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Research Article

TO COMPARE THE EFFECTIVENESS OF CONTRACTURE PREVENTIVE POSITIONING PROCEDURE FOR HEMIPLEGIC ARM WITH CONVENTIONAL THERAPY

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ABSTRACT

The purpose of the study is to compare the effectiveness of contracture preventive positioning procedure for hemiplegic arm with conventional therapy. An experimental study was carried out with 30 stroke patients for duration of 3 weeks. 30 patients was divided into two groups i.e. group A which is control group and group B which is experimental group. For group A conventional treatment was given such as passive range of motion. Group B received passive range of motion and positioning. Passive range of motion by goniometer, Modified Ashworth scale, Burnstorm stages of recovery was use as outcome measures. Established stroke patients by means of CT and MRI, Spasticity under Ashworth scale between grade 1 to3 where included in the study were as patients on antispasticity drugs or pain reducing drugs were excluded from the study. Both the results i.e pre and post was compared with Modified Ashworth scale and Burnstorm stage of recovery scale. Conclusion it was seen that both the groups showed improvement in their respective analysis, but in between group analysis it was seen that no one group is better than the other, so we can safely presume that positioning with conventional treatment may not be only better than conventional treatment it is still as effective as conventional in improving the patient condition to prevent contracture in stroke.

INTRODUCTION

Stroke, also known as a cerebrovascular accident (CVA), occurs when the arteries leading to certain areas of the brain rupture (hemorrhagic stroke) or get blocked (ischemic stroke). Without sufficient oxygen supply, brain cells die. Depending on the amount of brain tissue damage, the stroke results in weakness or paralysis of the body.[1] Stroke is a major public health concern. Most of the surviving patients make incomplete recovery, and need assistance in activities of daily life (ADL).Contracture refers to the loss of joint range of motion resulting from changes in the mechanical properties of soft tissues which cross the joint. Long-term disability associated with failure to regain use of the arm is a major problem following stroke. This could involve a reduction in rest length or increase in stiffness of muscles or tendons.[3] Upper-limb contractures are common. The abnormal position of the hemiplegic hand and wrist due to spasticity and muscle contractures may interfere with daily activities and hygiene maintenance, both negatively influencing the quality of life. Different approaches are used to inhibit spasticity, prevent contractures, reduce pain and edema, or improve hygiene maintenance of the hand in stroke patients with a nonfunctional spastic upper limb.[3,4] In conjunction with contracture, resistance to passive movement and spasticity develops in some patients. Spasticity was found to be present in 26% of acute hemiparetic patients and in 28% three months after stroke.[1] Spasticity (or more specifically, hypertonus) seems to be another cofactor in the development of hemiplegic shoulder pain.[5] It is related to a decrease in joint passive range of motion and correlates both to motor impairments and limitations in activities of daily living (ADL). Post stroke contracture is a result of loss of range of motion (ROM) due to pain and wrong positioning. The proportion of patient with contracture in the hemiplegic arm approximately 5 months post stroke was reported to be high. Along with contracture, spasticity also develops in some patients.[4] In presence of severe loss of strength and dexterity after stroke the wrist and finger flexor muscles are at risk of developing contracture because the hand usually rest on lap. In this position the wrist and finger are in flexion so the flexor muscles are effectively immobilized in the shorten part of the range. Therefore are shortly undergo some adaptation. Hence prevention of contracture and maintaining an optimal pain free joint range of motion is an important therapeutic intervention in stroke rehabilitation.[6]

