

# *Scolopendra* Pharmacopuncture Combined with Electroacupuncture for the Treatment of Ganglion Cysts: A Retrospective Study

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**Objectives:** Ganglion cysts require a sustainable treatment that suppresses their frequent recurrence. This study aimed to explore the clinical effects of *Scolopendra* pharmacopuncture (SP) and electroacupuncture on ganglion cysts.

**Methods:** We retrospectively reviewed the patient records and follow-up reports for 20 patients with wrist ganglion cysts who received SP and electroacupuncture from April 2016 to March 2017. The cyst diameter, recurrence, visual analog scale (VAS) scores for pain, the Korean version of the disabilities of arm, shoulder, and hand (K-DASH) score, and the Korean version of the patient-rated wrist evaluation (K-PRWE) score before and after treatment were noted.

**Results:** After treatment, the cyst diameter decreased significantly from  $13.61 \pm 6.41$  mm to  $5.15 \pm 6.18$  mm ( $p < 0.001$ ), and VAS score for pain decreased from  $1.31 \pm 1.77$  to  $0.41 \pm 0.33$  ( $p = 0.021$ ). Further, the K-DASH score decreased significantly from  $8.97 \pm 12.66$  to  $2.21 \pm 7.39$  ( $p = 0.016$ ), and score for the function subscale of K-PRWE decreased from  $11.37 \pm 4.48$  to  $9.1 \pm 3.67$  ( $p = 0.046$ ). No recurrences were reported from the followed-up patients. Any complication related to SP or electroacupuncture was not observed, except mild rash, itching, and swelling at the injection site in four patients.

**Conclusion:** Combination of SP and electroacupuncture may be effective in treating ganglion cysts; further prospective studies with large population are needed to clarify the effect of SP and electroacupuncture.

**Keywords:** scolopendra pharmacopuncture, electroacupuncture, ganglion cysts, retrospective studies

## INTRODUCTION

Ganglion cyst is one of the most common soft tissue masses found in the synovial tissue [1, 2]. These cysts may develop in any connective tissue, such as the joint capsules and tendon sheaths [3]. Most ganglion cysts are asymptomatic; however, some patients experience pain, tenderness, weakness, and abnormal sensation depending on the size and location of the le-

sion [4]. Patients with ganglion cysts are typically educated and reassured regarding the mass; no further intervention is usually suggested, or they are offered either aspiration, often combined with the injection of various substances, or surgical excision [1]. Generally, aspiration, followed by steroid injection is the most popular treatment. Aspiration is considered safe and associated with a low risk of local skin infection; however, it could cause increased pain and cyst recurrence; the recurrence rate for cysts

is >50% with this treatment [5]. Surgical excision is also associated with a recurrence rate of up to 39% [6]. Furthermore, there is a risk of treatment failure or adverse effects, such as increased pain and stiffness, infection, scarring, and permanent or temporary neurological damage, after surgical excision [3]. Therefore, a sustainable treatment that suppresses their recurrence is desirable, and demands for improved conservative treatments remain high.

Korean medicine (KM) therapy has been recognized for its superior effectiveness in the management of ganglion cysts, including acupuncture, moxibustion, acupotomy (new type of noninvasive acupuncture or microsurgery using a small needle-scalpel), electroacupuncture, and pharmacopuncture [3, 7-10]. In particular, *Scolopendra* pharmacopuncture (SP) combined with electroacupuncture was reported to significantly reduce the size of wrist ganglions and their related symptoms, such as pain and discomfort. This treatment also achieves low recurrence rates with shorter treatment duration [11]. However, previously conducted studies comprised only one or two case series and were not sufficient to support the potential benefits of SP and electroacupuncture. Accordingly, this study was performed to determine the effectiveness of SP and electroacupuncture in ganglion cyst treatment through by quantitatively analyzing our case series. Based on the superior quality of evidence obtained from real-world clinical practice, we tried to evaluate the efficacy of KM therapies for ganglion cysts and to present a safe and standardized treatment protocol.

