



POST STROKE HEMIPLEGIC SHOULDER PAIN CAUSES– AN OBSERVATIONAL STUDY

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ABSTRACT

Introduction: Hemiparetic Post Stroke Shoulder Pain (HPSSP) is common complication after Stroke. Common factors contributing to HPSSP include subluxation, spasticity of muscles with imbalance of the gleno-humeral joint, contracture of periarticular soft tissues, rotator cuff tendinitis, complex regional pain syndrome (CRPS). Other significant causes are adhesive capsulitis, subacromial bursitis, brachial plexus traction neuropathy, heterotopic ossification, thalamic syndrome (also known as central post stroke pain syndrome) and soft tissue injury or trauma. **Objectives:** To study the common causes of post stroke shoulder pain to develop better understanding. **Materials & Methods:** 107 subjects of hemiparetic Stroke patients of both sexes from urban & rural population with complain of shoulder pain who were attending Physical Medicine & Rehabilitation department were selected as per inclusion and exclusion criteria. Assessed patients in detail and analyzed subsequently. **Results:** Most common cause for Hemiplegic Shoulder Pain Syndrome identified in our study are Subluxation of glenohumeral joint 39%, Adhesive Capsulitis 31%, Rotator Cuff Tendinitis 17% and CRPS 4% as per decreasing order of frequency. A few cases of Bicipital Tendinitis, Post stroke central pain and supraspinatus bursitis also landed up with shoulder pain in our study group. **Conclusions:** Subluxation of the shoulder joint is the major etiology of shoulder pain followed by adhesive capsulitis, rotator cuff tendinitis, CRPS, bicipital tendinitis. In general, left shoulder joint involvements are much more common than the right shoulder joint involvement. In our study right shoulder joint is mostly affected in case of rotator cuff tendinitis.

KEYWORDS : Post Stroke Hemiplegia, Shoulder Pain, Subluxation, Adhesive capsulitis

INTRODUCTION

Common sequel of stroke is shoulder pain in the affected side that can hamper functional recovery, subsequently leading to disability. Shoulder pain is probably the most common complication associated with hemiplegia and has the potential to delay rehabilitation as the painful joint may mask the improvement in motor function. The reported prevalence of shoulder pain in post-stroke hemiplegic ranges from 34% (1) to 84% (2). In the largest cohort of hemiplegic subjects followed longitudinally for an average of 11 months, shoulder pain occurred in 72% of cases (3). Although the natural history of shoulder pain is not well understood, a number of cohort studies have shown that pain can develop within weeks or months after onset of hemiplegia and can become chronic and refractory to treatment (4,5,6). Shoulder pain is clinically associated with severe motor impairment (4,5,6), sensory impairment (4,5), duration of hemiplegia, and decreased range of motion (ROM) of shoulder joint.

Most studies have speculated about the etiology of shoulder pain in hemiplegia but have failed to establish a cause and effect relationship. Some of the most suspected factors contributing to shoulder pain include subluxation, contracture, rotator cuff tendinitis, complex regional pain syndrome, and spastic muscle imbalance of the gleno-humeral joint (7).

Various studies reported other significant causes of post stroke shoulder pain syndrome. They are adhesive capsulitis, subacromial bursitis, brachial plexus traction neuropathy, heterotopic ossification, neglect, thalamic syndrome (also known as central post stroke pain syndrome) and soft tissue injury or trauma.

However, identifying the exact mechanism of shoulder pain can be inherently difficult, with many of the correct treatment regimens varying according to assumptions made about its cause. Hanger and Colleagues (8) suggested that the cause is multifactorial, with different factors contributing at different stages of recovery i.e. flaccidity contributing to subluxation and subsequent capsular stretch, abnormal tone and synergy patterns contributing to rotator cuff or scapular instability. Because of the difficulty in treating shoulder pain, early initiation of treatment is valuable.

Materials and Methods

The present study was conducted in the department of Physical Medicine and Rehabilitation, KGMU Lucknow, during the period from January 2018 to June 2019.

Cases were selected from Hemiparesis patients of both sex and of both urban & rural population with complain of shoulder pain attending OPD of Physical Medicine & Rehabilitation. Consequently, 107 subjects were selected according to the inclusion criteria and a written consent was obtained.

Inclusion criteria —

- Confirmed case of CVA with shoulder pain.
- Patients of both sexes of age group 18 years and above.
- Patients who had given written consent to enter into the study.
- Adequate communication ability to cope with the verbal rating score for pain and disability.

Exclusion Criteria—

- Patients who were not willing or not in a sound mental state to give consent.

- Patients who had pain in other joint or body area apart from shoulder joint of hemiparetic side.
- Traumatic, infective or neoplastic causes of shoulder joint pain.
- Radiating shoulder pain from other side.
- Referral pain from other causes.
- Shoulder pain with sensory changes.
- Pregnant woman.
- On cardiac pacemaker or metal in situ.