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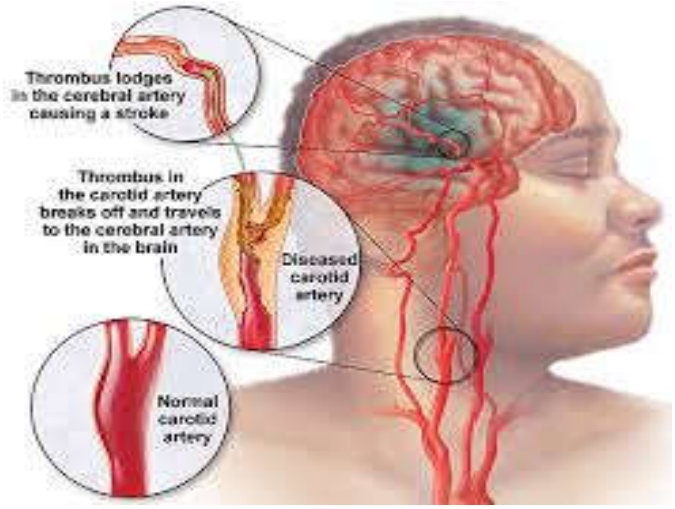


Bent wrist

Wrist is bent with the fingers pointing down and back toward the forearm.

Closed fist

Fingers are tightly clasped into the palm of the hand.

Flexed elbow

Elbow is bent with the hand at the shoulder.

METHODOLOGY

30 hemiplegic patients were selected. In this study, sample size were divided into two groups i.e. group A which is control group and group B which is experimental group .

For group A conventional treatment was given such as passive range of motion – The patients upper limb is moved passively in shoulder flexion, abduction, elbow flexion, wrist flexion throughout the available pain free range of motion. The rhythmic passive movement is with 10 repetition.

Stretching-This therapeutic maneuver is used to increase the extensibility of soft tissue, thereby improving flexibility by elongating (lengthening) the upper limb muscles with 30 seconds holds and repeated 10 times.

Group B-Experimental treatment was given

Passive range of motion-Same as done for group A i.e the shoulder flexion, abduction, elbow flexion, wrist flexion performed passively with 10 repetition.

Stretching-This is done same as for group A. The hemiplegic upper limb is stretched in shoulder flexion, abduction, elbow flexion, wrist extension, flexion. Stretching is done with hold of 30 seconds and repeated 10 times.

Positioning-Positioning was carried out twice a day for half an hour in week days. Care was taken that while moving the arm into position, the shoulder was moved with sufficient external rotation to avoid impingement or damage to the rotator cuff muscles. The arm was positioned with as much shoulder abduction, shoulder external rotation, elbow extension and supination of the forearm as the subject could endure without any pain. The arm was always supported by a pillow and held in position with a sandbag. Patients were instructed not to change the position of the trunk to keep the pectoralis major muscle elongated. Nursing staff were informed to take care to maintain the position.

Both the results i.e pre and post was compared with Modified Ashworth scale and Burnstorm stage of recovery scale

Statistical Analysis

Table no. 1 Comparison of group A pre treatment scores in shoulder, elbow, wrist flexion passive range of motion.

	Mean	S .D	P value	Level of significance
Shoulder	82.66	10.499	<0.0001	Extremely significant
Elbow	139	5.412		
Wrist	70.33	3.994		

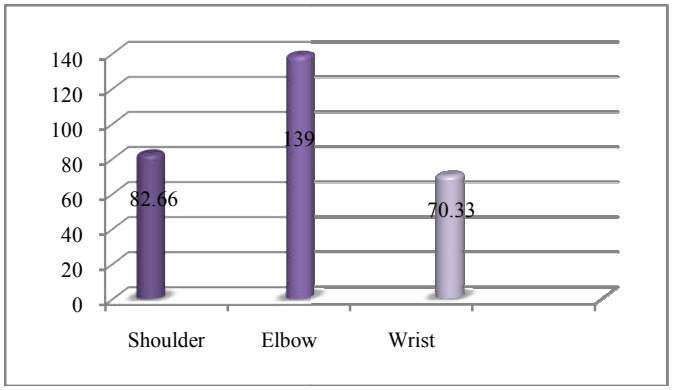


Table no 2 Comparison of group A post treatment scores in shoulder, elbow, wrist flexion passive range of motion .

