FREQUENCY AND INTENSITY OF SHOULDER PAIN AFTER STROKE: A HOSPITAL BASED STUDY

Uzma Akhlaq, Saeed Bin Ayaz*, Noreen Akhtar, Atif Ahmed Khan

Armed Forces Institute of Rehabilitation Medicine Rawalpindi Pakistan, * Combined Military Hospital, Okara Pakistan

ABSTRACT

Objective: To determine the frequency and intensity of shoulder pain in stroke patients and explore any relation of shoulder pain with the side of involvement and the primary etiology of stroke.

Study Design: A cross-sectional descriptive study.

Place and Duration of Study: Armed Forces Institute of Rehabilitation Medicine (AFIRM), Rawalpindi from January 2012 to June 2012.

Material and Methods: Through non-probability convenience sampling 100 patients of both genders satisfying the World Health Organization clinical definition of stroke and reporting within one year of stroke development were included and those with cognitive dysfunction and rheumatic diseases or a history of chronic pain prior to the stroke were excluded. Shoulder pain was defined as pain in the shoulder area requiring analgesia for two or more consecutive days and its intensity was graded on visual analogue scale (VAS).

Results: Of 100 patients (mean age: 63 ± 18 years), majority were males (76%), diagnosed with ischemic stroke (80%) and had a right sided pain (44%). Patients with moderate to severe pain were more common (83.3%). On comparison with the type of stroke, the pain was more prevalent on left side (72.7%) and in patients of ischemic stroke (62.5%). However, these relations were statistically insignificant (p=0.061 and p=0.197 respectively).

Conclusion: More than half of the stroke patients reporting to our institute developed shoulder pain in first year after stroke the majority of whom had moderate to severe pain. The shoulder pain is not related to the primary etiology of stroke and side of involvement.

Keywords*:* Shoulder pain, Stroke, Visual analogue scale.

INTRODUCTION

Pain in hemiplegic shoulder is a common complication after stroke. The presence of pain discourages movement and may hinder recovery. Thus pain in these patients needs to be effectively treated or prevented so that rehabilitation strategies can be used effectively. Pain is an important factor in delaying rehabilitation and prolonging hospital admission in stroke survivors[1]. Shoulder pain in stroke patients may be due to shoulder subluxation, rotator cuff impingement/tear, adhesive capsulitis, bicipital tendonitis or other reasons[2-6]. Bad positioning, improper transfer techniques and trauma in initial days after stroke may play part in pain etiology[5].

Correspondence: Dr Uzma Akhlaq, Consultant PM&R AFIRM Rawalpindi, Pakistan *(Email: uzmaaftab11@gmail.com)*

Received: 13 May 2014; revised received: 27 Oct 2014; accepted: 12 Nov 2014

Internationally, the prevalence of shoulder pain ranges from 11% to 40%[7] and it is established as an important factor in delaying rehabilitation and increasing the cost of management as well as hospital burden in stroke patients[7]. So far, little is known about prevalence, pattern and intensity of pain in stroke survivors in Pakistan. In this study, we aimed at determining the frequency and intensity of shoulder pain in stroke patients who presented to a tertiary care rehabilitation setting in Pakistan. The secondary aim was to find any relation of shoulder pain prevalence with the side of involvement and the primary etiology of stroke.

MATERIAL AND METHODS

It was a cross–sectional study carried out at Armed Forces Institute of Rehabilitation Medicine (AFIRM), Rawalpindi from January 2012 to June 2012. Patients of both genders (age:

30 - 80 years) who fulfilled the World Health Organization clinical definition of stroke[8] and reported within one year of stroke development were included in the study. Patients with cognitive dysfunction and rheumatic diseases or a history of chronic pain prior to the stroke were excluded. Hundred patients were recruited through non-probability consecutive sampling from the outdoor specialized Stroke rehabilitation clinic and the indoor rehabilitation ward. Shoulder pain was defined as pain in the shoulder area requiring analgesia on two or more consecutive days[9]. At the time of the interview, patients indicated their worst self-perceived pain on a 0-100 mm visual analog scale (VAS) marked at one end as "no pain" and at the other as "worst imaginable pain"[10]. VAS score "0" was defined as no pain, "10 to 30" as mild pain, "40 to 70"as moderate and "80 -100" as severe pain[10]. The samples were followed for 4 months to register any pain complaint arising in the shoulder.