Sample Size— 107 subjects of hemiplegia of both urban and rural population and of both sex with complain of shoulder joint pain of different etiologies were enrolled for study.

Study Design— Cross sectional observational study.

Result analysis

93 patients of our study population presented with hemiplegic shoulder pain out of 107 recruited were diagnosed as subluxation, adhesive capsulitis & rotator cuff tendinitis. 14 patients of the study population were rare presentation group of different etiology and also small in no (Statistically insignificant) and so, were excluded from the statistical analysis. They were distributed as 5 patients of CRPS, 4 patients of Bicipital Tendinitis, 3 patients of Bursitis and 2 patients of central pain syndrome.

Table – 1: Age & Sex Distribution

Causes	No.	Mean	Median (IQR)	Range	Minimum	Maximum
Subluxation	42	64.93±9.45	64.50	40	45	85
Capsulitis	33	66.58±6.29	67.00	23	55	78
Rot. Cuff tendinitis	18	66.67±9.26	69	31	55	86

	Subluxation	Capsulitis	Rot. cuff tendinitis
Male	25	20	12
Female	17	13	6
P-value	0.869(chi-square test)		

Table-1 shows a wide range of age distribution in different treatment group. The minimum age of presentation is 45 years and maximum age of presentation is 86 yrs. The mean age for Subluxation 64.93yrs with S.D 9.45, mean age of 66.58 for Adhesive Capsulitis with S.D 6.29, and mean age for Rotator cuff Tendinitis is 69.67 with S.D 9.26. The males clearly outnumbered the female in our study population with patient of HSP syndrome. However, the male: female distribution is comparable between the three groups.

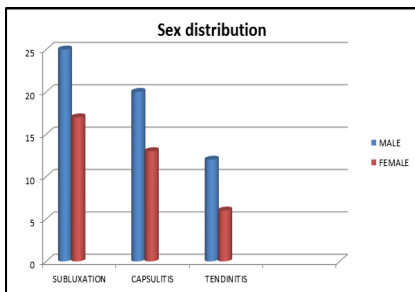


Fig. 1 Depicted bar diagram shown that male are clearly outnumbered female patients

Distribution of affected side:

In our study, left shoulder joint involvement is more commonly seen in case of patients with shoulder joint Subluxation and in patients of Adhesive Capsulitis. But reverse is seen in patients with Rotator Cuff Tendinitis, where right shoulder joint involvement is more than the left shoulder joint as shown in Fig. 2.

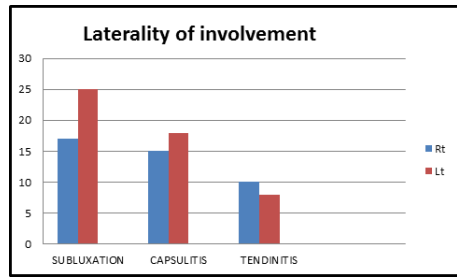


Table – 2: Distribution of Time/Days for Pain

Causes	No	Mean	Median (IQR)	Range	Minimum	Maximum
Subluxation	42	29.05 ± 9.44	29.50	39	10	49
Capsulitis	33	30.39 ± 13.10	30.00	44	12	56
Rot. cuff tendinitis	18	29.30 ± 9.45	30.00	35	10	45

Distributions of time/days since onset of appearance of pain and 1st visit: There is an overall wide range of variation in time of feeling sensation of pain in affected shoulder joint, which was also seen in our study e.g. in case of Subluxation minimum time of onset of beginning of pain to 1st visit is 10 days and maximum time of beginning of pain to 1st visit is 49 days with mean of 29.05± 9.44 after onset of stroke, in case of Adhesive Capsulitis it is minimum of 12 days and maximum of 56 days, with mean of 29.30±9.45, and in case of Rotator Cuff Tendinitis it is minimum of 10 days and maximum of 45 days, with a mean of 30.39± 13.10.

Table – 3: Distribution of time in days since onset of stroke to 1st visit.

Causes	No	Mean	Median (IQR)	Range	Minimum	Maximum
Subluxation	42	59.05 ± 24.59	58	88	22	110
Capsulitis	33	91.03 ± 17.18	90	75	58	133
Rot.cuff tendinitis	18	84.00 ± 24.54	87.5	86	39	125

Table 3. There is clearly evident that there is wide range of time in presentation for seeking treatment of HSP since the incidence of stroke.

Table-4: Distribution of Etiology Of HSPS:

DISEASE	TOTAL
Subluxation	42(39%)
Adhesive Capsulitis	33(31%)
Rot cuff tendinitis	18(17%)
CRPS	5(4%)
Bicipital tendinitis	4(4%)
Bursitis	3(3%)
Central pain syndrome	2(2%)

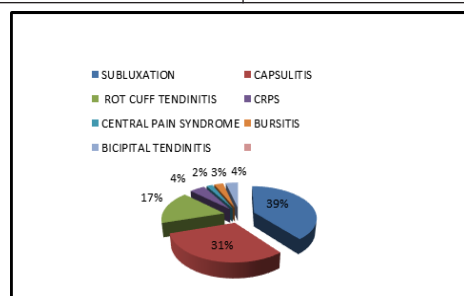


Fig. 3 Above data shows that Subluxation is the most predominant cause (39%) in Hemiplegic shoulder pain syndrome, whereas Adhesive Capsulitis 31%, Rotator Cuff Tendinitis 17% and CRPS & Bicipital tendinitis share each of 4% of our study population.