	Mean	S .D	P value	Level of significance
Shoulder	10.889	91	<0.0001	Extremely significant
Elbow	3.086	141.66		
Wrist	2.535	73		

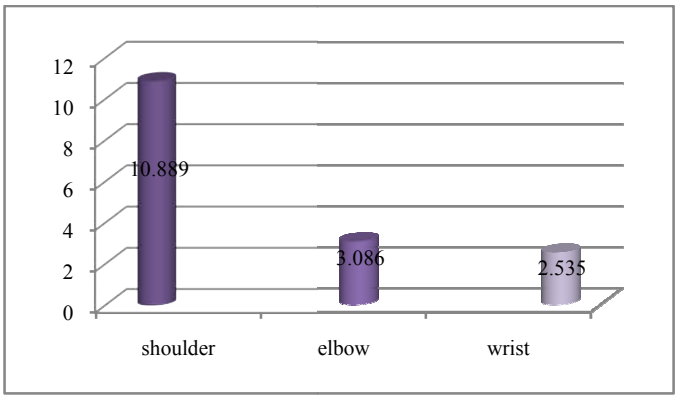


Table no. 3 Comparison of group B pre treatment scores in shoulder, elbow, wrist flexion passive range of motion .

	Mean	S .D	P value	Level of significance
Shoulder	79.66	12.882	<0.0001	Extremely significant
Elbow	138.33	4.499		
Wrist	69.33	4.169		

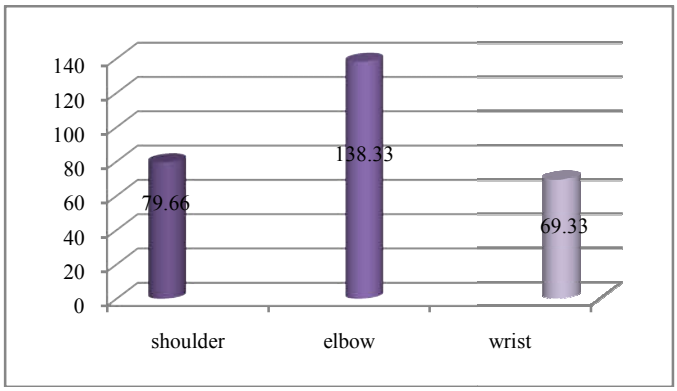


Table no. 4 Comparison of group B post treatment scores in shoulder, elbow, wrist flexion passive range of motion.

	Mean	S .D	P value	Level of significance
Shoulder	90.66	12.659		
Elbow	141.66	3.086	<0.0001	Extremely significant
Wrist	72	3.162		

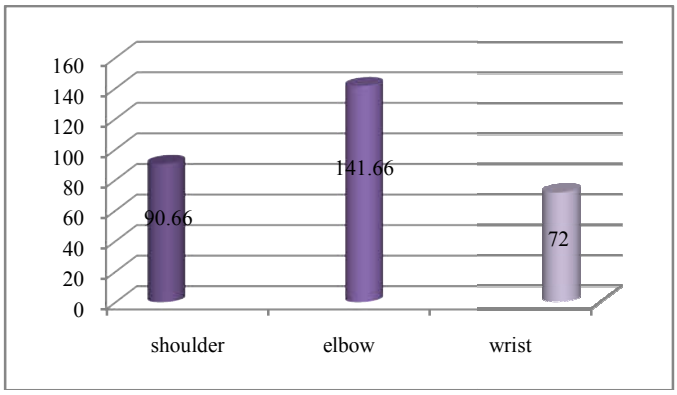


Table no 5 Comparison of group A pre treatment scores in shoulder, elbow, wrist in Modified Ashworth scale .

