



Original Article

Effect of Traditional Korean Medicine Treatment Including Acupotomy on the Level of Pain and Quality of Life of Patients with Cervical Herniated Intervertebral Disc: A Retrospective Observational Study



Beom Seok Kim, Ki Jung Sung, Ye Ji Lee, Ju Hyun Jeon, Young Il Kim*

Department of Acupuncture and Moxibustion Medicine, College of Korean Medicine, Daejeon University, Daejeon, Korea

ABSTRACT

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Background: The purpose of this study was to statistically analyze the treatment effect and patient satisfaction of traditional Korean medicine, including acupotomy treatment of cervical herniated intervertebral disc.

Methods: This was a retrospective study of 22 patients who received traditional Korean medicine including acupotomy treatment amongst all patients diagnosed with cervical herniated intervertebral discs at the Korean Medicine hospital in Daejeon, Korea, from January 01, 2020 to April 30, 2021. The clinical data from patient medical records were statistically analyzed.

Results: The Numeric Rating Scale, the European Quality of Life 5 Dimensions, and the European Quality of Life Visual Analogue Scale questionnaire scores were each compared before and after traditional Korean medicine treatment, including acupotomy, showed significantly improved scores after treatment ($p < 0.001$). Out of a total of 22 patients, 11 rated the treatment “very satisfactory” (50%), 5 “satisfactory” (22.7%), 5 “indifferent” (22.7%), 1 “unsatisfactory” (4.5%), and 0 “very unsatisfactory” (0%). Of the total 22 patients, 17 patients (77.3%) were willing to have further treatment, and 5 patients (22.7%) were not willing.

Conclusion: Traditional Korean medicine treatment including acupotomy was an effective treatment for cervical herniated intervertebral discs. To determine the effect of an individual application (e.g., acupotomy) of traditional Korean medicine treatment for cervical herniated intervertebral disc, a prospective, controlled study is needed.

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Introduction

Cervical herniated intervertebral disc (CHID) manifests as various clinical symptoms. It is caused by herniation of the nucleus pulposus (which is due to degeneration of the cervical disc and rupture of the fibrous ring), causing pressure on the dura mater, and the nerve root [1]. Globally, since 2010, the most common musculoskeletal disorder has involved the cervical and lumbar discs [2]. CHID can be diagnosed using computed tomography and magnetic resonance imaging [1] and shows how symptoms such as pain and stiffness on the cervical spine, pain on the medial part of the scapula, precordial pain, pain and weakness of the upper limb, and hypoesthesia of the fingers may have arisen [3].

Acupotomy is a relatively novel acupuncture therapy which

combines acupuncture and moxibustion theory of Korean medicine with surgical therapy of conventional Western medicine. It is a therapy that practices synectomy, incision, and removal of soft tissue to treat painful conditions/diseases which have caused damage to the soft tissue [4]. The advantage of acupotomy is that it is highly effective at treating the symptoms of chronic conditions/diseases which have caused adhesion [5] and is simple to manipulate with minimal tissue damage, and treatment sessions are brief, and the period of treatment for the symptoms is typically short [4], making it an appropriate treatment method for people today with busy lives.

However, studies on herniated disc where acupotomy has been applied, are typically concentrated on lumbar herniated intervertebral disc, and studies on CHID are typically case reports

*Corresponding author. Young Il Kim

Department of Acupuncture and Moxibustion Medicine, College of Korean Medicine, 75, Daedeok-daero, 176, Beon-gil, Seo-gu, Daejeon, Korea

Email: omdkim01@dju.kr

ORCID: Beom Seok Kim <https://orcid.org/0000-0001-9572-288X>, Ki Jung Sung <https://orcid.org/0000-0001-8440-1191>, Ye Ji Lee <https://orcid.org/0000-0002-2759-5644>, Ju Hyun Jeon <https://orcid.org/0000-0001-6666-7922>, Young Il Kim <https://orcid.org/0000-0001-9221-3238>

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[6,7] where statistical analysis of the effect of acupotomy on CHID is not possible. Hence, we aim to report the statistical analysis of the treatment effect and satisfaction of patients who were hospitalized and received Korean medicine treatment, including acupotomy therapy, after being diagnosed with CHID at the Daejeon University Korean Medicine hospital, Department of Acupuncture and Moxibustion, in Korea from January 1, 2020 to April 30, 2021.

