Hemiplegic Shoulder Pain – A Case Report

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Abstract :

Shoulder pain due to hemiplegia is one of the common consequence following stroke. Pain in the shoulder joint negatively affects the mobility, transfers and performing Activity of daily living (ADL's) and the effective use of hand. The main cause of pain which is impingement due to altered scapula-humeral kinematics. If shoulder pain is not approached at the right phase of rehabilitation can lead to rotator cuff tear in an already weakened upper extremity, thereby will hamper the function to a great extent. Thus in this single case study of a 70 year old patient 4 months post stroke a structured goal directed physiotherapy intervention approaches were administered. These interventions mainly emphasized on treating the cause mainly the pain due to impingement of sub-acromial structures, restricted joint mobility due to capsular adhesion and rotator cuff muscle weakness and altered kinetics and kinematics at the shoulder complex. Intervention led to more than 30% of change for reduction in pain improvement in Range of motion (ROM)decreased muscle tightness and improved muscle flexibility.

Keywords : Hemiplegia, Shoulder pain, Physiotherapy, VAS, DASH SCore

Introduction:

Shoulder pain is one of the most prevalent musculoskeletal complication following stroke .It usually develops between 2 week to 2 months post stroke. Making it the most common reason for functional impairment. The etiology of pain and stiffness are multifactorial, most frequently associated with glenohumeral subluxation ,adhesive capsulitis, Rotator cuff tear, Shoulder Hand syndrome and spasticity of subscapularis and pectoral muscle, the prevalence of hemiplegic shoulder pain in India varies between 34% to 86 %. Risk factors are of developing hemiplegic shoulder pain are age more than 70,suprispinatus tendon tear/tendonosis and adhesive capsulitis.[(1)]

Following shoulder pain there is an imbalance in the surrounding muscles of the shoulder, which is secondary to muscle inhibition and lack of rotator cuff muscle activation. In due course, due to the gravity dependent position of the hemiplegic hand and lack of the stabilization factors of the Gleno-humeral joint the risk of inferior subluxation the humeral head increases.[(2)] Pain and inactivity at the shoulder joint ,there is gradual restriction ROM .In the long there is shortening and thickening of the GH joint along with adhesion of the capsule. The above functional changes leads to "stiffness" and resistance to passive motion which causes an inability to dissociate the scapula from the humerus leads to altered scapular humeral rhythm. Activities of daily living like dressing, bathing, lifting heavy objects and overhead activities.[(3)]

Existing literature for the management of hemiplegic shoulder pain consist of the ROM exercises concentrating more on the active assisted ROM with proper scapular positioning, pain relieving electrotherapeutic modalities (TENS, Ultrasound, IFT), neurological approaches (NDT, Brunnstrom approach, PNF, Roods, CIMT, motor imagery technique), joint mobilization techniques, Stretching techniques.[(4)] Along with the above intervention to maintain the neutral position of scapula, prevent inferior subluxation splinting and bracing techniques are incorporated. But there is lacunae of a structured approach where all the functional impairment is taken into consideration.

Case Report :

A 70 year old Male who had a history of paralysis 5 months back came with the complaints of shoulder pain and inability to elevate his left shoulder joint since 4 months. Initially the patients was unable to move upper and lower limb of his left side, thereafter he started initiating the movements. In the mean while he started developing left shoulder pain which was gradual in onset and progressive in nature which aggravated with elevation activities. Due to shoulder pain, his sleep was disturbed at night. His activities of daily living such as donning and doffing his clothes, bathing, toileting, overhead activities and farming was hampered.

For 2 months the patient continued the exercises which was taught to him in the rehabilitation centre. There was improvement in his overall health condition but still his left shoulder pain was not relieved and was increasing progressively. The pain was aggravated by any movement of the left arm. He came to our out- patient department with pain in his left shoulder joint and difficulty in elevating his left shoulder completely.

Subjective & Objective Assessment:

Pain assessment: presently patients complaints of throbbing pain on his antero-medial and postero-lateral aspect of his left shoulder joint which aggravates on shoulder rotation and elevation movements and is relieved by exercises and sleeping on left side lying position. Moderate irritability.

Posture: Patients left shoulder was elevated, scapula was protracted and thoracic kyphosis. Marked wasting was observed over the deltoid muscle.

Study design : A-B-A Case report

A : Baseline

Outcome measures	Activity	A-Baseline	A-After 2 weeks	Percentage change
Pain(VAS)[5]	At rest	2/10	0/10	20
	On activity	6/10	3/10	50
ROM (Goniometry)[6]	Flexion(degree)	0-74	0-142	47.88
	Extension(degree)	0-36	0-37	3
	Abduction(degree)	0-46	0-87	47.12
	Lateral rotation(degree)	0-20	0-43	53.48
	Medial rotation(degree)	0-28	0-87	67.81
Muscle tightness (length test)	Resting Pectoralis Minor(cm)[7]	11	8	27.27
DASH score[8]	Activity limitation	72.2	48.3	33.1

B : Intervention

This is an integrated intervention approach for hemiplegic shoulder pain .The intervention program was administered 5 times a week and for 2 weeks such that the session were divided into 2 sessions a day to avoid fatigue. For pain reduction Hot moist pack(HMP)[9] was given over the left shoulder complex for 20 mins. To increase Joint and soft tissue mobility- Maitland posterior glide to improve flexion and internal rotation, Maitland anterior glide to improve extension and external rotation.[10] Mobilization with movement to improve external rotation **(Fig 1)**,[11] Scapular mobilization,[10] Capsular stretcting,[12] Bobath Neurodevelopmental technique to facilitate trunk extension.**(Fig 2)**[13] Active assisted ROM for shoulder to maintain the mobility achieved by the above techniques was incorporated. To improve strength and neuromuscular control glenohumeral and scapulohumeral muscles-Scapular stabilization exercise.[14] Scapular PNF **(Fig 3)**[15] Deltoid activation using EMS –faradic re-education **(Fig 4)**[16] and Functional training exercise were done. To improve cardiovascular endurance the patient did Static cycling.[17] Along with the intervention patient was advised to wear a figure of eight brace)to prevent inferior subluxation of the glenohumeral joint.

