The effectiveness of spinal manipulation in patients with lower back pain due to spondylolisthesis

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SUMMARY

Objective: *Evaluation of results of treatment of low back pain due to cervical spondylosis by chiropractic spine method combined with electro-acupuncture and infrared therapy.*

Subject and Methods: *prospective clinical intervention study, comparing before and after with a control group.*

Results: *After 15 days of treatment, spinal manipulation combined with electroacupuncture and infrared therapy reduced pain score by 83,9% according to VAS, improved lumbar spinal function by 60,1% according to ODI, good and good results at 91,4%; this result was trend of better than the control group.*

Conclusions: *Chiropractic spine method combined with electro-acupuncture and infrared therapy has effective in patients with lower back pain due to spondylolisthesis*

Keywords: *Low back pain, chiropractic spine method, degenerative spine.*

TÓM TẮT

Mục tiêu: *Đánh giá kết quả điều trị đau thắt lưng do thoái hóa cột sống cổ bằng phương pháp tác động cột sống kết hợp điện châm và hồng ngoại trị liệu.*

Đối tượng và Phương pháp: *Nghiên cứu can thiệp lâm sàng tiến cứu, so sánh trước sau có nhóm chứng.*

Kết quả: *Sau 15 ngày điều trị, tác động cột sống kết hợp điện châm và hồng ngoại trị liệu giúp giảm 83,9% điểm đau theo VAS, cải thiện 60,1% chức năng cột sống thắt lưng theo ODI, kết quả tốt và khá đạt 91,4%; kết quả này xu hướng tốt hơn nhóm chứng.*

Kết luận: *Phương pháp tác động cột sống kết hợp điện châm và hồng ngoại trị liệu mang lại hiệu quả điều trị ở bệnh nhân đau thắt lưng do thoái hóa cột sống cổ.*

Từ khóa: *Đau thắt lưng, tác động cột sống, thoái hóa cột sống.*

INTRODUCTION

Lower back pain (LBP) is an acute or chronic pain in the spinal area from the L1 vertebra level to the L5-S1 disc, which is a very common clinical condition in traditional medicine practice. LBP has many causes, with the primary manifestation being pain and limited range of motion in the lower back. It is not only common in the elderly but also in individuals of working age. Modern medicine, medical treatment, and physical therapy is the first choice, in which infrared therapy is a method of heat therapy that has beneficial effects in treating pain and is widely used [1], 2].

The spinal manipulation is a diagnostic and

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treatment method founded and developed by Herbalist Nguyen Tham Tan, involves using hands to mechanically affect the spine. This method has been successfully applied to treat many diseases in and outside the spine, including the most common neck pain and lower back pain [3]. In clinical practice, there is a trend of combining spinal pain treatment methods to improve effectiveness. However, there is no published reports on the effectiveness of spinal manipulation combined with electro-acupuncture and infrared therapy in lower back pain treatment. Therefore, to gain more and provide more evidences for LBP treatment options, we conducted this study with the following objectives: evaluate the effectiveness of the spinal manipulation combining electroacupuncture and infrared therapy in the treating lower back pain due to spondylolisthesis.

PARTICIPANTS AND STUDY DESIGN

Research material

The research material is the "spine manipulation method" applied to treating lumbar spine disease, which is a non-drug therapy using the soft tip of the finger to apply an appropriate force in the axial and radial direction to the spine, founded and developed by the herbalist and thepapist Nguyen Tham Tan.

Study design

The study subjects were 70 patients diagnosed with lower back pain due to spondylolisthesis according to the "Guidelines for diagnosis and treatment of musculoskeletal disease" of the Ministry of Health in 2016 [4], relevant to "Yêu thống - Low back pain" syndrome caused by Liver-Kidney defficiency combined with wind-dampness-cold of traditional medicine.. Selected patients were divided into two groups according to the parity method.

- Study group (ST, n = 35): Treated by spinal manipulation combined with electro-acupuncture and infrared therapy, in order: electro-acupuncture, infrared therapy, spinal manipulation.

- Control group (CO, n= 35): treated with acupressure massage combined with electro-acupuncture and infrared therapy, in order: electro-acupuncture, infrared therapy, acupressure massage.

Patients were treated according to the respective regimens of the groups over a continuous course of 15 days. Monitoring and evaluating the results at the following times: Start of the study (D_0) and 5-10-15 days following the treatment (D_5-D_{10}-D_{15}). Research criteria include Pain level according to the VAS scale, the range of motion of waist flexion and extension using the Zero method; Lumbar spine function using the ODI scale.