	Mean	S .D	P value	Level of significance
Shoulder	1.8	0.7746		
Elbow	1.933	0.7037	0.7572	Not significant
Wrist	2	0.7559		

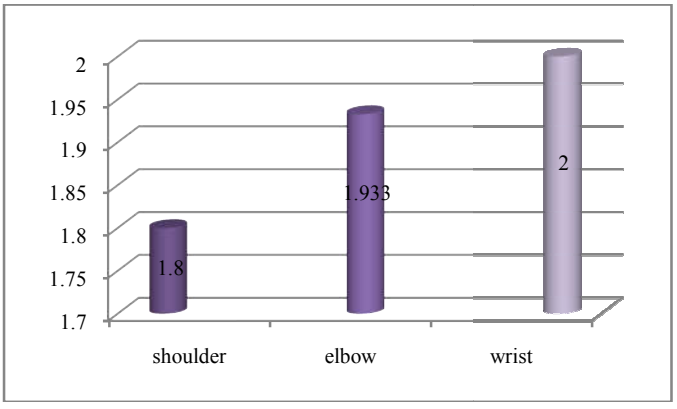


Table no. 6 Comparison of group A post treatment scores in shoulder , elbow, wrist in Modified Ashworth scale.

	Mean	S .D	P value	Level of level
Shoulder	1.266	0.4577		
Elbow	1.933	0.7037	0.0131	Significant
Wrist	1.8	0.6761		

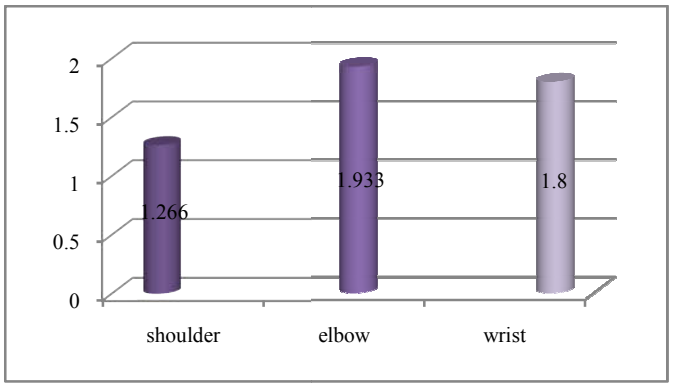


Table no. 7 Comparison of group B pre treatment scores in shoulder, elbow, wrist in Modified Ashworth scale .

	Mean	S .D	P value	Level of significance
Shoulder	2.466	0.6399		
Elbow	2.4	0.6325	0.8612	Significant
Wrist	2.333	0.7237		

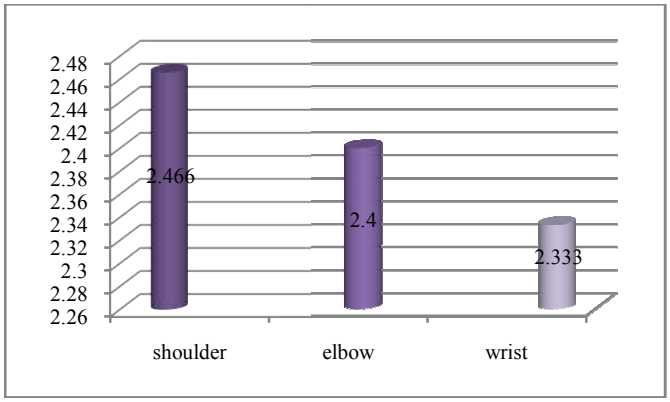


Table no. 8 Comparison of group B post treatment scores in shoulder, elbow, wrist in Modified Ashworth scale.

	Mean	S .D	P value	Level of significance
Shoulder	1.733	0.7037		
Elbow	1.333	0.6170	0.0463	Significant
Wrist	1.2	0.4140		

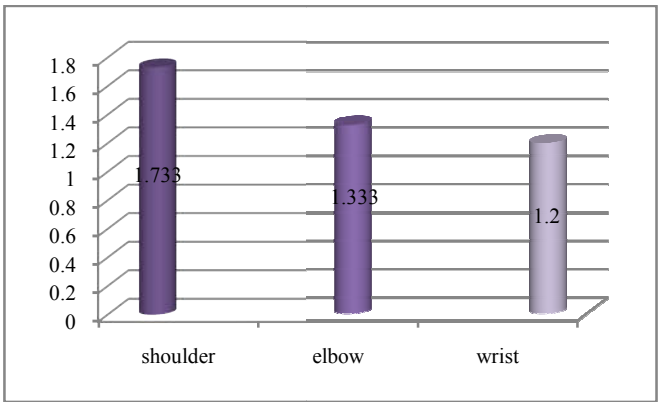


Table no 9 Comparison of group A pre and post treatment scores in Burnstorm stages of recovery.