## MATERIALS AND METHODS

### 1. Subjects

We conducted a retrospective chart review of 20 patients with ganglion cysts who visited Shin Min-Seop Korean Medicine Clinic, Jeonju, South Korea between April 2016 and May 2017. We included patients with ganglion cysts involving joints or tendons (sheaths) (ICD-10: M67.4) (2-1), who received SP and electroacupuncture at least once a week. Patients who understood the treatment and agreed to share their treatment information with research efforts were included. We excluded patients for whom the complete data records were not available, such as patients who discontinued treatment less than twice or those who had undergone surgery during the treatment regimen.

The research was approved by the Institutional Review

Board of the Korea Institute of Oriental Medicine (I-1708/001-005-01). Written informed consent was obtained from each patient.

### 2. Treatment

The patients received SP and electroacupuncture as the main intervention. Both treatments were administered once per week on the same day by Korean Medicine doctors with 10 years of clinical experience.

Approximately 0.5 mL of SP solution was administered into the ganglion cysts using a sterile hypodermic syringe (30-31 gauge, 1.0 cc; DM Medirat, Dongbang, Seoul, Korea). All SP solutions were prepared in a laboratory at the Korean Pharmacopuncture Institute, in accordance with Korea Good Manufacturing Practice, under the supervision of a Korean Medicine Doctor [12].

Electroacupuncture (CELLMAC, STN-100; Gyeonggi-do, Korea) was also performed in some patients after SP injection. Acupuncture needles with 0.25-mm diameter and 30-mm length were used (Dong Bang; Gyeonggi-do, Korea). The acupuncture needle was inserted through the ganglion cyst, with the tip of the needle targeting the center of the cyst. After needle insertion, a 2-Hz current was applied for 12 min for electrostimulation.

As additional KM therapies to SP and electroacupuncture, acupuncture treatments tailored to the individual patients were performed according to the standard KM theory of pattern identification.

### 3. Data collection and analysis

The primary outcome was the size of the ganglion cyst; the diameter of the largest cyst was measured by ultrasound (SA-6000, Medison, South Korea) because the mere presence of ganglion cysts causes dissatisfaction and motivates patients to seek treatment, even in the absence of direct clinical symptoms [4]. The ultrasound images; Visual Analogue Scale (VAS) score for pain; Korean version of the disabilities of arm, shoulder, and hand (K-DASH) score [13]; Korean version of the patient-rated wrist evaluation (K-PRWE) score [14]; and recurrences as assessed by telephone calls were also evaluated.

All statistical analyses were performed using R- 3.5.2 for Windows. Continuous variables are expressed as means  $\pm$  standard deviations (SDs). Changes in the cyst diameter, VAS scores

for pain, and questionnaire scores between the first and last visit were evaluated using paired t-tests.

## RESULTS

Among the 31 patients, 20 who met the eligibility criteria were included in this study. The clinical characteristics of the eligible patients are summarized in **Table 1**. The mean duration of treatment was  $37.2 \pm 41.01$  (median: 22) days and the number of treatment sessions was  $3.95 \pm 1.67$  (median: 4).

The cyst diameter significantly decreased from  $13.61 \pm 6.41$  mm to  $5.15 \pm 6.18$  mm ( $p < 0.001$ ) at the last visit after treat-

**Table 1.** Clinical characteristics of 20 patients with ganglion cysts

Sex (M/F)	9/11
Lesion site	
Wrist	18
Ankle	2
Consistency of the lesion	
Hard	7
Soft	2
Not assessed	11
Treatment periods (days)	$37.2 \pm 41.01$

**Table 2.** Assessment of outcome measures

Variables	Sample	Before treatment	After treatment	Mean difference (95% CI)	p-value
Cyst diameter cyst (mm)	20	$13.61 \pm 6.41$	$5.15 \pm 6.18$	8.46 (6.25-10.66)	< 0.001
VAS for pain	20	$1.31 \pm 1.77$	$0.41 \pm 0.33$	0.90 (0.15-1.66)	0.021
K-DASH score	17	$8.97 \pm 12.66$	$2.21 \pm 7.39$	6.76 (1.45-12.08)	0.016
K-PRWE score	15	$11.37 \pm 4.48$	$9.1 \pm 3.67$	2.27 (0.05-4.48)	0.046

VAS, visual analog scale; ROM, range of motion; K-DASH, Korean version of the disabilities of arm, shoulder and hand (K-DASH); K-PRWE, Korean version of the patient-rated wrist evaluation.