The data had been analyzed with the help of SPSS V 20(IBM Corp., Armonk, NY, USA). Mean and standard deviation (SD) were calculated for age. Frequencies along with percentages were calculated forgender, primary etiology of stroke, side of involvement of pain, presence of pain and the pain intensity groups based on VAS. Pearson's Chi Square test was applied to study the association of pain with primary etiology and the side of involvement. A *p*-value <0.05 was considered significant

RESULTS

There were a total of 100 patients (mean age: 63 ± 18 years). Seventy-six (76%) were males and 24 (24%) were females. Eighty were diagnosed with ischemic and 20 with hemorrhagic stroke. Forty-four percent had right sided while 56% had left sided weakness.Shoulder pain was found in 58% of the patients. Ten patients could not grade their pain on VAS despite fulfilling the criteria of having shoulder pain. Eight (8%) patients gradedtheir pain as mild, 26 (26%) as moderate and 14 (14%) as severe (fig-1). Among those who commented, the patients with moderate to severe pain were more common (83.3%) than the patients with mild pain (16.7%). On comparing presence of shoulder pain with the type of stroke, the pain was more prevalent in patients of ischemic stroke (62.5%) than hemorrhagic stroke (40%). Considering the side the pain was more common on left side (72.7%) than right side (46.4%). However, both these relations were statistically insignificant (*p*=0.061 and *p*=0.197 respectively)

Table-1: Shoulder pain in relation to primary stroke etiologies and the side of involvement.

Characteristics	Present	Absent	*p*-value (2-tailed)
	n (%)	n (%)	
Primary etiology of stroke ischemic stroke	50 (62.5)	30 (37.5)	0.197
Hemorrhagic stroke	8(40.0)	12 (60.0)	
Side of pain			
Left	32 (72.7)	12 (27.3)	0.061
Right	26 (46.4)	30 (53.6)	

DISCUSSION

While considerable discussion has been done in the literature on issues related to the painful shoulder and its management, the condition remains prevalentand typically seems to be accepted as an accepted and inevitable entity in stroke patients[11]. The pain in shoulder limits activity of this joint discouraging the use of upper extremity and preventing the patients to take part in useful motor activity and acquire potential motor recovery with and without assistive technology. All the current and future motor therapy systems such as functional electrical stimulation, constraint induced movement therapy, robotics and virtual reality depend exclusively upon movement around shoulder joint and would be useless if pain around shoulder joint cannot be better managed[12-16].

The prevalence of shoulder pain in stroke patients reported internationally has shown some variance. An American study conducted

by Dromeric et al reported shoulder pain prevalence of 37% (n=17) in 46 subjects; 7 of whom already had pain before onset of stroke[17]. A Swedish study registered a little lower prevalence of 22% and 24% at follow-up of 4 months and 16 months post stroke onset in 416 stroke patients[9] and it corresponded well to a prevalence of 23% observed in another population based study[18]. Wanklyn and colleagues found a prevalence of 20% in their subjects that began immediately after stroke[19]. Conflicting results have come up with two other British studies. Langhorne and colleagues found a prevalence rate of 9% and Gamble et al found a prevalence of 40% in 311 and 152 patients respectively[20,21]. Our study has shown that 58% of the patients presented with stroke complained of pain in the shoulder joint.This increased incidence of pain probably resulted from a liberal criteria set by us for inclusion .i.e. We included individuals who had pain requiring analgesia for just two days. Other studies have generally used relatively strict criteria e.g. enrolling patients who had pain for at least two weeks[9].

Considering the intensity of shoulder pain, majority of the patients (83.3%) graded their pain as of moderate to severe intensity. Comparing the patient groups based on intensity of pain, the patients with moderate to severe pain were more common than the patients with mild pain. These results are relevant to the Swedish study conducted by Lindgren and colleagues which also concluded that 79% of the patients had moderate to severe pain[9] Jonson and colleagues in another study from Sweden also found moderate to severe pain as more frequent (32%) at four months post stroke which decreased to (21%) on second follow up after 16 months[22].

