

Comparison of low level laser therapy and interferential current on post stroke shoulder pain

Fahmida Jan,¹ Aamir Naeem,² Arshad Nawaz Malik,³ Imran Amjad,⁴ Tariq Malik⁵

Abstract

The objective of the study was to compare the effects of LASER therapy and Interferential current on post stroke shoulder pain. Diagnosed patients (n=38) of post stroke shoulder pain were randomly divided into two groups i.e., LASER group (LG =20 patients) and Interferential current group (IFCG=18 patients). The variables under study were pain, satisfaction, disability, and function level before and after treatment. Improvement in pain and satisfaction level after LASER therapy was significant ($p < 0.001$). However improvement in functional level was not significant ($p > 0.05$). The study findings revealed that LASER therapy is more effective than Interferential current in decreasing pain and increasing satisfaction level of stroke patients having shoulder pain.

Keywords: LASER, Stroke, Shoulder Pain, Satisfaction Level.

Introduction

Stroke is typically categorized as a neurological deficit because of an acute focal injury to the central nervous system (CNS) by a vascular cause.¹ Shoulder pain is considered a common secondary complication after stroke. The prevalence rate of shoulder pain after stroke vary as reported by different studies i.e., approximately 22%-23% in the stroke survivors and almost 54%-55% among stroke patients in rehabilitation centers.² There are many causes of hemiplegic shoulder pain but according to studies the most common causes are "spasticity" and "position of affected upper limb".³

Low level light amplification by stimulated emission of radiation (LASER) therapy is a new method for the treatment of this kind of the pain. Many researchers have conducted studies on the effect of LASER therapy in treating the shoulder pain with other causes⁴⁻⁶ but less work has been done on the effects of LASER on treating shoulder pain in hemiplegic patients. So this study was planned with the objective to compare the effects of

LASER therapy and Interferential current on post stroke shoulder pain.

Methods and Results

This study was conducted at Armed Forces Institute of Rehabilitation Medicine (AFIRM), Rawalpindi from February to July 2015. The study protocol was approved by Ethical committee of Riphah International University. Participants included were all diagnosed cases of stroke presenting with shoulder pain. Shoulder pain of traumatic history was excluded. Patients were randomly assigned to LASER group (n=20) and interferential current (IFCG) group (n=18) by lottery method.

LASER therapy was given to LASER group using cluster probe (Endolaser 422) of 905 nm with a power of 400mW, covering whole shoulder (superior anterior and posterior side) using grid method with 6 J/cm² energy and 5000 Hz frequency.

The total treatment time was 10 min once a day for 10 days on single shoulder joint. The other group received Interferential current (IFC) treatment from IFC machine (ENRAF-NONIUS), by a four-pole method with Dipole vector (automatic). One of the alternating currents had a fixed frequency of 4000 Hz; while the frequency of the other current was adjusted between 4000 and 4250 Hz with a treatment time of 15 min after which moist superficial heat was applied for another 15 min. One session was given for 10 days. The tools used in the study included Visual analog scale (VAS), Penn shoulder score (PSS), Shoulder pain and disability index (SPADI). The data was entered into SPSS V.20, and non parametric test (Mann Whitney) was applied on all variables to determine variation among the treatment groups.

The study integrated 38 patients (Male 21, Female 17) of average age of 52.92 ± 11.67 years. 20 patients had right CVA (left affected hand) and 18 patients had left CVA (right affected hand).

There was significant difference ($p < 0.05$) between VAS, Penn shoulder score; shoulder pain and disability index in experimental and control group (Table). But the difference was not significant for PASS pain, Pass function and SPADI disability (Table).

^{1,5}Armed Forces Institute of Rehabilitation, Rawalpindi, ²⁻⁴Riphah College of Rehabilitation Sciences, Riphah International University, Islamabad, Pakistan.

Correspondence: Imran Amjad. Email: mianimran.pt@gmail.com

Table: Showing mean \pm SD and P value of visual analog scale (VAS), Penn shoulders scale (PSS), and shoulder pain and disability index (SPADI) measured pre and post treatment in LASER and Interferential current Group.