Group A	Mean	S .D	P value	Level of significance
Pre t/t	2.466	1.060	0.0001	Extremely significant
Post t/t	3.133	1.187		

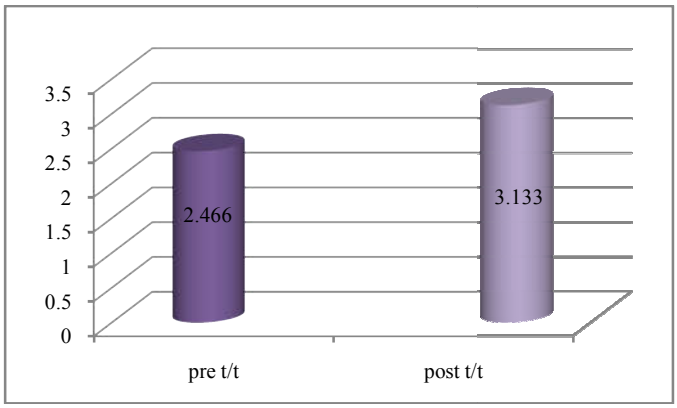


Table no. 10 Comparison of group B pre treatment scores in Burnstorm stages of recovery .

Group B	Mean	S .D	P value	Level of significance
Pre t/t	2.533	1.187	< 0.0001	Extremely significant
Post t/t	3.466	1.125		

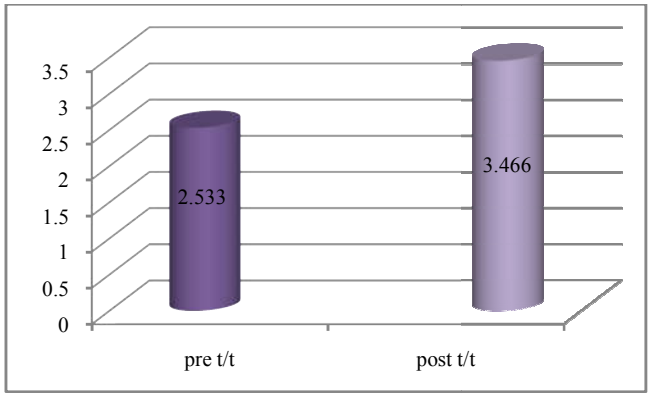


Table no. 11 Comparison of group A and B post treatment scores in Burnstorm stages of recovery.

Group	Mean	S .D	P value	Level of significance
Group A	3.066	1.100	0.0390	Significant
Group B	3.866	0.915		

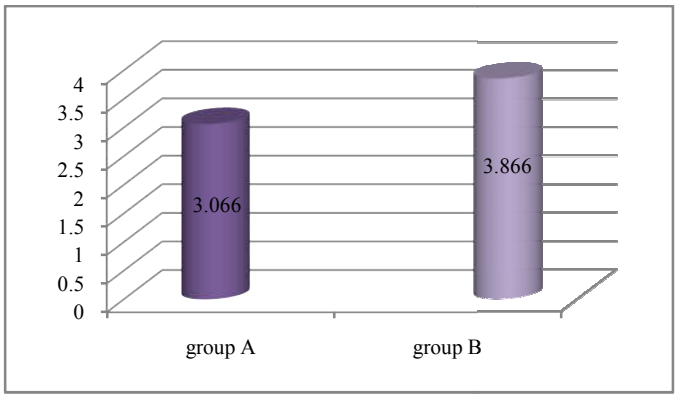


Table no 12 Comparison of group B pre and post treatment scores for passive shoulder abduction range of motion.