Data analytic method

Using the χ^2 (chi-2) algorithm for qualitative data, compare before and after results using the paired-sample T-tests, compare the control using independent-sample T-test.

RESULTS

Participant characteristics

Table 1. Age distribution

Group / Age group	Study group (n=35)		Control group (n=35)	
	n	Percentage (%)	n	Percentage (%)
38 - 49	1	2,9	1	2,9
50 - 59	3	8,6	3	8,6

60 - 69	11	31,4	11	31,4
≥ 70	20	57,1	20	57,1
Sum	35	100	35	100
$\bar{X} \pm SD$	69,09±8,24		69,23±6,48	
p_{ST-CO}	>0,05			

Comment: In both groups, patients were mainly distributed in the age group ≥ 70 (57.1% in both groups), followed by the age group 60-69 (31.4%). The mean age in both groups was 69.09 ± 8.24 and 69.23 ± 6.48, respectively. There was no difference in age distribution between the two groups.

Table 2. Clinical index before treatment

Score	Mean score ($\bar{X} \pm SD$)		
	Study (n=35)	Control (n=35)	p
VAS	5,17 ± 0,66	5,06 ± 0,59	>0,05
Schöber (cm)	1,60 ± 0,50	1,63 ± 0,50	>0,05
Fingertip-to-Floor (cm)	29,14 ± 2,28	28,86 ± 2,44	>0,05
Flexion (degree)	42,17 ± 4,08	42,63 ± 4,62	>0,05
Extension (degree)	15,37 ± 0,91	15,54 ± 0,98	>0,05
Lateral bending (degree)	19,80 ± 0,96	20,0 ± 0,91	>0,05

Comment: There was no difference in pain level and spinal range of motion before treatment between the two groups.

Analgesic effect

Table 3. VAS score 15 days after treatment

Severity \ Group	Study group (n = 35)					Control group (n = 35)				
	D_0		D_{15}		p	D_0		D_{15}		p
	n	%	n	%		n	%	n	%	
No pain	0	0	14	40	<0,05	0	0	13	37,1	<0,05
Mild pain	0	0	21	60		0	0	22	62,9	
Moderate pain	35	100	0	0		35	100	0	0	
Severe pain	0	0	0	0		0	0	0	0	
($\bar{X} \pm SD$)	5,17 ± 0,66		0,83 ± 0,78		<0,05	5,06 ± 0,59		1,09 ± 1,04		<0,05
pST-CO (D_0)	>0,05									
pST-CO (D_{15})	>0,05									

Comment: At the time of D15, there were no patients with moderate pain in both group. The rate of mild pain increased to 60% in the study group and 62.9% in the control group. Patients with no pain increased from 0 to 40% in the study group and 37.1% in the control group. The change compared to before treatment was statistically significant with p<0.05. The average pain score in

both groups after 15 days of treatment decreased significantly compared to before treatment with p<0.05; the study group decreased to 0.83 ± 0.78 (point) and the control group decreased to 1,09 ± 1.04 (points). The results of the study group tended to be better than the control group, but the difference was not statistically significant.

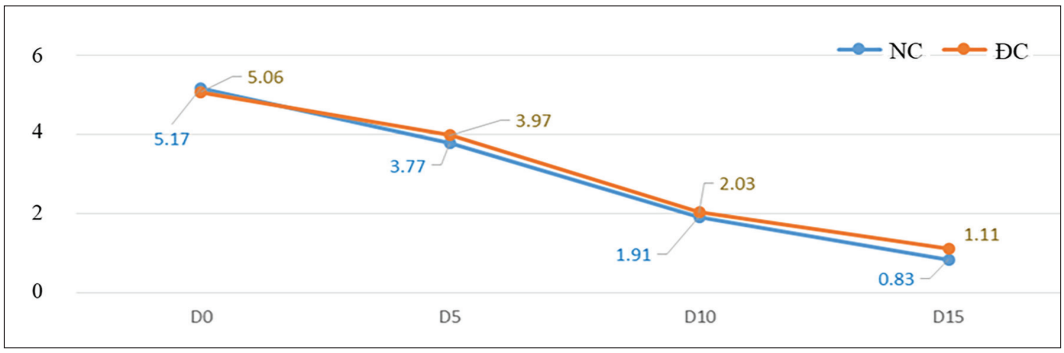


Chart 1. VAS score between 2 groups at the time of study

Comment: After 5, 10, and 15 days of treatment, the mean VAS scores of both groups decreased compared to before treatment with p < 0.05. At the time of evaluation, there was no difference in mean VAS score between the study and control groups.