Materials and Methods

Design

This study was a retrospective analysis of the medical records of patients who were hospitalized and received Korean medicine treatment including acupotomy therapy after being diagnosed with CHID at Daejeon University Korean Medicine hospital, Department of Acupuncture and Moxibustion, in Korea from January 1, 2020 to April 30, 2021.

Patients

There were 24 patients who were hospitalized with CHID and received Korean medicine treatment including acupotomy therapy. Among them, 22 patients were selected for this study: there were 2 patients excluded as they had no record of computed tomography and magnetic resonance imaging. The sex, age, disc herniation stage, existence of radiating pain, duration of illness, hospitalization period, number of acupotomy sessions, Numeric Rating Scale (NRS), European Quality of Life 5 Dimensions (EQ-5D), European Quality of Life Visual Analogue Scale (EQ-VAS), satisfaction, and willingness for further treatment were recorded. The duration of illness was classified as “acute” if the patient experienced symptoms less than 4 weeks to the 1st treatment, “subacute” 4 to 12 weeks, and “chronic” if more than 12 weeks to the 1st treatment [8].

Ethics statement

This study was approved by the Institutional Review Board of Daejeon University Korean medicine hospital for its study design (Approval no.: DJDSKH-21-E-20).

Interventions

The Korean medicine treatments that the patients of this study received were acupotomy, acupuncture, moxibustion, herbal medicine, and physical therapy.

Acupotomy

Acupotomy was performed by Korean medicine doctors (with more than 10 years of experience in practicing acupotomy), on Mondays, Wednesdays, and Fridays during the hospitalization period. The theory of the study, adverse events of the treatments, and the effect of acupotomy therapy was explained in detail to the patients before the treatment, and written informed consent was given (Appendix A).

Disposable acupotomy needles (DongBang Corp., Sunnam, Korea) 0.75 × 80 mm were used, and the needle was inserted parallel to the blood vessels and nerves, at a depth of 5-10 mm on GB20, GB21, BL10, EX-HN15, where the needle was rotated, and removed (Fig. 1.)

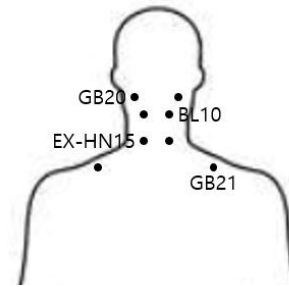


Fig. 1. Acupotomy points.

Acupuncture

Acupuncture treatment was performed once on the days acupotomy therapy was administered (before the acupotomy session), and twice (mornings and afternoons) when acupotomy sessions were not administered. The needles (DongBang Corp., Sunnam, Korea) used were disposable, sterilized, stainless steel, sized 0.25 × 30 mm, and the acupuncture points that were used were GB20, GB21, BL10, and EX-HN15.

Moxibustion

Moxibustion treatment was performed once per day. Electric moxibustion (Technoscience Corp, Seoul, Korea) was used on GB20, GB21, BL10, and EX-HN15.

Herbal medicine

Different herbal medicines were prescribed according to the patient's symptoms (Table 1).

Physical therapy

Deep thermal therapy using microwaves was performed daily for 15 minutes on the cervical spine area.

Assessment methods

To assess the level of pain, the NRS score was recorded at admission and after discharge [9], and to evaluate the quality of life, EQ-5D and EQ-VAS were examined separately at admission and after discharge. The EQ-5D is composed of 5 multiple choice questions, to be answered as “not at all problematic,” “quite problematic,” or “seriously problematic.” The answers of each question were weighted and calculated as the EQ-5D index. The equation for the EQ-5D index is as follows.

$$\text{EQ-5D index} = 1 - (0.050 + 0.096 \times M2 + 0.418 \times M3 + 0.046 \times \text{SC2} + 0.136 \times \text{SC3} + 0.051 \times \text{UA2} + 0.208 \times \text{UA3} + 0.037 \times \text{PD2} + 0.151 \times \text{PD3} + 0.043 \times \text{AD2} + 0.158 \times \text{AD3} + 0.050 \times \text{N3});$$

$$\text{If } LQ_1\text{EQL} = 1 \ \& \ LQ_2\text{EQL} = 1 \ \& \ LQ_3\text{EQL} = 1 \ \& \ LQ_4\text{EQL} \ \& \ LQ_5\text{EQL} = 1 \ \text{then } \text{EQ5D} = 1$$

The EQ-5D index score was within the range of -0.171-1, and the score was proportional to the quality of life [10] (Appendix B). The EQ-VAS is a visual analogue scale examining the quality of life, and the patients express their subjective state of health on a scale of 0-100 [11] (Appendix C).

