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Case Report

A Retrospective Study on Combined Traditional Korean Medicine Treatment of Cervical Radiculopathy Patients Who Underwent Ineffective Epidural Steroid Injection Treatment

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ABSTRACT

This retrospective study reports the effects of combined traditional Korean treatment of cervical radiculopathy in patients who underwent ineffective epidural steroid injection treatment. This study analyzed cervical radiculopathy in patients who visited traditional Korean medicine hospital following an ineffective epidural steroid injection. There were 29 cases included in this study. Scores for Visual Analog Scale (VAS) and Neck Disability Index (NDI) were measured before and after combined treatment with acupuncture, herbal medicine, and chuna therapy. The results of this study showed that patient VAS scores for neck and shoulder pain were significantly reduced ($p < 0.001$) when comparing scores before treatment (6.03 ± 2.04) with after treatment (2.14 ± 1.27). In addition, the VAS score for radiating pain before treatment (6.67 ± 1.44) compared with after treatment (2.89 ± 1.83) showed a significant reduction ($p < 0.001$). Furthermore, the NDI score before treatment (25.85 ± 6.33) compared with after treatment (11.33 ± 7.47), also showed a significant reduction ($p < 0.001$). The results in this study showed the positive effects of combined traditional Korean medicine treatment in significantly reducing pain for patients with cervical radiculopathy, who had ineffective anesthesia.

Introduction

Epidural steroid injection is 1 of the most conventional treatments for herniated intervertebral disc. Local anesthesia such as lidocaine or bupivacaine, and a steroid such as methylprednisolone are injected near to the cervical nerve ending to reduce inflammation and symptoms of herniated intervertebral disc [1,2].

There are 2 approaches to nerve blocks in the cervical area, either interlaminar or transforaminal epidural injection. There is supportive evidence and limited side effects with interlaminar epidural injection treatment for cervical disc herniation. However, the evidence for transforaminal epidural injection is poor and side effects occur more frequently [3]. There are also skeptical views on the effects of steroids used in treatment [4].

Combined traditional Korean medicine treatment is an alternative for patients whose symptoms are not relieved through the use of epidural steroid injection. There are many studies that show the effectiveness of traditional Korean medicine treatment for cervical radiculopathy [5-7]. Treatment of lumbar intervertebral disc herniation has been reported [8], however, no research on treatment after ineffective epidural steroid injection of the cervical region has been reported. Thus, this retrospective study of patients who were diagnosed with cervical radiculopathy and received 1 or more epidural steroid injections were performed.

Case Report

Patients

Patients diagnosed with cervical radiculopathy, who had 1 or more epidural steroid injections within 3 months of hospitalization in Mokhuri Neck and Back Hospital, between January 2015 to September 2017 (n = 37) were included in the total population of this study. Patients with cervical myelopathy, ossification of posterior longitudinal ligament and syringomyelia were excluded. Patients who received treatment such as neuroplasty and/or nucleoplasty after epidural steroid injection were also excluded from the study. In addition, patients who recovered after

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epidural steroid injection and relapsed due to injury or sprain were excluded. Since the duration of pain relief for epidural steroid injections is 3 months, all patients included in the sample population (n = 29) in this study had their injection within 3 months to exclude cases of relapse due to other causes [9].

The measure for ineffective epidural steroid injection treatment included 1 or more of the following criteria:

1) If the patient mentioned ineffectiveness of the epidural steroid injection.

2) If the patient's VAS was above 8.

3) If the patient suffered from night pain.

Treatment method

Each patient received GV_{14} · GV_{16} · BL_{12} · GB_{20} · GB21 · CV_{24} · BL_7 · GV_{20} · GB_{12} · GV_{15} · BL_{11} with 0.25 × 40 mm stainless steel acupuncture needles (Dongbang medical disposable acupuncture, Boryung City, Chungnam, Korea). Each of the points were inserted to a 0.2-0.3 cm depth and left for 15 minutes, twice a day. They received Hwanglyeonhaedok-tang pharmacopuncture treatment (Korean Pharmacopuncture institute) once a day. Needle insertion points were GV_{14} · GV_{16} · BL_{12} and GB_{20}. and 0.1 mL was injected after the regurging process. They also received traditional Korean medicine treatment, either Gangchuctang or Gangchucjetongtang, and Gangchuchwan. Each medicine was administered 3 times a day, 30 minutes after food. The configuration of herbs is shown in Table 1. Each patient received neck extension chuna treatment for 15 minutes, 5 times a week, in a supine position on an Ergo StyleTM FX－5820 Table (Chattanooga Group, USA).