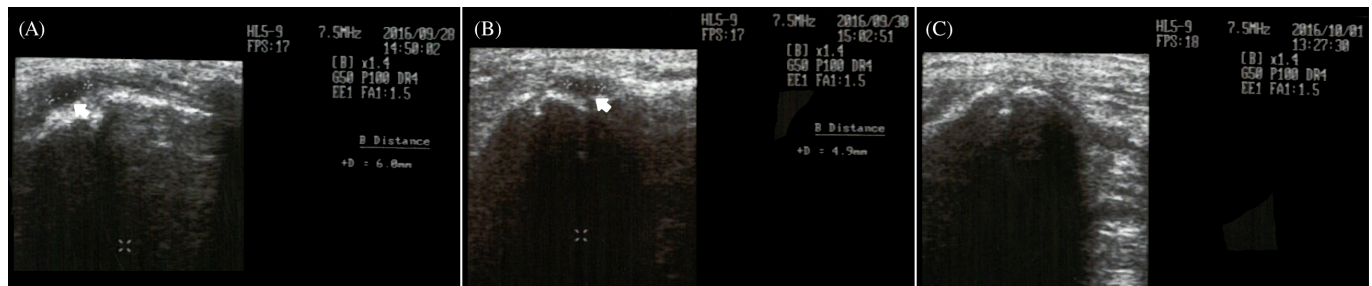
ment; the mean difference in size was 8.46 mm (95% confidence interval [CI]: 6.25-10.66 mm; **Table 2**).

The pain VAS scores significantly reduced from  $1.31 \pm 1.77$  to  $0.41 \pm 0.33$  mm ( $p = 0.021$ ) after the last visit for treatment and symptom questionnaire scores showed significantly decreased scales as well in both the K-DASH and K-PRWE; the K-DASH score decreased from  $8.97 \pm 12.66$  to  $2.21 \pm 7.39$  with mean difference of 6.76 ( $p = 0.016$ ; 95% CI: 1.45-12.08 mm; **Table 2**), and the K-PRWE score decreased from  $11.37 \pm 4.48$  to  $9.1 \pm 3.67$  ( $p = 0.046$ ; 95% CI: 0.05-4.48 mm; **Table 2**).

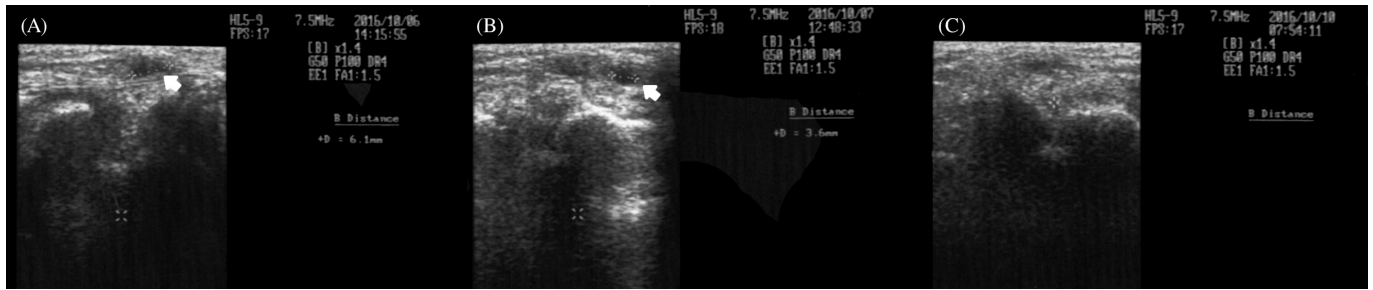
Gross and ultrasound findings before and after treatment for two representative patients are shown in **Fig. 1** and **2**. No recurrences were reported during the follow-up period, except for eight patients who were not accessible. The median follow-up period was  $13 \pm 39.01$  days. Four patients experienced mild local adverse events at the site of injection. Two patients developed rash, one developed itching, and one developed a swelling. The swelling diminished within 1 day, while itching resolved after 19 days. The rash disappeared after 12 days in one patient and 10 days in the other.