The treatment effect was also analyzed by considering the stage

Table 1. Herbal Medicine Prescriptions.

| Patients (sex, years) | Herbal medicine prescription (days) |
|-----------------------|--|
| P1 (F, 49) | Samuleajin-tang (19) |
| P2 (M, 42) | Oyaksungi-san (6) |
| P3 (M, 64) | Hoesu-san (4) |
| P4 (F, 55) | Hoesu-san (27) |
| P5 (F, 43) | Samuleajin-tang (4) |
| P6 (F, 61) | Ssanghwa-tang (4) - > Guibisoyo-san (7) - > Yukwool-tang (22) |
| P7 (F, 56) | Dokwhalsokdan-tang (14) - > Boyanghwano-tang (11) |
| P8 (F, 59) | Hangkihyangso-san (17) |
| P9 (M, 38) | Oyaksungi-san (13) |
| P10 (M, 55) | Hoesu-san (3) |
| P11 (F, 39) | Gigukyanghyeol-tang (4) |
| P12 (F, 55) | Ojeok-san (8) - > Buyangjowi-tang (5) |
| P13 (M, 51) | Ssanghwa-tang (7) |
| P14 (F, 70) | Ikgibohyeol-tang (36) |
| P15 (M, 51) | Dokwhalsokdan-tang (17) - > Gaegyeolseogyong-tang (2) |
| P16 (F, 55) | Samuleajin-tang (7) - > Sungihwalhyeol-tang (14) - > Dokwhalsokdan-tang (11) |
| P17 (F, 42) | Sihogyoji-tang (4) |
| P18 (F, 49) | Seungseup-tang (21) |
| P19 (M, 40) | Oyaksungi-san (4) |
| P20 (F, 63) | Cheonwangbosim-dan (17) - > Sinchul-san (16) |
| P21 (M, 46) | Jakyakgamcho-tang (6) |
| P22 (F, 50) | Ugui-eum (3) |

of disc herniation, existence of radiating pain, stage of disease, and the number of acupotomy treatments patients received.

The evaluation of treatment satisfaction was performed after the patient was discharged using a Likert scale [12], where 1 point was given if the treatment was “very unsatisfactory,” 2 points for “unsatisfactory,” 3 points for “indifferent,” 4 points for “satisfactory,” and 5 points were given if the treatment was “very satisfactory.” Willingness for further treatment was surveyed using either “yes” or “no.”

Statistical analysis

The data were analyzed using IBM SPSS Version 23.0, and the normality test was performed using the Shapiro–Wilk test.

However, since the data did not satisfy normality, the significance of the treatment effect was tested using the Wilcoxon’s signed-rank test. The significance level for the statistical analysis was a $p < 0.05$, and the measurements were shown as the average \pm SD.

Results

Descriptive statistics

The sex, age, stage of disc herniation, existence of radiating pain, and stage of disease were collected from medical records. The average duration of hospitalization was 15.13 ± 11.32 days, and number of acupotomy treatments which was recorded after the course of treatment had ended was 5.90 ± 4.81 (Table 2).

Table 2. Frequency Analysis and Descriptive Statistics of Demographic and Disease Characteristics.

| Variables | N | % | |
|-----------------------------|---------------|----|---------------|
| Sex | Male | 8 | 36.4 |
| | Female | 14 | 63.6 |
| Age (y) | 1-39 | 2 | 9.1 |
| | 40-49 | 7 | 31.8 |
| | 50-59 | 9 | 40.9 |
| | 60- | 4 | 18.2 |
| | Mean ± SD | | 52 ± 8.57 |
| Stage of disc herniation | Bulging | 10 | 45.5 |
| | Protrusion | 10 | 45.5 |
| | Extrusion | 1 | 4.5 |
| | Sequestration | 1 | 4.5 |
| Radiating pain | Yes | 17 | 77.3 |
| | No | 5 | 22.7 |
| Stage of disease | Acute | 4 | 18.2 |
| | Subacute | 4 | 18.2 |
| | Chronic | 14 | 63.6 |
| Duration of admission (d) | 1-9 | 10 | 45.5 |
| | 10-19 | 5 | 22.7 |
| | 20-29 | 3 | 13.6 |
| | 30- | 4 | 18.2 |
| | Mean ± SD | | 15.13 ± 11.32 |
| No. of acupotomy treatments | 1-4 | 11 | 50.0 |
| | 5- | 11 | 50.0 |
| | Mean ± SD | | 5.90 ± 4.81 |

SD: Standard Deviation.

