on motor relearning progamme along with rest in between.

With first 3days after stroke, blood pressure, oxygen saturation, heart rate, temperature should be circumspectly monitored before and after each mobilization.

2.1.2.2 Supine lying:

Therapist lifts the patient's arm and supports it in forward flexion Patient attempts to reach up towards ceiling.

Encouraged to log rolling.

Rolling to either side.

Pelvic bridging

All these are given with proper instruction given by the therapist .

2.1.2.3 Side lying

Therapist encourages the patient to turn his head, assist him to bring his shoulder and arm forward and to flex his hips and knees.

Therapist assists the patient to lift his head off the pillow and patients Attempts to lower his head to pillow.

2.1.2.4 Sitting position

Sitting at chair or end of the couch , patient practices reaching forward and upward. He should work within the range he can control, gradually increasing it.

2.1.2.5 Standing up

In sitting, patient feet flat on floor, then practices inclining his trunk forward by flexing at hips with the neck and trunk extended, with enough momentum to move the knees forward.

With his shoulders and knees forward, the patient practices standing up. The therapist can give him the idea of pushing down through his affected foot by bushing down through his knee along the line of the shank while moving forward

Therapist may need to help the patient with the forward movement of shoulder and knee at the beginning of the movement.

Pick up a glass from the floor with one hand (or) bimanually.

Patient takes a step forward with intact leg, then backwards.

2.1.2.6 Walking

Patient practices stepping forward and backward with intact leg as above, making sure he extends his affected hip as he steps forwards.

Standing with intact leg in front of affected leg. Patient practices moving his weight forward over his intact foot and back while maintaining the knee extension of the affected leg.

In standing hips in front of ankles, patient practices shifting his weight

From one foot to the other. Therapist indicates with her finger how far his pelvis should shift.

Walking combined with other activities such as conversation

2.1 Duration of the Procedure

All this protocols are given with proper instructions by the physiotherapist.

Repetition: 10 repetitions per exercise for 6 days a week.

Treatment duration: I hour daily,

No. Of session**:** 2 times per day.

2.3 Outcome Measurement Tool

Motor assessment scale

Barthel index scale

3. Statistical Analysis

Pre-test and post-test values of the study was collected and assessed for variation in improvement & their results will be analyzed using Independent 't' test and paired 't' test.

INDEPENDENT't' TEST (between groups)

$$t = \frac{x1-x2}{s}\sqrt{\frac{n1\,n2}{(n1+n2)}}$$

Where, $S=\sqrt{\frac{\sum d_1^2+\sum d_2^2}{n1+n2-2}}$

Paired't Test (within group)

$$t = \frac{d\sqrt{n}}{s}$$

Where,$S = \sqrt{\frac{\sum d^2-\bar{d}^2\times n}{n-1}}$

S = combined standard deviation

d1 & d2 = difference between initial & final readings in group A& group B respectively.

n1 & n2 =number of patients in group A & group B respectively.

$\overline{X}_1$ & $\overline{X}_2$= Mean of group A & group B respect.

3.1 Group 1-Control Group

Motor Assement Scale: For 9 degrees of freedom and at 5% level of significance, the table 't' value is 1.833 and the calculated 't' value is 4.64. Since the calculated't' value is greater than the table't' value the null hypothesis is rejected.

Barthel Index: For 9 degrees of freedom and at 5% level of significance, the table 't' value is 1.833 and the calculated 't' value is 3.67. Since the calculated't' value is greater than the table't' value the null hypothesis is rejected.

SCALES	MEAN VALUES		Calculated 't' Values	Table 't' Value
	Pre- Test	Post-Test		
Motor Assessment scale	7.1	9.7	4.64	1.833
Barthel Index	29.5	32.5	3.67	1.833

Table - 1

3.2 Group II: Experimental Group

Motor assement scale: For 9 degrees of freedom and 5% level of significance, the table 't' value is 1.833 and the calculated 't' value is 12.14. Since the calculated't' value is greater than the table't' value the null hypothesis is rejected.

Barthel index: For 9 degrees of freedom and 5% level of significance, the table 't' value is 1.833 and the calculated 't' value is 4.7. Since the calculated't' value is greater than the table 't' value the null hypothesis is rejected.

SCALES	MEAN VALUES		Calculated 't' Values	Table 't' Value
	Pre-Test	Post-Test		
Motor Assessment Index	6.3	15.1	12.14	1.833
Barthel Index	29.0	29.0	4.7	1.833

Table -2

3.3 Pre-Test values: Group I and Group II

Motor Assessment Scale: For 18 degrees of freedom and 5% level of significance, the table 't' value is 1.734 and the calculated 't' value is 1.24. Since the calculated't' value is lesser than the table't' value the null hypothesis is accepted.

Barthel index: For 18 degrees of freedom and 5% level of significance, the table 't' value is 1.734 and the calculated 't' value is 0.24. Since the calculated't' value is lesser than the table't' value the null hypothesis is accepted.

