P75

Therapeutic effect of microcurrent therapy in herniated lumbar disc patients with neuropathic pain

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Objective

Herniated lumbar disc (HLD) is a disease with a high prevalence rate. The patients usually show symptoms like neuropathic pain such as a tingling sensation on the legs, or numbness. For treatment, various types of therapies are performed including medication, traction, manual therapy, and electrothermal therapy (ultrasound, hot packs, and interference current therapy). This study aims to evaluate the efficacy of microcurrent therapy in patients with HLD presenting neuropathic pain.

Methods

1) Patients This is a retrospective short-term cohort study with 33 patients (October, 2016 ~ November, 2017) who are complaining neuropathic pain with HLD findings on magnetic resonance image (MRI). The basic characteristics were reviewed including age, sex, height, weight, body mass index (BMI), diabetes mellitus (DM) history, diagnosis, spinal stenosis, and pain medication. 2) Microcurrent Microcurrent therapy was applied to the neuropathic pain area (paralumbar or lower limb) with a medical device called a PANACELL (Chungam Medical Co, Seoul, Korea). Treatment was conducted for seven minutes per treatment with 0.25~1.00 mA intensity as high as the patients could tolerate via stimulating probe with roller type (Figure 1), and the frequency was 60 Hz with a sine wave pulse. 3) Primary outcome Visual analog scale (VAS) score was used to assess the degree of the pain. The VAS score was checked just before and after the treatment. 4) Statistical analysis A Kruskal-Wallis test, Fisher exact test, and a paired T-test were used for statistical analysis.

Results

The degree of pain reduction (ΔVAS) was compared according to several sub-groups (diagnosis, stenosis, dermatome area, medication, pain site, and the number of treatments) (Table 1). The ΔVAS according to the diagnosis, stenosis, dermatome area, medication, and pain site was not statistically significant (P = 0.40, 0.96, 0.65, 0.65, and 0.43, respectively). However, the ΔVAS according to the number of treatments (1-2 times, ≥3 times) showed a statistically significant difference (P = 0.04) (Table 1). The basic characteristics of the patients according to the number of treatments showed no statistically significant difference except DM (P = 0.047) (Table. 2).

Conclusion

There was a significant reduction in neuropathic pain in the group treated more than three times compared to the group treated one or two times. This result suggesting that the microcurrent would have cumulative effect in reducing neuropathic pain. However,

considering the limitation of the small sample size, further accumulation of data is required for more delicate analysis.

roller type probe

Table 1. Pain improvement after microcurrent by several sub-groups

	VAS pre	VAS post	⊿VAS
Diagnosis			
HLD L4/5	4.63	2.88	1.70
HLD L5/S1	7.00	4.50	2.50
Other single level	6.00	4.50	1.50
Multi-level	6.10	4.62	1.40
P-value	0.03	0.05	0.40
Stenosis			
Absent	6.10	4.48	1.62
Present	5.25	3.67	1.58
P-value	0.14	0.17	0.96
Dermatome			
L5	6.17	4.17	2.00
S1	5.15	3.62	1.54
Paralumbar	6.23	4.77	1.46
Other(L2)	6.00	4.00	2.00
P-value	0.27	0.31	0.65
Medication			
No Medication	5.00	2.50	2.50
Medication 1	5.50	4.12	1.38
Medication 2	8.00	6.00	2.00
Medication 3	5.80	4.00	1.80
Medication 4	5.00	3.75	1.25
Medication 5	6.60	5.00	1.60
Medication 6	6.00	4.67	1.33
P-value	0.29	0.38	0.65
Treatment site			
Paralumbar	6.23	4.77	1.46
Limb	5.50	3.80	1.70
P-value	0.11	0.06	0.43
Number of treatment			
1-2	5.67	4.29	1.38
≥3	6.00	4.00	2.00
P-value	0.49	0.60	0.04

Medication 1, NSAID, Nonsteroidal anti-inflammatory drug ; Medication 2, gabapentin or pregabalin; Medication 3, NSAID + gabapentin or pregabalin; Medication 4, gabapentin or pregabalin + opioid; Medication 5, NSAID + gabapentin or pregabalin + opioid; Medication 6, other.

Table 2. Basic characteristics of the patients according to treatment number

	Group A	Group B	*P*-value
Age	50	60	0.54
Sex			
Male	7	4	1.00
Female	14	8	
Height (cm)	163.4	156.6	0.09
Weight (kg)	63.2	60.5	1.00
BMI (kg/m^2)	23.5	24.8	1.00
DM			
Absent	20	8	0.05
Present	1	4	(0.047)
Diagnosis			
HLD L4/5	6	2	0.05
HLD L5/S1	0	2	(0.052)
Other single level	0	2	
Multi-level	15	6	
Stenosis			
Absent	15	6	0.27
Present	6	6	
Medication			
No Medication	1	1	0.19
Medication 1	4	4	
Medication 2	1	0	
Medication 3	8	2	
Medication 4	3	1	
Medication 5	1	4	
Medication 6	3	0	
VAS_{adm}	6.8	6.2	0.97

BMI, body mass index; DM, diabetes mellitus; HLD, herniated lumbar disc;

VASadm, visual analog scale on admission; Group A, 1-2 times of number of treatment; Group B, ≥3 times of number of treatment

Medication 1, NSAID, Nonsteroidal anti-inflammatory drug; Medication 2, gabapentin or pregabalin; Medication 3, NSAID + gabapentin or pregabalin; Medication 4, gabapentin or pregabalin + opioid; Medication 5, NSAID + gabapentin or pregabalin + opioid; Medication 6, other.