Measurement

The Visual Analog Scale (VAS) was used for the measurement of pain in patients. The measurement range was from 0-10, 0 being the least amount of pain and 10 the most amount of pain. VAS scores were measured before and after hospitalization.

The Neck Disability Index (NDI) was used to evaluate patients before and after treatment. There were 10 questions with 6 items (0 to 5 score) Disability scores were 0-4 (no disability), 5-14 (mild disability), 15-24 (moderate disability), 25-34 (severe disability), and above 35 (completely disable). Higher scores indicate more disability in the patient [10].

Table 1. Composition of Gangchuctang Used in This Study.

Scientific name	Amounts (g)
Geranii herba	8
Sorbus commixta	8
Archyranthes radix	4
Cibotii rhizoma	4
Acanthopanax sessiliflorum seeman	4
Ledebouriella seseloides	4
Eucommia ulmoides Oliver	4
Atractylodes macrocephala Koidzumi	4
Aralia continentalis Kitagawa	4
Rehmannia glutinosa for hueichingensis	4
Carthamus tinctorius	1.5
Total	49.5

Data and statistical analysis

This study gathered patient characteristics and medical history (gender, age, present illness regarding nerve block treatment, morbidity period and hospitalization period) with narrative statistics.

The Shapiro-Wilk test was used to compare VAS and NDI scores before and after treatment. This test was also used to compare VAS and NDI differences in scores for groups categorized by gender, age and hospitalization period. The data were tested for normality, and if sample distribution was normal a paired t test, an indirect sample t test, and a 1-way ANOVA was performed. If the data was not validated, a Wilcoxon Signed-Rank Test, a Mann-Whitney U test, and a Kruskal-Wallis test was performed.

The data was considered statistically significant when $p < 0.05$. All measurements were presented as mean ± S.D. The resultant data was rounded up to 3 decimal places, and p value was rounded up to 4 decimal places. All analysis was processed with IBM SPSS Version 22.0 (IBM Corp., Armonk, New York, USA).

Ethical review

This study was a retrospective study that used anonymous patient data. The study was approved by Mokhuri Neck and Back Hospital Institutional Review Board on the 1st November 2017 (MHNBH-IRB-17001).

Baseline pain assessment statements from patients with ineffective epidural steroid injections

There were 20 (68.97%) patients that reported that their epidural steroid injection was ineffective. There were 5 (17.24%) patients who reported a VAS score of above 8 on their 1st hospital visit. There were 4 (13.79%) patients who reported that they suffered from night pain even though their VAS score was below 7 (Table 2).

There were 6 (20.7%) patient statements that were recorded by telephone interview before visiting hospital, 2 (6.9%) patient statements that were taken during preliminary diagnosis, 10 (34.5%) patient statements that were gathered during the 1st diagnosis with the doctor, and 2 (6.9%) patient statements that were gathered through patient information documents from Mokhuri Neck and Back Hospital (Table 2).

Table 2. Distribution of Patient Statements Included in the Study.

		N	%
Subjects' statement	telephone interview	6	20.7
	preliminary interview	2	6.9
	1st diagnosis	10	34.5
	patient information from another clinic	2	6.9
VAS ≥ 8 (1st diagnosis)		5	17.24
Insomnia due to night pain (VAS ≤ 7)		4	13.79
Total		29	100

VAS, visual analog scale.

Test of normality

Before the analysis of the effect, a normality test was conducted using the Shapiro-Wilk test to select an appropriate analysis tool. Shapiro-Wilk test was used to test VAS scores and NDI scores before and after treatment, and differences in gender, age, hospitalization period and treatment timing.