On comparing presence of shoulder pain with the type of stroke, the pain was more common in patients of ischemic stroke (62.5%) than hemorrhagic stroke (40%). However, this predominance was not statistically significant. (p=0.061) Lindgren and colleagues also found slightly larger prevalence of shoulder pain in patients of ischemic stroke (22.3%) than hemorrhagic stroke (17.6%) and they too did not find any significance (p=0.202)[9]. Considering the side, the pain was more common on left (72.7%) than right side (46.4%), adding, that this relations was statistically insignificant (p=0.197). The pain in shoulder joint in stroke patients is usually difficult to link with a single pathology. However, four general types of inciting factors can be identified such as joint pain; muscle pain; pain from altered sensitivity and shoulder-hand pain syndrome[18] In routine clinical practice, patients may present with different combinations of these types complicating differential diagnosis. Therefore, detailed imaging and clinical examination should be included to reveal the true pathology, and in turn to allow for effective management[23]. Possible strategies to prevent shoulder pain

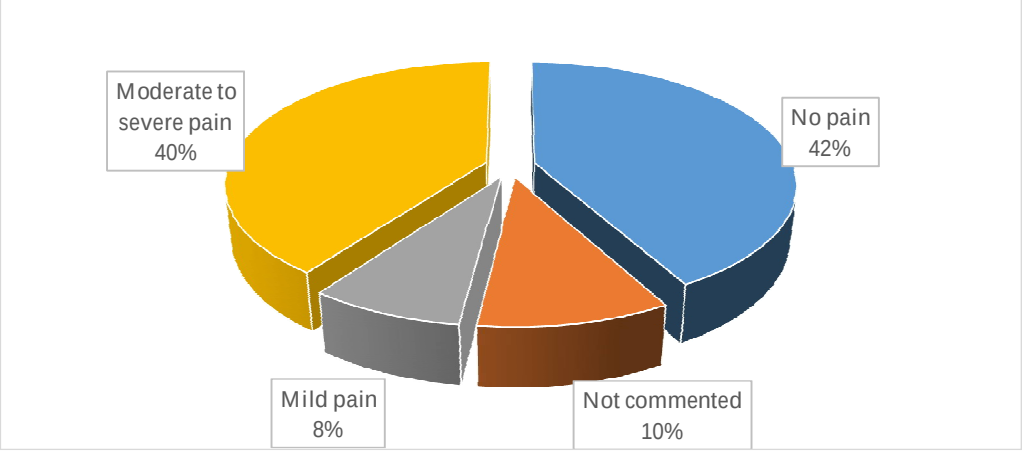

Figure-1: Intensity of pain among patients based on visual analogue scale.

have been discussed in several studies. In one report, it was recommended that patients with stroke should be taught to use a range-of-motion exercise program to prevent shoulder pain[24]. There is also evidence for the efficacy of supportive devices in preventing shoulder subluxation and pain[25]. Another report suggested that electrical stimulation may have a potential as treatment to promote motor recovery and possibly prevent shoulder pain, but further studies must be more carefully designed to obtainmore reliable results[26].

The study had few limitations. First, the sample size was relatively smaller compared to the huge population of Pakistan. Secondly, we did not explore the primary etiology of shoulder pain that would have improved the statistics about the innate trends of shoulder pain. Needless to say that this was one of the few studies in which the information about local population of stroke has been explored. A more definitive study of the pathophysiology of shoulder pain in stroke patients combined with imaging and electrophysiological data is necessitated using a larger sample.

CONCLUSION

More than half of the stroke patients reporting to our institute developed shoulder pain in first year after stroke the majority of whom had moderate to severe pain. The shoulder pain is not related to the primary etiology of stroke and side of involvement.

CONFLICT OF INTEREST

The authors of this study reported no conflict of interest.