Group A	Mean	S .D	P value	Level of significance
Pre t/t	99.66	14.816	0.0001	Extremely significant
Post t/t	110	8.864		

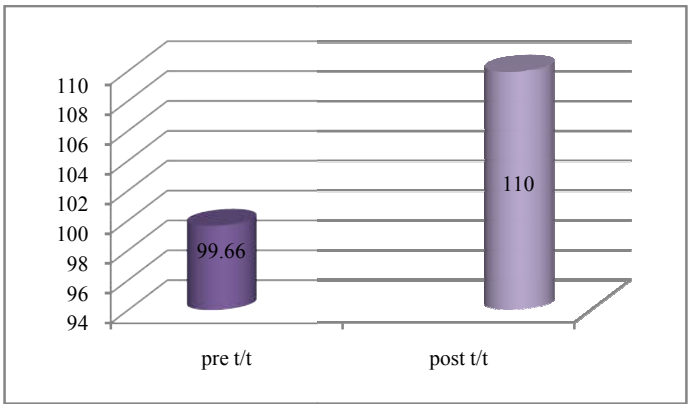


Table no. 13 Comparison of group A pre and post treatment scores for passive shoulder abduction range of motion .

Group B	Mean	S .D	P value	Level of significance
Pre t/t	95	12.956	< 0.0001	Extremely significant
Post t/t	102.33	11.150		

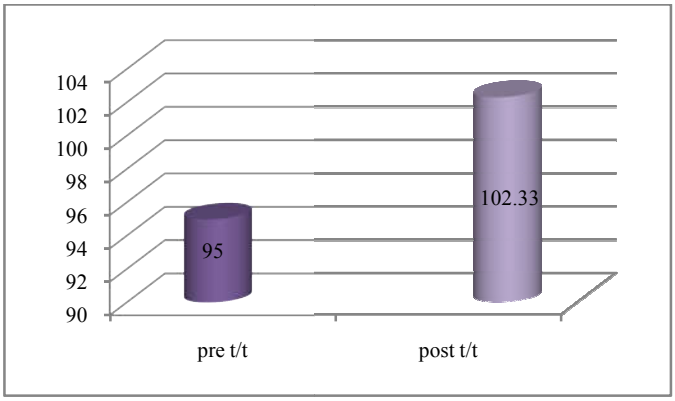


Table no. 14 Comparison of group A and B post treatment scores for passive shoulder abduction range of motion.

Group	Mean	S .D	P value	Level of significance
Group A	102.33	11.159	0.0464	Significant
Group B	110	8.864		

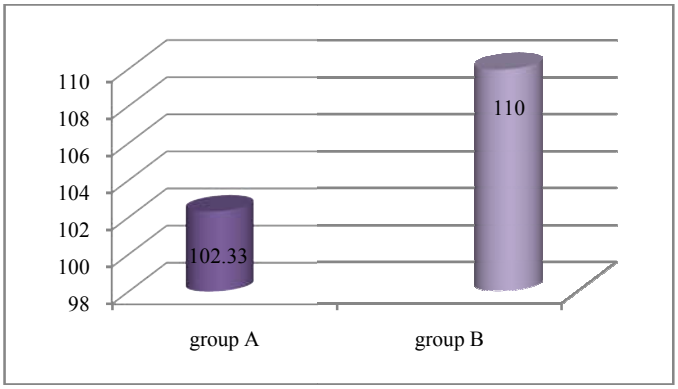


Table 15 comparison of group A post treatment in shoulder, elbow, wrist spasticity in Modified Ashworth scale and burnstorm