Comparison of VAS before and after treatment

VAS scores for neck and shoulder pain, and radiating pain were measured before and after hospitalization. The average neck and shoulder pain VAS score was 6.03 ± 2.04 before hospitalization and was significantly reduced (2.14 ± 1.27) after hospitalization ($p < 0.001$). Similarly, the average radiating pain VAS score was 6.67 ± 1.44 before hospitalization and was significantly reduced (2.89 ± 1.83) after hospitalization ($p < 0.001$; Table 3).

Comparison of NDI before and after treatment

The average NDI score was 25.85 ± 6.33 before hospitalization and was significantly reduced to 11.33 ± 7.47 after hospitalization ($p < 0.001$; Table. 3).

Analysis of the effect of treatment between or among the small groups

This study categorized groups by age, gender, timing of epidural steroid injection, and hospitalization period. All the groups showed statistically significant reduction in pain after hospitalization. Reduction in radiating pain in patients aged 50 years and younger was more prominent than in patients aged above 50 years ($p = 0.037$). This study also showed that male patients had a more prominent change compared with female patients in VAS score change for neck and shoulder pain ($p = 0.016$; Table 4.).

Table 3. Changes of VAS and NDI Average Score Before and After Korean Medical Combination Treatments.

		VAS_N		VAS_R		NDI	
		Admission	Discharge	Admission	Discharge	Admission	Discharge
Total		6.03 ± 2.04	2.14 ± 1.27	6.67 ± 1.44	2.89 ± 1.83	25.85 ± 6.33	11.33 ± 7.47
		z = -4.560, $p < 0.001^{\dagger}$		t = 11.144, $p < 0.001^{*}$		t = 10.056, $p < 0.001^{*}$	
Days before the epidural steroid injection	1~7	5.90 ± 1.85	1.75 ± 0.82	6.70 ± 1.42	2.90 ± 1.60	24.39 ± 4.59	11.51 ± 9.12
		z = -2.721, $p = 0.007^{\dagger}$		z = -2.831, $p = 0.005^{\dagger}$		t = 5.524, $p < 0.001^{*}$	
	8~28	5.67 ± 2.50	2.33 ± 1.20	6.56 ± 1.24	3.00 ± 1.48	23.32 ± 6.40	9.40 ± 5.36
		t = 4.061, $p = 0.004^{*}$		t = 5.629, $p < 0.001^{*}$		t = 6.840, $p < 0.001^{*}$	
	29~90	6.50 ± 1.90	2.35 ± 1.68	6.75 ± 1.83	2.75 ± 2.56	29.60 ± 6.55	12.9 ± 7.64
		t = 6.185, $p < 0.001^{*}$		t = 4.888, $p = 0.002^{*}$		t = 5.505, $p < 0.001^{*}$	
Gender	M	5.53 ± 2.46	1.93 ± 0.90	7.00 ± 1.18	2.39 ± 1.37	26.80 ± 6.87	10.20 ± 6.55
		t = 5.065, $p < 0.001^{*}$		t = 11.426, $p < 0.001^{*}$		t = 8.583, $p < 0.001^{*}$	
	F	6.57 ± 1.40	2.36 ± 1.59	6.31 ± 1.65	3.42 ± 2.14	24.84 ± 5.78	12.54 ± 8.42
		t = 10.772, $p < 0.001^{*}$		t = 6.463, $p < 0.001^{*}$		t = 5.964, $p < 0.001^{*}$	
Age (y)	≤ 50	6.44 ± 2.22	2.16 ± 1.31	7.07 ± 1.10	2.67 ± 1.83	26.94 ± 6.82	10.50 ± 7.33
		z = -3.447, $p = 0.001^{\dagger}$		t = 10.612, $p < 0.001^{*}$		t = 8.185, $p < 0.001^{*}$	
	> 50	5.54 ± 1.76	2.15 ± 1.28	6.17 ± 1.70	3.17 ± 1.86	24.52 ± 5.65	12.36 ± 7.80
		t = 5.240, $p < 0.001^{*}$		t = 6.141, $p < 0.001^{*}$		t = 6.232, $p < 0.001^{*}$	
Post admission date	10~14	6.80 ± 1.62	2.65 ± 1.76	6.67 ± 1.50	3.56 ± 2.47	27.70 ± 7.36	14.70 ± 8.96
		t = 7.437, $p < 0.001^{*}$		t = 3.515, $p = 0.008^{*}$		t = 3.888, $p = 0.004^{*}$	
	15~21	5.67 ± 2.40	1.61 ± 0.78	6.50 ± 1.20	1.88 ± 1.25	25.33 ± 4.82	7.00 ± 3.67
		z = -2.254, $p = 0.024^{\dagger}$		t = 8.272, $p < 0.001^{*}$		t = 8.272, $p < 0.001^{*}$	
	22~30	5.60 ± 2.07	2.10 ± 0.91	6.80 ± 1.69	3.10 ± 1.26	24.48 ± 6.61	11.87 ± 7.04
		t = 5.529, $p < 0.001^{*}$		t = 11.961, $p < 0.001^{*}$		t = 9.192, $p < 0.001^{*}$	