Changes in the level of pain and quality of life after treatment

Comparing scores before and after traditional Korean medicine treatment including acupotomy, and using the NRS, EQ-5D, and EQ-VAS, all scores significantly improved after treatment ($p < 0.001$; Table 3). According to the stage of disc herniation, the NRS score, decreased significantly after treatment in patients with bulging discs ($p = 0.007$) and disc protrusion ($p = 0.011$), whilst the EQ-5D increased significantly in patients with bulging ($p = 0.012$) and protruding ($p = 0.012$) discs, and the EQ-VAS increased significantly in bulging ($p = 0.007$) and protruding ($p = 0.007$) discs. However, patients in the extrusion and sequestration stages of disc herniation could not be statistically analyzed because there was only 1 patient in each group.

The NRS score when comparing before and after treatment, according to the existence of radiating pain, decreased significantly in both patients with radiating pain ($p = 0.001$) and without radiating pain ($p = 0.042$), whilst the EQ-5D increased significantly in both patients with ($p = 0.002$) and without ($p = 0.042$) radiating pain, and the EQ-VAS increased significantly in both patients with ($p = 0.001$) and without ($p = 0.042$) radiating pain.

The NRS score when comparing before and after treatment, according to stage of disease, decreased significantly in both patients in the acute, subacute-stage ($p = 0.026$) and chronic-stage ($p = 0.001$), whilst the EQ-5D increased significantly in both patients in the acute, subacute-stage ($p = 0.028$) and chronic-stage ($p = 0.003$), and the EQ-VAS increased significantly in both patients in the acute, subacute-stage ($p = 0.017$) and chronic-stage ($p = 0.002$).

The NRS score when comparing before and after treatment, according to the number of acupotomy treatments, decreased significantly in patients who were treated 1-4 times ($p = 0.011$) or more than 5 times ($p = 0.003$), whilst the EQ-5D increased significantly in patients who were treated 1-4 times ($p = 0.017$) or more than 5 times ($p = 0.005$), and the EQ-VAS increased significantly in patients who were treated 1-4 times ($p = 0.008$) or more than 5 times ($p = 0.004$; Table 4).

Satisfaction

Out of a total of 22 people who were surveyed about the level of satisfaction they felt regarding their treatment, 11 were “very satisfactory” (50%), 5 “satisfactory” (22.7%), 5 “indifferent” (22.7%), 1 “unsatisfactory” (4.5%), and no “very unsatisfactory” responses (0%; Table 5).

Table 3. Changes in NRS, EQ-5D, and VAS Scores Before and After Treatment.

| Scores | Before treatment | After treatment | Improvement | Z* (p) |
|--------|------------------|-----------------|---------------|---------------------------|
| NRS | 4.55 ± 1.37 | 2.23 ± 1.51 | 2.31 ± 1.52 | -3.848 ($p < 0.001$) |
| EQ-5D | 0.81 ± 0.08 | 0.90 ± 0.05 | 0.09 ± 0.07 | -3.641 ($p < 0.001$) |
| EQ-VAS | 43.86 ± 7.38 | 64.55 ± 14.38 | 20.68 ± 13.82 | -3.849 ($p < 0.001$) |

* Wilcoxon's signed-rank test was used to perform statistical analysis.

EQ-5D, EuroQol 5 Dimensions; EQ-VAS, EuroQol visual analogue scale; NRS, numeral rating scale.