Fig 1: MWM – posterolateral glide to improve external rotation

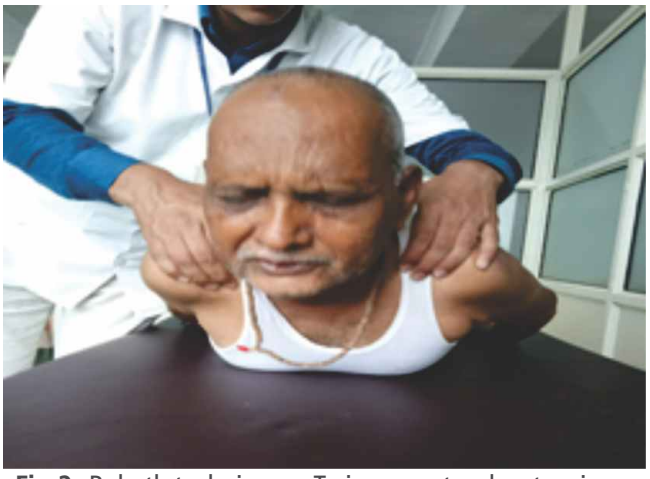

Fig 2: Bobath technique – To improve trunk extension

Fig 3: Scapular PNF

Fig 4: Deltoid activation using Electrical muscle stimulation

Discussion :

This single case study of a patient with hemiplegic shoulder pain was carried out to find out the effectiveness of structured physiotherapy intervention. In the current case study there was 50% reduction in pain on activity. There was 47.88 % increase in flexion, 47.12 % increase in abduction, 53.48 % increase in lateral rotation and 67.81% increase in medial rotation range of motion. pectoralis minor tightness decreased by 27.27% and the Disability of Arm, Shoulder and Hand (DASH) decreased by 33.1%.

The pain reduction was mainly due to cumulative effect of prior hot moist pack joint mobilization technique, soft tissue technique and the maintenance of the kinematics of the shoulder joint complex. Hot moist pack induces hyperemia of the skin/soft tissue temperature, thereby increasing metabolic rate and the tissue extensibility. These effects increases the tolerance to manual therapy technique increases with least pain.[9] Joint mobilization reduces pain by activation of the mechanoreceptors which inhibits the pain gate at the spinal cord and brain stem level.[18] Selective Capsular stretching exercises helped in loosening the adhesion by loading of capsular structures statically which induced change in creep and thus helped in realignment of the collagen fibre bonds. Both the techniques restores normal movement of joint and connective tissue which removes the mechanical irritant to a nociceptor. Thus targets nociceptive pain thereby increases peripheral inhibition, promotes healing of injured/inflamed tissues, and may reduce mechanical activation of a nociceptor.[19]

The other pain causing reason is the altered biomechanics during elevation of the arm due to reduced external rotation, increasing the translation of the humeral head. Therefore there is decreased in the subacromial space causing the structures in it to get impinged. The scapular PNF technique helps in correcting the altered scapular humeral rhythm. These helps to stretch or strengthen the muscles selectively. It also helps the muscles amount and timing of recruitment which gets impaired following cerebrovascular damage and can lead to the restoration of balance between different groups of muscles.[20] The scapular stabilization exercises helps in activation of the force couple so as to stabilize the humeral head in the glenoid cavity during elevation movement. There is selective activation of the scapular stabilizing muscle i.e the middle trapezius, lower trapezius rhomboids and serratus anterior acting as a force couple against the deltoid and rotator cuff muscle force couple. Thus helped in correcting the altered biomechanics.[14] This can be inferred by the improved ROM as well as improved in DASH score.

The electrical muscle stimulation using faradic current helped in activation of the deltoid muscle which is an important muscle for superiorly translatory force of the humeral head. As in HSP one of the major consequence is Inferior subluxation or dislocation, Thus using EMS the volitional activity of the deltoid muscle was enhanced thereby prevention of inferior shoulder instability.[21] In addition to this the patient also wore a figure of 8 brace which also aided in maintain the alignment of the shoulder in all the activity of daily living in which the shoulder was in gravity dependent position. All the gained effect due to the above approaches were maintained using Active assisted ROM with the scapula stabilized so as to prevent impingement of the subacromial structures during Movement. As Proximal stability enhances distal mobility, thus improvement in ROM and pain reduction enhanced improvement in activity of daily living (33.1% reduction in activity limitation of DASH score) which the patient couldn't perform before the integrated approach. In addition to the above intervention the patient also was engaged in aerobic exercise program. In patients in the recovery phase of stroke it's found that the energy expenditure is more as compared to the healthy age matched individuals.[22]

Thus the aerobic exercise increased the cardiopulmonary endurance, aiding in increased functional performance by decrease in activity limitation in DASH score Thus an integrated approach used in our study proved to beneficial in not only decreasing pain but also increasing ROM and thus improving functional performance.

Conclusion :

Thus a structured physiotherapeutic approach proved to be beneficial reducing pain and improving ROM and functional deficit in a single patient with Hemiplegic Shoulder pain .However long term study should be carried out with a randomized control trial design to identify its effectiveness compared to the present interventions.

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