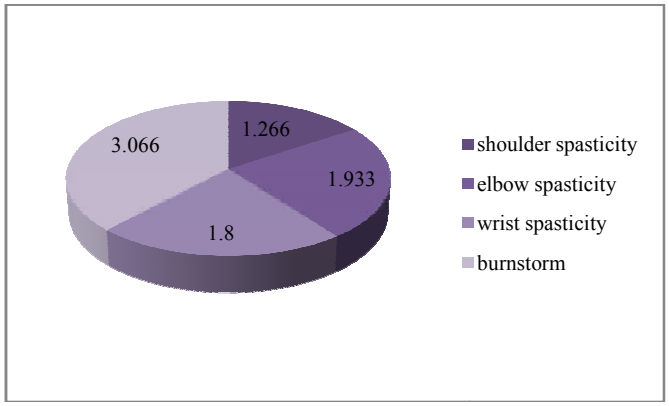
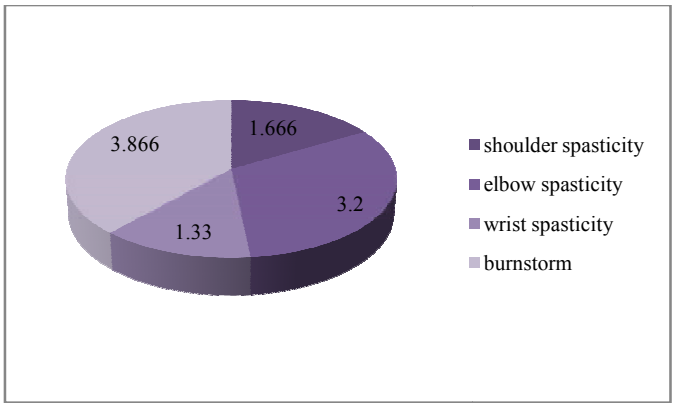


Table 16 comparison of group B post treatment in shoulder, elbow, wrist spasticity in Ashworth scale and burnstorm



RESULT

- For passive range of motion (flexion) of shoulder, elbow, wrist extremely significant difference was seen between the pre and post treatment scores of group A and group B.
- For passive range of motion (abduction) of shoulder extremely significant difference was seen between the pre and post treatment scores of group A and group B and significant difference was seen in post treatment scores of group A and group B.
- Spasticity under modified ash worth scale was significant for post treatment scores of both group A and B.
- No significant difference was seen between the pre treatment scores of upper limb spasticity under Modified Ashworth scale between both groups A and B.
- Extremely significant difference was seen between pre and post treatment scores for Burnstorm stages of recovery of group A and group B.
- Significant difference was seen between the post treatment scores of Burnstorm stages of recovery between both groups A and B.
- Voluntary control has improved more than spasticity in positioning in group B.

DISCUSSION

The aim of this study was to investigate the effectiveness of a contracture preventive positioning procedure for stroke patients. The results of this study revealed that both conservational treatment (group A) and conservational treatment along with positioning (group B) both were effective in preventing contracture of upper limb. However, it was revealed that conservative treatment that includes passive movement, and stretching along with positioning was more effective as compared to conservative treatment to reduce spasticity in patients with stroke.

Passive range of motion exercises, helps to prevent muscles weakness or stiffness followed by stroke. Repeated passive movement decreases resistance that occurred due to spasticity. Passive exercises are largely preventive in nature and are used to maintain range of motion, joint and connective tissue mobility, minimizes the effects and the formation of contractures, enhances synovial movement, maintain mechanical elasticity of muscles, assist circulation, help maintain the patient's awareness of movement.

Stretching include muscle elongation by moving and maintaining joint range of motion manually, that normalize muscle tone, maintain or increase soft tissue extensibility, reduce contracture, and improve motor function. The effect of stretching on spasticity may be explained by change in the excitability of motoneuron supplying the spastic muscle. The effect of passive stretching for prevention of contracture is by maintaining or increasing in number of sarcomere, together with the maintenance of tendon length and connective tissue elasticity. Sarcomere numbers are maintained by stretching when the muscles are held in lengthened position.

Passive movement and stretching along with positioning has improved voluntary control grading that was assessed by burnstorm stages of recovery than only passive and stretching. There was few or no effect of positioning in elbow and in wrist flexion. The patients upper limb was kept in muscle lengthened position. Therefore, positioning have slowed down the development of shoulder abduction contracture.

CONCLUSION

In our study it was seen that both the groups showed improvement in their respective analysis, but in between group analysis it was seen that no one group is better than the other, so we can safely presume that positioning with conventional treatment may not be only better than conventional treatment it is still as effective as conventional in improving the patient condition to prevent contracture in stroke. So it is to be considered as a viable treatment option in stroke patients.

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