DISCUSSION

According to Aras et al⁽⁹⁾ high incidence of shoulder pain is seen in stroke patient with older age group. In our study the patients presented to us were in the 7th decade of their life and it corroborated with the findings of the previous observers.

In our study left shoulder joint involvement is more commonly seen in case of patient with shoulder joint subluxation and in patients of adhesive capsulitis but reverse is seen in patient with rotator cuff tendinitis, where right shoulder joint involvement is more than left.

Ikai T. et al⁽¹⁰⁾ also concluded in their study that the shoulder joint pain was significantly more frequent in left sided hemiplegia. The probable explanation of the cause is that the patients with left hemisphere of brain involvement due to stroke were excluded due to their inability of communication following aphasia.

According to Poduri et al⁽¹¹⁾ HSP can begin as early as 2 weeks post stroke but typically occur 2 to 3 months post stroke. Polin de et al⁽¹²⁾ said that HSP onset may start in the first week after stroke or may develop much later. This overall wide range of variation in the time of feeling of pain sensation in affected shoulder joint was also seen in our study e.g. in case of subluxation minimum time of onset of beginning of pain to 1st Visit is 10 days and maximum time of beginning of pain to 1st Visit is 49 days with mean of 29.05 ± 9.44 after onset of stroke, in case of adhesive capsulitis it is minimum of 10 days and maximum of 56 days, with mean of 29.30 ± 9.45 , and in case of rotator cuff tendinitis it is minimum of 12 days and Maximum of 45 days, with a mean of 30.39 ± 13.10 . In this context our study observations are also supported by the study of Gamble et al. (2002)⁽⁴⁾. In their observation shoulder pain developed following stroke in 28% cases by two weeks and 87% cases by two months. Lindgren et al. (2007) observe that, approximately half of the HSP patients developed pain between stroke onset and 4 months.

Risk factors of hemiplegic shoulder pain syndrome identified in different literature are gleno humeral subluxation, hemineglect, spasticity, flaccidity, and prior shoulder pathology. According to Teasell RW⁽⁷⁾ the other contributing factors for shoulder pain are improper positioning, lack of support in upright position and pulling on the hemiplegic arm when transferring the patient. Similarly, in our study we noted the most common contributing factors of hemiplegic shoulder pain syndrome are subluxation of glenohumeral joint 39%, adhesive capsulitis 31%, rotator cuff tendinitis 17% and CRPS 4% as per decreasing order of frequency. A few cases of bicipital tendinitis, post stroke central pain syndrome and supraspinatus bursitis also landed up with shoulder pain in our study group. An interesting study by Lee et al, 2009⁽¹³⁾ noted the sonographic findings of shoulder joint of HSP patients. They said that the most common finding is sub-acromion and sub-deltoid bursitis, followed by supraspinatus tendinosis and partial thickness tear of supraspinatus tendon. According to Ratnasabapathy et al., 2003⁽⁵⁾ the predictors of shoulder pain were having a positive association with motor deficit, side of deficit and severity of deficit. Moreover, diabetes was also identified as a predictor of shoulder pain. As per the observations of Crossens-sills and Schenkman (1985) and others, factors most commonly associated with shoulder pain are shoulder subluxation, shoulder contractures or restricted shoulder range of motion, and the study of Braun et al (1981) and other observers was spasticity,

particularly of the subscapularis and pectoralis muscles are the cause of shoulder pain.

Although contradictory observation was noted by Joynt RL1992⁽¹⁴⁾ that the shoulder pain was unrelated to spasticity. In our study we did not evaluate the roll of spasticity as a contributing factor for development of HSP

CONCLUSION

Most of the patients with hemiplegic shoulder pain syndrome are presented in the 7th decade of their life with the mean age of 64.93 for subluxation of shoulder joint, 66.58 for adhesive capsulitis, and 66.67 for rotator cuff tendinitis. It is clearly evident that there is male preponderance over the female in HSP syndrome. In general, left shoulder joint involvements are much more common than the right shoulder joint involvement. But right shoulder joint is mostly affected in case of rotator cuff tendinitis in our study. Most of the patients are presented after some duration of shoulder pain and it is ranging from 10 days to 56 days since the onset of pain. Patients were presented to our study of minimum 22 days to maximum of 133 days from the onset of stroke. In our study subluxation of the shoulder joint is the major etiology of shoulder pain followed by adhesive capsulitis, rotator cuff tendinitis, CRPS, bicipital tendinitis.

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