

Original Research

Effectiveness of electro acupuncture therapy in autonomic status and pain of chronic low back pain

Ashish Kumar

Associate Professor, Department of Physiology, Venkateshwara Institute of Medical Sciences, Gajraula, Uttar Pradesh, India

ABSTRACT:

Background: Pain that lasts more than 12 weeks is referred to as chronic low back pain (LBP), and it is frequently linked to trauma or degenerative disorders of the spine. The present study was conducted to assess effectiveness of electro acupuncture therapy in autonomic status and pain of chronic low back pain. **Materials & Methods:** 60 patients with chronic low back pain (LBP) of both genders were split into two study groups at random. Group I underwent ten sessions of electroacupuncture at the GB and UB points while group II received oral Valdecoxib along with supervised physical therapy. Equal number of healthy controls (60) were put in group III. Non-invasive cardiovascular autonomic function tests, such as the sustained handgrip test, postural challenge test, E:I ratio, and 30:15 ratio, the global perceived effect (GPE) and the visual analogue scale (VAS) were recorded. **Results:** The mean weight was 58.2 kgs, 58.5 kgs and 59.3 kgs in group I, II and III respectively. BMI was 21.4, 21.8 and 23.5, basal heart rate was 72.4 bpm, 73.2 bpm and 74.8 bpm respectively. A significant ($P < 0.05$) difference in E: I ratio, 30: 15 ratio, SBP, DBP, PCT and SHT change in blood pressure in all groups. Before and after GPE value in group I was 2.6 and 5.1 and in group II was 2.3 and 5.9 respectively. The mean VAS was 6.4 and 3.9 and 6.5 and 4.2 before and after in group I and II respectively. The difference was significant ($P < 0.05$). **Conclusion:** When compared to the medication group, the participants in the acupuncture group had a better response, suggesting that acupuncture may be used as an additional or alternative treatment for persistent LBP.

Keywords: chronic low back pain, electroacupuncture, visual analogue scale

Received: 11 June, 2018

Accepted: 13 July, 2018

Corresponding author: Ashish Kumar, Associate Professor, Department of Physiology, Venkateshwara Institute of Medical Sciences, Gajraula, Uttar Pradesh, India

This article may be cited as: Kumar A. Effectiveness of electro acupuncture therapy in autonomic status and pain of chronic low back pain. J Adv Med Dent Sci Res 2018;6(8):215-217.

INTRODUCTION

Pain that lasts more than 12 weeks is referred to as chronic low back pain (LBP), and it is frequently linked to trauma or degenerative disorders of the spine.¹ Although women report low back pain more frequently, both sexes are equally afflicted. Among developed nations, it is the costliest benign condition because it is the most common cause of disability among individuals under 45. Chronic LBP is a complex illness that develops over time due to a variety of endogenous and exogenous factors that impact an individual's productivity beyond the initial pathologic dysfunction.^{2,3}

Under normal circumstances, autonomic activity has very little effect on sensory neurons that project to the skin and deep somatic tissue; however, following any injury or inflammation to the periphery, significant hyperexcitability of spinal neurons is noted, as

somatoautonomic interactions take place in multiple neuronal systems on the same side.⁴ Nociceptive and autonomic nervous systems have been demonstrated to interact in this way at several nervous system levels, including the peripheral, spinal cord, brainstem, and frontal lobes. Thus, to trigger autonomic, behavioral, and antinociceptive responses, visceral or noxious inputs activate different nociceptive and autonomic regulatory regions of the central nervous system (CNS). Although there are numerous therapeutic approaches, the long-term benefits of individual therapy approaches are still somewhat restricted.⁵ One of the numerous options for treating low back pain symptoms in patients is drug therapy. Drug therapy typically has no anatomical or physiological impact on the body, but it may have significant physiological effects on the sense of central pain, muscular relaxation,

neurotransmitter balance, and inflammation.⁶The present study was conducted to assess effectiveness of electro acupuncture therapy in autonomic status and pain of chronic low back pain.