Motion improvement

Table 4. Schober index at the time of study

Study times		Mean Schober indexs ($\overline{X} \pm SD$)		p_{ST-CO}
		ST (n=35)	CO (n=35)	
D_0		1,60 ± 0,50	1,63 ±0,49	>0,05
D_5		1,80 ± 0,53	1,86 ±0,36	>0,05
D_{10}		2,94 ±0,34	2,97 ±0,17	>0,05
D_{15}		3,91 ±0,89	3,71 ±0,67	>0,05
Decrease efficiency	$D_5 - D_0$	0,20 ±0,41	0,23 ±0,49	>0,05
	$D_{10} - D_0$	1,34 ±0,48	1,34 ±0,54	>0,05
	$D_{15} - D_0$	2,31 ±0,96	2,09 ±0,7	>0,05
$p (D_0-D_5)$		<0,05	<0,05	
$p (D_0-D_{10})$		< 0,05	< 0,05	
$p (D_0-D_{15})$		< 0,05	< 0,05	

Comment: After 5, 10 and 15 days of treatment, the mean Schöber index of both groups increased compared to before treatment with p < 0.05. At the time of evaluation, there was no difference in the mean Schöber index between the study and control groups.

Table 5. Lumbar extension ROM at the time of study

Study times		Mean Lumbar extension ROM ($\bar{X} \pm SD$)		p_{ST-CO}
		Study (n=35)	Control (n=35)	
D_0		15,34 ± 0,90	15,54 ±0,98	>0,05
D_5		17,29 ± 0,71	17,46 ±0,70	>0,05
D_{10}		20,66 ± 0,99	21,17 ±1,20	>0,05
D_{15}		24,26 ± 1,09	24,09 ±0,85	>0,05
Decrease efficiency	$D_5 - D_0$	1,94 ± 0,68	1,91 ±0,74	>0,05
	$D_{10} - D_0$	5,31 ± 1,23	5,63 ±1,45	>0,05
	$D_{15} - D_0$	8,91 ±1,24	8,54 ±1,22	>0,05
p (D_0-D_5)		<0,05	<0,05	
p (D_0-D_{10})		< 0,05	< 0,05	
p (D_0-D_{15})		< 0,05	< 0,05	

Comment: After 5, 10, and 15 days of treatment, the mean extension ROM in both groups increased compared to before treatment with p < 0.05. At the time of evaluation, there was no difference in the mean extensor ROM between the study and control groups.

Spinal function improvement

Table 6. Limitation in activities of daily living after 15 days of treatment

Level \ Group	Study group (n = 35)					Control group (n = 35)				
	D_0		D_{15}		p	D_0		D_{15}		p
	n	%	n	%		n	%	n	%	
No limitation	0	0	14	40	<0,05	0	0	13	37,1	<0,05
Slight limitation	0	0	21	60		0	0	22	62,9	
Moderate limitation	30	85,7	0	0		31	88,6	0	0	
Severe limitation	5	14,3	0	0		4	11,4	0	0	
($\bar{X} \pm SD$)	23,49 ±1,07		9,37 ±1,57		<0,05	19,83 ± 2,58		10,09 ± 2,59		<0,05
pST-CO (D_0)	>0,05									
pST-CO (D_{15})	>0,05									

Comment: At the time of D15, there were no patients with moderate limitation in both group; No limitation increased from 0 to 40% in the study group, and 37.1% in the control group. The change was different from before treatment with p<0.05. The average ODI score in both groups after 15 days of treatment decreased significantly compared to before treatment with p<0.05, the study group decreased to 9.37 ± 1.57 (point), the control group decreased to 3,43 ± 0.70 (points). The reduction results of the study group tended to be better than the control group, but the difference was not statistically significant.

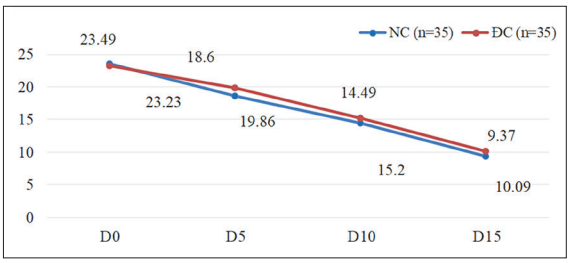
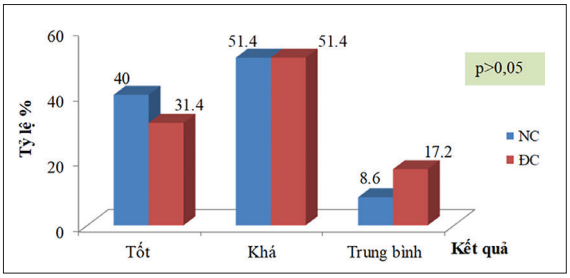


Chart 2. VAS score of the two groups at the time of study

Comment: After 5, 10, and 15 days of treatment, the mean ODI scores of both groups decreased compared to before treatment with p<0.05. At the time of evaluation, there was no difference in mean ODI scores between the study and control groups.