* t & p by Paired t test in before and after treatment ($p < 0.05$).
† z & p-value by Wilcoxon Signed-Rank test in before and after treatment ($p < 0.05$).
VAS_N, visual analog scale of neck and shoulder pain; VAS_R, visual analog scale for radiating pain; NDI, neck disability index.

Discussion

There were 37 patients who were hospitalized within 3 months of epidural steroid injection between January 2015 to September 2017. Three patients were excluded because their epidural steroid injection had relieved their pain. Five patients were excluded due to missing patient information. In the sample population 29 patients were included in this retrospective study. Short term relief due to the effects of epidural steroid injection has been reported to be between 70% to 87% for interlaminar epidural injections, and 49% to 93% for transforaminal steroid injections [3]. In the total study population, 3 out of 37 patients (8%) stated that the epidural steroid injection was effective. However, this discrepancy may be due to a skew in the study population; patients visit traditional Korean medicine hospital typically when they are dissatisfied with conventional treatment.

The average VAS and NDI scores significantly reduced during hospitalization ($p < 0.001$). There was also a statistically significant difference in VAS and NDI scores which was regardless of age, gender, and morbidity period ($p < 0.05$; Table 3). The effect on VAS scores for neck and shoulder pain were more prominent among male patients than with female patients (U = 42.000, $p = 0.016$). The change in VAS score for radiating pain in patients under 50 years of age was more prominent than the over 50's group (t = 2.198, $p = 0.037$) but all other variants tested resulted in no differences between groups (Table 4). These results showed that combined traditional Korean medicine treatment can alleviate pain, according to VAS and NDI patient scores.

However, there are several limitations of this study. Firstly, this study was an observation study that did not have a control group. Thus, the correlation between treatment and the reduction of VAS and NDI scores was weak. In addition, the number of patients included in this study was small. Furthermore, due to heterogeneity amongst the patients it was difficult to make comparisons. Further research is required on this topic.

Table 4. Comparison of Effectiveness of Combined Korean Medicine Treatments Between or Among the Groups.

		Changes of VAS_N	Changes of VAS_R	Changes of NDI
Days before the epidural steroid injection	1~7 8~28 29~90	H = 0.902 $p = 0.637^{\S}$	H = 0.025 $p = 0.988^{\S}$	F = 0.625 $p = 0.543^{\ddagger}$
Gender	M F	U = 42.000 $p = 0.016^{\dagger}$	t = -0.757 $p = 0.457^{*}$	t = 1.525 $p = 0.139^{*}$
Age (y)	≤ 50 > 50	U = 77.000 $p = 0.233^{\dagger}$	t = 2.198 $p = 0.037^{*}$	t = 1.505 $p = 0.144^{*}$
Post admission date	10~14 15~21 22~30	H = 1.551 $p = 0.461^{\S}$	H = 4.117 $p = 0.128^{\S}$	F = 1.605 $p = 0.220^{\ddagger}$

* t & p-value by Independent t-test between the groups ($p < 0.05$).
† U & p-value by Mann-Whitney U test between the groups. ($p < 0.05$).
‡ F & p-value by one-way ANOVA among the groups ($p < 0.05$).
§ H & p-value by Kruskal-Wallis test among the groups ($p < 0.05$).
VAS_N, visual analog scale of neck and shoulder pain; VAS_R, visual analog scale for radiating pain; NDI, neck disability index.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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