MATERIALS & METHODS

The present study consisted of 60 patients with chronic low back pain (LBP) of both genders. All gave their written consent to participate in the study. Data such as name, age, gender etc. was recorded. Patients were split into two study groups at random. Group I underwent ten sessions of electroacupuncture at the GB and UB points that were chosen for back pain on alternate days, while group II received oral

Valdecoxib along with supervised physical therapy. Equal number of healthy controls (60) were put in group III. The patients were evaluated twice, once before and once after the three-week treatment program was over, compared to the controls who were evaluated only once. Non-invasive cardiovascular autonomic function tests, such as the sustained handgrip test, postural challenge test, E:I ratio, and 30:15 ratio, were used to assess the autonomic status. The global perceived effect (GPE) and the visual analogue scale (VAS) were used to quantify the intensity of pain. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Baseline parameters

Parameters	Group I	Group II	Group III	P value
Weight (kg)	58.2	58.5	59.3	0.85
BMI	21.4	21.8	23.5	0.72
Basal heart rate (bpm)	72.4	73.2	74.8	0.91

Table I shows that the mean weight was 58.2 kgs, 58.5 kgs and 59.3 kgs in group I, II and III respectively. BMI was 21.4, 21.8 and 23.5, basal heart rate was 72.4 bpm, 73.2 bpm and 74.8 bpm respectively. The difference was non-significant ($P > 0.05$).

Table II Comparison of autonomic function test

AFT	Group I		Group II		Group III	P value
	Before	After	Before	After		
E: I ratio	1.33	1.32	1.35	1.31	1.42	0.09
30: 15 ratio	1.19	1.14	1.17	1.12	1.24	0.05
Resting SBP	112.4	111.6	113.2	112.6	104.5	0.04
Resting DBP	78.4	77.4	76.4	74.2	72.4	0.75
PCT SBP change	-2.41	-4.42	-0.54	-1.92	-1.86	0.02
PCT DBP change	0.08	0.84	0.26	2.15	0.84	0.03
SHT SBP change	17.9	19.4	19.8	19.7	19.2	0.05
SHT DBP change	18.2	19.5	18.2	19.3	19.1	0.04

Table II shows significant ($P < 0.05$) difference in E: I ratio, 30: 15 ratio, SBP, DBP, PCT and SHT change in blood pressure in all groups.

Table III Comparison of global perceived effect (GPE) and the visual analogue scale (VAS)

Scale	Group I		Group II		P value
	Before	After	Before	After	
GPE	2.6	5.1	2.3	5.9	0.02
VAS	6.4	3.9	6.5	4.2	0.05

Table III, graph I shows that before and after GPE value in group I was 2.6 and 5.1 and in group II was 2.3 and 5.9 respectively. The mean VAS was 6.4 and 3.9 and 6.5 and 4.2 before and after in group I and II respectively. The difference was significant ($P < 0.05$).

DISCUSSION

Changes in affective, emotional-behavioral, and sensory-discriminative components are the hallmarks of the pain syndrome.^{7,8} In order for this to be the case, pain pathways need to communicate with the limbic system, the autonomic nervous system, other sensory modalities, and brain regions, particularly those involved in higher functions.^{9,10} The present study was conducted to assess effectiveness of electro acupuncture therapy in autonomic status and pain of chronic low back pain.

We found that the mean weight was 58.2 kgs, 58.5 kgs and 59.3 kgs in group I, II and III respectively. BMI was 21.4, 21.8 and 23.5, basal heart rate was 72.4 bpm, 73.2 bpm and 74.8 bpm respectively. Shankar et al¹¹ in their study LBP patients were randomly allocated into two study groups – Group A received 10 sittings of electro acupuncture, and group B received a conventional drug therapy. Following treatment, both the study groups showed a reduction in vagal tone together with a decrease in the sympathetic activity. There was also a considerable