General effectiveness



Comment: After treatment, the excellent and good results in the study group were 91.4%; the trend was higher than in the control group (82.8%). However, the difference is not statistically significant.

DISCUSSION

According to the results, in both groups of patients admitted to the hospital with moderate pain, the average VAS score of the study group was 5.17 ± 0.66 points; of the control group was 5.06 ± 0.59. After 15 days of treatment, VAS pain score in both study groups improved compared to before treatment. The study group had 40% no pain, 60% mild pain, no moderate pain or higher while control group had 22.9% no pain, 77.1% mild pain. Comparing this result with other studies using the VAS score to assess pain, we found that despite using different traditional medicine methods in lumbar spondylosis treatment, pain assessment scores usually improve pretty well after the intervention from 5-10 days and remain stable until 20-30 days after treatment. This is evidenced by specific results of some studies such as Nguyen Van Hung (2018), patients with mild pain before treatment accounted for 53.3%, and moderate pain accounted for 46.7% with no severe pain or unbearable pain. After 20 days of treatment, the pain level improved clearly, with 100% mild pain with no moderate or higher pain [5].

The general treatment in the study and control groups was electro-acupuncture and infrared therapy. Therefore, comparing the analgesic effect between the two groups is to compare the therapeutic effect of the spinal manipulation with acupressure massage. According to the neural mechanism, acupuncture inhibits pain transmission in the reflex arc, thereby reducing pain. Electro-acupuncture, as well as other effects on acupoints, will activate and create nerve reflex arcs at three levels: local, secretory, and systemic. In the reflex arc, there are sensitive parts, including skin, nerve structures, and blood vessels. The reflex centers are neural structures that include the spinal cord, thalamus, hypothalamus, and neurons of the central nervous system. Efferent nerve fibers are nerve fibers that go to the skin, muscles, blood vessels, and organs. All mechanical, physical, and chemical factors affecting acupoints can regulate the dysfunction of the body through these reflex arcs. Electro-acupuncture cuts off these pathological reflex arcs, thus inducing anti-inflammatory effects, relieving pain,

vasodilating, increasing circulation, enhances metabolism, thereby healing the injury. The combination of the spinal manipulation with electro-acupuncture and infrared therapy has clearly improved pain symptoms.

Improvement of daily functioning depends on the degree of pain relief and rehabilitation of the lumbar spine range of motion, which is limited by low back pain. On the other hand, lumbar functional outcome is assessed through the Oswestry Disability questionnaire, which is a comprehensive assessment of the patient's daily activities. The cause of lower back pain due to spondylolisthesis is not only the impairment kidney and liver function, but also the combination of wind-dampness-cold block up meridians system then result to Qi stagnance and blood stasis. The spinal manipulation affects on the nervous system due to the wrong, convex, deviated, concave vertebrae..., pressing on the peripheral nerves, making all body activities, the nervous system controls disease-causing disorder. The spinal manipulation helps to adjust the tendons, muscles, spine to regain the operation of the nervous system, increase blood circulation. Thus, the patient will get better and recover from the disease. Combined with electro-acupuncture and infrared therapy, it increases the effect of Qi regulating and blood circulating, reduce pain and relax muscles. Therefore, the improvement of daily living function of the study group was better than that of the control group.

CONCLUSION

The spinal manipulation combined with electroacupuncture and infrared therapy for 15 days has the following effects:

- Reduced pain level by 83.9%, VAS score from 5.17 points at D0 to 0.83 points at D15 ($p<0.05$);

- Increased spinal range of motion according to Fingertip-to-floor and Schober index at the time of D0 and maintained to D15 significantly compared with the time before treatment ($p<0.05$)

- Improved spinal function by 60.1%, mean ODI score decreased from 23.49 points at time D0 to 9.37 points at time D15.

- The overall treatment results of the study group tended to be higher than that of the control group (the good and fair results of the study group were 91.4% compared to the control group was 82.8%), but the difference was not statistically significant.

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