## DISCUSSION

This study was conducted to verify the effectiveness of SP



**Figure 1.** Ultrasound image before and after treatment for Case 1. The patient received an injection of 0.5 mL of *Scolopendra* pharmacopuncture solution in the ganglion cyst. (A-C) Changes in the ultrasound findings (white arrows). The diameter decreased from 6 mm before treatment to 4.9 mm on the day after treatment, and the cyst disappeared at 4 days after treatment.



**Figure 2.** Ultrasound image before and after treatment for Case 2. The patient received an injection of 0.5 mL of *Scolopendra* pharmacopuncture solution in the ganglion cyst. (A-C) Changes in the ultrasound findings (white arrows). The diameter decreased from 6.1 mm before treatment to 3.6 mm on the day after treatment, and the cyst disappeared at 4 days after treatment.

combined with electroacupuncture for ganglion cysts. All patients showed improvement of ganglion cysts with no recurrence and a low complication rate. The size of the ganglion cysts exhibited a significant decrease after treatment with SP combined with electroacupuncture. The severity of pain decreased after treatment. Moreover, recurrence was not observed in any of the patients.

According to a systematic review [1], open surgical excision has a mean recurrence rate of 21%, while aspiration has a recurrence rate of 59%. Hence, SP combined with electroacupuncture may be more useful than aspiration and surgical excision in the treatment of ganglion cysts. Even though the incidence of adverse events in the present study was approximately 20%, the events were mild, including mild rash, itching, and swelling at the injection site that resolved within a few days. The adverse events in treatment with SP combined with electroacupuncture are milder than those observed with aspiration and surgical excision, which can include nerve injury, artery laceration, persistent pain, and limitation of function [15].

Ganglion cyst is categorized as a phlegm nodule in Korean Medicine. It is thought to be formed by a combination of phlegm and static blood under the conditions of phlegm dampness; i.e., stagnant blood cannot flow for a long time [16]. *Scolopendra* is considered to dispel wind to free the collateral vessels, settle convulsive disease, relieve pain, and detoxify [11]. SP is expected to show complex effects that include the pharmacological action of *Scolopendras* and the effect of physical stimulation of the meridian point; hence, it has been used for treating joint pain and nerve entrapment syndrome [11, 17]. In a previous study [18], SP improved sciatic functional index in walking tract analysis and suppressed the pain severity in sciatic crushed nerve injury in rats. It suppressed COX-2 and TNF- $\alpha$  expression and enhanced the neurofilament expression in sci-

atic crushed nerve injury. The findings of this study suggest the effectiveness of SP in the treatment of ganglion cysts.

Electroacupuncture may be beneficial in the treatment of ganglion cyst of the wrist, but only case series have been conducted to assess its efficacy [3, 7, 8]. Electroacupuncture blocks pain by activating a variety of bioactive chemicals through peripheral, spinal, and supraspinal mechanisms. These include opioids, which desensitize peripheral nociceptors and reduce proinflammatory cytokines peripherally and in the spinal cord; and serotonin and norepinephrine, which decrease spinal N-methyl-d-aspartate receptor subunit GluN1 phosphorylation [19].

Several limitations could have led to potential bias in our study. The sample size was small, and combined therapies were used. It is difficult to determine which therapy provided the greatest contribution. However, considering the difficulties in conducting clinical trials on pharmacopuncture, the effectiveness of SP and electroacupuncture was established by retrospective chart review. Within the above-mentioned limitations, this study suggests that SP combined with electroacupuncture can not only reduce the size of the ganglion cysts and accompanying pain, but also ameliorate functional and psychological deterioration, with a low complication rate. Further studies with large samples reflecting various types of lesions are necessary to confirm our results.

## CONCLUSION

This study verified that combination treatment of SP and electroacupuncture may be effective in treating ganglion cysts, by reducing the size of cysts, severity of pain and related symptoms.

However, the small number of included cases and combined

other therapies remain a limitation of this study. Further prospective studies with large population are needed to clarify the effect of SP and electroacupuncture.

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## CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

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