LESCAS	MEAN VALUES		Calculated 't' Values	Table 't' Value
	Group I	Group II		
Motor Assessment Scale	7.1	6.3	1.24	1.734
Barthel Index	29.5	29.0	0.24	1.734

Table - 3

3.4 Post test Values Group I and Group II:

Motor Assessment Scale: For 18 degrees of freedom and 5% level of significance, the table 't' value is 1.734 and the calculated 't' value is 4.21. Since the calculated't' value is lesser than the table't' value the null hypothesis is accepted.

Barthel index: For 18 degrees of freedom and 5% level of significance, the table 't' value is 1.734 and the calculated 't' value is 1.68. Since the calculated't' value is lesser than the table't' value the null hypothesis is accepted.

Pre-Test values: Group I and Group II

SCALES	MEAN VALUES		Calculated 't' Values	Table 't' Value
	Group I	Group II		
Motor Assessment Scale	9.7	15.1	4.81	1.734

Barthel Index	**29.5**	**34.0**	**1.68**	**1.734**

Table – 4

3.5 Results

Post-Test Values Group I and Group II

3.5.1 Motor Assessment Scale:

For 18 degrees of freedom and 5% level of significance, the table 't' value is 1.734 and the calculated 't' value is 4.21. Since the calculated' value is lesser than the table't' value the null hypothesis is rejected.

Thus, there is no significant difference exist between early mobilization training started within 24-48 hours and mobilization training after a week following stroke on gross motor function in hemi paretic stroke subjects.

3.5.2 Barthel Index:

For 18 degrees of freedom and 5% level of significance, the table 't' value is 1.734 and the calculated 't' value is 1.68. Since the calculated't' value is lesser than the table't' value the null hypothesis is accepted. Thus, there is a significant difference exist between early mobilization training started within 24-48 hours and mobilization training after a week following stroke on functional outcome in hemiparetic stroke subjects.

4. Conclusion

The aim the study was to find the effect of early mobilization training in improving gross motor function and functional outcome of acute stroke subject. Twenty acute hemi paretic stroke subjects were selected by purposive sampling method in which ten of them were another ten subject conventional and another ten subject conventional with mobilized after one week of stroke onset for study duration of two weeks.

Gross motor function and functional outcome were assessed. Gross motor functions were assessed by gross motor component of motor assessment scale and functional outcome were assessed by barthel index. The data were analyzed by using't' test. The result show significant improvement of group of gross motor function between the groups. But there is no much significant improvement of functional outcome between the two groups.

From this study we concluded, that early mobilization had a beneficial and not a harmful effect in the acute stage stroke subjects. Thus this may a simple and effective invention, which will improve the gross motor function in acute stroke subject.

5. Discussion

Stroke is considered to be one of the leading causes of disability in society as about 30% to 50% of patients who sustain a stroke are left with considerable residual deficits. 57% of subjects with stroke developed moderate to severe disability at the time of discharge, the disabilities are due to medical complication and motor impairment caused by loss of mobility and activities of daily living.

Motor dysfunction is one of the most frequently encountered and therapeutically constant problems in acute stroke. Therefore the primary source of movement dysfunction (or) universal disability in many hemi paretic stroke patients is due to motor impairment, which will affect the individual's ability to do entire activities of daily living.

In acute stroke the amount of gross motor limitation is not only dependent on level of motor impairments but also dependent on other medical complication such as deconditioning, depression, mood disorder and infection.

The early activation and transition of patients as quickly as possible into more intensive rehabilitation minimize complication, accelerate recovery and improve ultimate outcome.

This study was conducted on 20 acute hemiparetic stroke patients, where 10 patients were allocated into the experimental group and was administered with early mobilization training along with conventional therapy and other 10 was given conventional therapy but mobilized one week after the onset of stroke. Mobilization training was given for 5 days per week about 2 sessions per day. Results were analyzed with gross motor component of motor assessment scale and barthel index scale. Statistical analyses were done with paired't' test and independent't' test.

On statistical analysis of motor assessment scale using paired't' test there was a significant improvement of gross motor function in both control and experimental groups. On analyzing two groups using independent't' test the experimental group had a higher improvement in gross motor function. Even there was significant improvement

found in both experimental and control group, comparatively experimental group has shown significant improvement than control group in gross motor function, this might be due to early mobilization which was given to the experimental groups.

In control group, improvement was not seen in sitting to standing and walking components of motor assessment scale, as conventional therapy was given within the bed and they are not mobilized until one week. This suggests that the gross motor function had a significant improvement with the early mobilization training. The results might be due to the two reasons one is development of impairments which is exist earlier. It's caused by involvement of the upper motor neuron, its pathway and connections. They are weakness, abnormal muscle activation and tone changes, abnormal reflexes, and disordered motor control. Lower extremities lose their strength about twice as fast as upper extremity muscles.

There is no evidence existing against the early mobilization training in acute stage. The literatures suggest that rehabilitation programme should be stated as soon as the subject that becomes medically stable. The result showed that majority of subject were able to sit out of bed for 55 minutes on first day of stroke with small transitory increase in blood pressure, heart rate and sustained improvement in consciousness and oxygen saturation.

Early mobilization is one of the effective and easy to deliver in acute stage stoke subjects. But further long term study is needed to know the outcome of acute stroke subjects with early mobilization training.

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