Variables	Pre-Treatment Mean \pm SD			Post-Treatment Mean \pm SD		
	LASER Group	Interferential current Group	P Value (Mann Whitney test)	LASER Group	Interferential current Group	P Value (Mann Whitney test)
Visual Analog scale	5.00 \pm 1.02	5.05 \pm 0.416	0.761	1.61 \pm 0.48	3.22 \pm 0.42	0.001
PSS Pain	18.25 \pm 3.39	17.83 \pm 3.80	0.478	25.53 \pm 16.70	19.80 \pm 14.62	0.127
PSS Satisfaction	2.40 \pm 1.04	2.16 \pm 1.29	0.446	6.4 \pm 1.42	4.0 \pm 1.53	0.001
PSS Function	17.31 \pm 13.18	17.01 \pm 13.77	0.745	25.53 \pm 16.70	19.80 \pm 14.62	0.330
SPADI Pain	53.15 \pm 8.43	49.44 \pm 5.77	0.095	16.70 \pm 4.73	31.44 \pm 4.43	0.0001
SPADI Disability	86.71 \pm 14.98	86.49 \pm 10.68	0.745	66.70 \pm 22.79	84.30 \pm 11.10	0.104

Discussion

Therapeutic effects of LASER have been described in various studies with contrasting results.

A randomized control trial on the effects of low level LASER treatment (LLLT) in shoulder pain after spinal cord injury and hemiplegia showed statistically significant improvement in shoulder ROM ($p=0.001$) and a considerable reduction in pain than those who had not received the LASER treatment.⁷ Another study on the patients with painful shoulder and shoulder hand syndrome after stroke demonstrated that LASER produced significant improvement in pain intensity ($p<0.0001$), oedema of the hand, ($p=0.01$), DASH score ($p<0.01$) and level of independence ($p<0.01$) in experimental group.⁸

There are different studies with weak evidence and poor quality which showed that LASER was not that much effective. A randomized placebo controlled double-blind prospective study on the effectiveness of laser in shoulder impingement, found laser to be equally effective as sham laser. However, the study had a small sample size, no long term follow up, ill-defined placebo group and using other forms of treatment interventions.⁹ Other studies had small sample size and did not meet the sample and dose recommendation criteria laid down by world association for laser therapy (WALT). The study findings indicated that LASER therapy was more effective than the interferential current in decreasing pain and increasing satisfaction level of patients. There was no significant difference in functional level of both groups. So it is concluded that LASER therapy decreases pain and increases the satisfaction level as compared to traditional

physiotherapy treatments.

References

1. Sacco R, Kasner S, Broderick J, Caplan L, Connors J, Culebras A, et al. on behalf of the American Heart Association Stroke Council, Council on Cardiovascular Surgery and Anesthesia, Council on Cardiovascular Radiology and Intervention, Council on Cardiovascular and Stroke Nursing, Council on Epidemiology and Prevention, Council on Peripheral Vascular Disease, and Council on Nutrition, Physical Activity and Metabolism. An updated definition of stroke for the 21st century: a statement for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*. 2013; 44: 2064-89.
2. Adey-Wakeling Z, Arima H, Crotty M, Leyden J, Kleinig T, Anderson CS, et al. Incidence and Associations of Hemiplegic Shoulder Pain Poststroke: Prospective Population-Based Study. *Arch Phy Med Rehab*. 2015; 96: 241-7.
3. Murie-Fernández M, Iragui MC, Gnanakumar V, Meyer M, Foley N, Teasell R. Painful hemiplegic shoulder in stroke patients: causes and management. *Neurología (English Edition)*. 2012; 27: 234-44.
4. Bingöl Ü, Altan L, Yurtkuran M. Low-power laser treatment for shoulder pain. *Photomed Laser Ther*. 2005; 23: 459-64.
5. Santamato A, Solfrizzi V, Panza F, Tondi G, Frisardi V, Leggin BG, et al. Short-term effects of high-intensity laser therapy versus ultrasound therapy in the treatment of people with subacromial impingement syndrome: a randomized clinical trial. *Phys Ther*. 2009; 89: 643-52.
6. Michener LA, Walsworth MK, Burnet EN. Effectiveness of rehabilitation for patients with subacromial impingement syndrome: a systematic review. *J Hand Ther*. 2004; 17: 152-64.
7. Hashmi JT, Huang Y-Y, Osmani BZ, Sharma SK, Naeser MA, Hamblin MR. Role of low-level laser therapy in neuro rehabilitation. *PMR*. 2010; 2: S292-S305.
8. Karabegovic A, Kapidzic-Durakovic S, Ljuca F. Laser therapy of painful shoulder and shoulder-hand syndrome in treatment of patients after the stroke. *Bosn J Basic Med Sci*. 2009; 9: 59-65.
9. Dogan SK, Ay S, Evcik D. The effectiveness of low laser therapy in subacromial impingement syndrome: a randomized placebo controlled double-blind prospective study. *Clinics (Sao Paulo)*. 2010; 65: 1019-22.