relief of pain in both groups, however, the acupuncture group showed a better response (P < 0.05) difference in E: I ratio, 30: 15 ratio, SBP, DBP, PCT and SHT change in blood pressure in all groups. We found that before and after GPE value in group I was 2.6 and 5.1 and in group II was 2.3 and 5.9 respectively. The mean VAS was 6.4 and 3.9 and 6.5 and 4.2 before and after in group I and II respectively. Collin et al¹² in their study eleven chronic low back pain (CLBP) patients were compared with eleven age-matched controls to different postures and stress while measuring paraspinal and frontalis EMG activity, heart rate and galvanic skin response. Contrary to current theory, results indicate that the CLBP group exhibited similar or significantly less paraspinal muscle activity than the control group. Frontalis EMG and skin conductance were significantly higher in the CLBP group. It was concluded that the theories are not supported. An alternative explanation of an increased arousal response and altered ability to respond to demanding tasks leading to pain and eventually to decreased paraspinal muscle activity is suggested. Bioardi et al¹³ studied autonomic function in cluster headache and confirmed the autonomic dysfunction in these patients, particularly regarding the parasympathetic system. In their study, on patients of chronic inflammatory demyelinating polyradiculopathy. The limitation of the study is the small sample size.

CONCLUSION

Authors found that when compared to the medication group, the participants in the acupuncture group had a better response, suggesting that acupuncture may be used as an additional or alternative treatment for persistent LBP.

REFERENCES

1. Carlsson CP, Sjolund BH. Acupuncture for chronic low back pain: a randomized placebocontrolled study with long-term follow-up. *Clin J Pain* 2001; 17: 296–305.
2. Comer C, Conaghan PG. Tackling persistent low back pain in primary care. *Practitioner* 2009; 253: 32–4.
3. Mathias CJ, Bannister R. Investigation of autonomic disorders. In: Mathias CJ, Bannister R, eds. *Autonomic failure: A textbook of clinical disorders of the autonomic nervous system*. 4th ed. London, Oxford University Press 1999; 169–195.
4. World Health Organization. A proposed standard international acupuncture nomenclature. Report of a WHO Scientific Group. Geneva: World Health Organization, 1991.
5. Nordenbo AM, Boesen F, Andersen EB. Cardiovascular autonomic function in multiple sclerosis. *J Auton Nerv Syst* 1989; 26: 77–84.
6. Andersson GBJ. Epidemiological features of chronic low back pain. *The Lancet* 1999; 354: 581–585.
7. Carlsson CA, Nachemson A. Neurophysiology of back pain: current knowledge. In: Nachemson A, Jonsson E, eds. *Neck and back pain: The scientific evidence of causes, diagnosis and treatment*. Philadelphia, Lipponcott Williams and Wilkins 2000; 149–163.
8. Lyu Rong-Kuo, Tank Lok-Ming, Wu Yin-Ru, Chen Sien-Tsong. Cardiovascular autonomic function and sympathetic skin response in chronic inflammatory demyelinating polyradiculoneuropathy. *Muscle and Nerve* 2002; 26: 669–672.
9. Coats TL, Borenstein DG, Nangia NK, Brown MT. Effects of valdecoxib in the treatment of chronic low back pain: results of a randomized, placebo-controlled trial. *Clin Ther* 2004; 26: 1249– 1260.
10. Wheelar AH. Diagnosis and management of low back pain and sciatica. *Am Fam Physician* 1995; 1333–1348.
11. Shankar N, Thakur M, Tandon OP, Saxena AK, Arora S, Bhattacharya N. Autonomic status and pain profile in patients of chronic low back pain and following electro acupuncture therapy: a randomized control trial. *Indian J PhysiolPharmacol*. 2011 Jan 1;55(1):25-36.
12. Collin GA, Cohen MJ, Naliboff BD, Schandler SL. Comparative analysis of paraspinal and frontalis EMG, heart rate and skin conductance in chronic low back pain patients and normals to various postures and stress. *Scand J Rehabil Med* 1982; 14: 39–46.
13. Bioardi A, Paggetta C, Milanese I, Frediani F, Bussone G. Cardiovascular reflex responses in cluster headache patient: basal autonomic alterations. *FunctNeurol* 1987; 2: 569–574.