REFERENCES

1. Feigin VL. Stroke epidemiology in the developing world. Lancet 2005; 365: 2160-61.
2. Braus DF, Krauss JK, Strobel J. The shoulder-hand syndrome after stroke: a prospective clinical trial. Ann Neurol 1994;36:72833.
3. Davies SW, Petrillo CR, Eichberg RD, Chu DS. Shoulder-hand syndrome in a hemiplegic population: a 5-year prospective study. Arch Phys Med Rehabil 1977;58:356.
4. Lo SF, Chen SY, Lin HC, Jim YF, Meng NH, Kao MJ. Arthrographic and clinical findings in patients with hemiplegic shoulder pain. Arch Phys Med Rehabil 2003;84:1786-91.
5. Joynt RI. The source of shoulder pain in hemiplegia. Arch Phys Med Rehabil 1992;73:409-13.
6. Najenson T, Yacbocih E, Pikielni S. Rotator cuff injury in shoulder joints of hemiplegic patients. Scand J Rehabil Med 1971;3:131-7.
7. Khealani BA, Wasay M. The burden of stroke in Pakistan. Int J Stroke 2008;3(4):293-6.
8. WHO. Cerebrovascular Disorders: A Clinical and Research Classification. Geneva: WHO, O□set Publication No. 43, 1978.
9. Lindgren I, Jönsson AC, Norrving B, Lindgren A. Shoulder pain after stroke: a prospective population-based study. Stroke. 2007; 38(2): 343-8.
10. The minimum clinically significant difference in visual analogue scale pain score does not differ with severity of pain. Emerg Med J 2001;18:205–207
11. Carr J, Shepherd R. Neurological Rehabilitation: Optimizing Motor Performance. Oxford: Butterworth Heinemann, 1998.
12. Chae J, Fang ZP, Walker M, Pourmehdi D. Intramuscular electromyographically controlled neuromuscular electrical stimulation for upper limb recovery in chronic hemiplegia. Am J Phys Med Rehabil 2001; 80:935-41.
13. Wolf SL, Winstein CJ, Miller JP,Taub E, Uswatte G, Morris D, et al; EXCITE investigators.Effect of constraint-induced movement therapy on upper extremity function 3 to 9 months after stroke: the EXCITE randomized clinical trial. JAMA 2006;296(17):2095-104.
14. Dromerick AW, Lang CE, Birkenmeier RL, Wagner JM, Miller JP, Videen TO, et al. Very Early Constraint-Induced Movement during StrokeRehabilitation (VECTORS): A single-center RCT. Neurology 2009;73(3):195-201.
15. Lum PS, Burgar CG, Shor PC. Evidence for improved muscle activation patternsafter retraining of reaching movements with the MIME robotic system in subjectswith post-stroke hemiparesis. IEEE Trans Neural SystRehabilEng 2004;12(2):186-94.
16. Volpe BT, Ferraro M, Lynch D,Christos P, Krol J, Trudell C, et al. Robotics and other devices in the treatment of patients recovering from stroke. CurrAtheroscler Rep 2004;6(4):314-9.
17. RomerickAW, Edwards DF, Kumar A. Hemiplegic shoulder pain syndrome: frequency and characteristics during inpatient stroke rehabilitation. Arch Phys Med Rehabil 2008; 89(8):1589-93.
18. Griffin J, Reddin G. Shoulder pain in patients with hemiplegia. A literature review. PhysTher 1981;61(7):1041-5.
19. Wanklyn P, Forster A, Young J. Hemiplegic shoulder pain (HSP): natural history and investigation of associated features. DisabilRehabil 1996;18:497-501.
20. Langhorne P, Stott DJ, Robertson L, MacDonald J, Jones L, McAlpine C, et al.Medical complications after stroke: a multicenter study.Stroke 2000;31(6):1223-9.
21. Gamble GE, Barberan E, Laasch HU, Bowsher D, Tyrrell PJ, Jones AK. Poststroke shoulder pain: a prospective study of the association and risk factors in 152 patients from a consecutive cohort of 205 patients presenting with stroke. Eur J Pain 2002; 6(6):467-74.
22. Jönsson AC, Lindgren I, Hallström B, Norrving B, Lindgren A. Prevalence and intensity of pain after stroke: a population based study focusing on patients' perspectives. J NeurolNeurosurg Psychiatry 2006;77(5):590-5.
23. Fotiadis F, Grouios G, Ypsilanti A, Hatzinikolaou K. Hemiplegic shoulder syndrome: Possible underlying neurophysiological mechanisms. Physical therapy reviews 2005;10(1):51-8.
24. Zorowitz RD, Hughes MB, Idank D, Ikai T, Johnston MV. Shoulder pain and subluxation after stroke: correlation or coincidence? Am J OccupTher 1996;50:194 –201.
25. Ada L, Foongchomcheay A, Canning C. Supportive devices for preventing and treating subluxation of the shoulder after stroke. Cochrane Database Syst Rev 2005;CD003863.
26. Pomeroy VM, King L, Pollock A, Baily-Hallam A, Langhorne P. Electrostimulation for promoting recovery of movement or functional ability after stroke. Cochrane Database Syst Rev 2006;CD003241.