Table 4. Changes in NRS and EQ-5D scores Before and After Treatment According to CHID Treatment Variables.

| Variables | NRS score | | | EQ-5D score | | | EQ-VAS score | | | |
|-----------------------------|--------------------|-----------------|-------------|------------------|-----------------|-------------|------------------|-----------------|---------------|-----------------|
| | Before treatment | After treatment | Z (p) | Before treatment | After treatment | Z (p) | Before treatment | After treatment | Z (p) | |
| Stage of disc herniation | Bulging | 4.20 ± 0.63 | 1.60 ± 0.97 | -2.687 (0.007*) | 0.81 ± 0.09 | 0.91 ± 0.04 | -2.527 (0.012*) | 43.50 ± 5.80 | 70.50 ± 10.12 | -2.694 (0.007*) |
| | Protrusion | 4.90 ± 1.52 | 2.60 ± 1.43 | -2.530 (0.011*) | 0.81 ± 0.09 | 0.90 ± 0.07 | -2.524 (0.012*) | 44.50 ± 8.96 | 62.00 ± 16.36 | -2.680 (0.007*) |
| Radiating pain | Yes | 4.59 ± 1.46 | 2.41 ± 1.66 | -3.316 (0.001*) | 0.82 ± 0.08 | 0.90 ± 0.06 | -3.066 (0.002*) | 44.71 ± 7.80 | 64.71 ± 15.76 | -3.326 (0.001*) |
| | No | 4.40 ± 1.14 | 1.60 ± 0.55 | -2.032 (0.042*) | 0.78 ± 0.10 | 0.90 ± 0.05 | -2.032 (0.042*) | 41.00 ± 5.48 | 64.00 ± 9.62 | -2.032 (0.042*) |
| Stage of disease | Acute and Subacute | 5.00 ± 1.41 | 3.13 ± 2.17 | -2.232 (0.026*) | 0.82 ± 0.09 | 0.90 ± 0.08 | -2.201 (0.028*) | 43.75 ± 8.76 | 61.25 ± 17.47 | -2.388 (0.017*) |
| | Chronic | 4.29 ± 1.33 | 1.71 ± 0.61 | -3.198 (0.001*) | 0.81 ± 0.09 | 0.91 ± 0.03 | -2.952 (0.003*) | 43.93 ± 6.84 | 66.43 ± 12.62 | -3.078 (0.002*) |
| No. of Acupotomy treatments | 1-4 | 4.73 ± 1.56 | 3.00 ± 1.79 | -2.536 (0.011*) | 0.82 ± 0.09 | 0.89 ± 0.06 | -2.384 (0.017*) | 45.00 ± 8.66 | 60.45 ± 16.50 | -2.673 (0.008*) |
| | 5- | 4.36 ± 1.21 | 1.45 ± 0.52 | -2.965 (0.003*) | 0.80 ± 0.09 | 0.92 ± 0.04 | -2.810 (0.005*) | 42.73 ± 6.07 | 68.64 ± 11.20 | -2.871 (0.004*) |

* Significant p value, Wilcoxon's signed-rank test was used to perform statistical analysis. EQ-5D, EuroQol 5 Dimensions; EQ-VAS, EuroQol visual analogue scale; NRS, numeral rating scale.

Table 5. Frequency Analysis and Descriptive Statistics of Patient Satisfaction with the Korean Medicine Treatment Received.

| Level of satisfaction (n) | N | % |
|---------------------------|----|------|
| Very unsatisfactory (1) | 0 | 0 |
| Unsatisfactory (2) | 1 | 4.5 |
| Indifferent (3) | 5 | 22.7 |
| Satisfactory (4) | 5 | 22.7 |
| Very satisfactory (5) | 11 | 50.0 |

Table 6. Frequency Analysis and Descriptive Statistics of Patient Willingness to Receive Further Treatment.

| Variable | N | % | |
|-----------------------------------|-----|----|------|
| Willingness for further treatment | Yes | 17 | 77.3 |
| | No | 5 | 22.7 |

Of the 22 patients, there were 17 patients (77.3%) who were willing to receive further treatment, and 5 patients (22.7%) who were not willing to receive further treatment (Table 6).

Discussion

CHID, is a common cause of cervical pain, and its diagnosis has become straightforward with the advances in imaging tools.

Generally, conservative treatments such as oral medication or physical therapy are primarily provided, and in most cases improvements in symptoms are observed, but when conservative treatments are not effective, surgical treatment is necessary [13]. It has been reported that 5-10% of cases of CHID indicate surgical intervention [14]. One study reported that most surgeons take cases of CHID as an indication for surgery [15]. There are cases of CHID where the symptoms of CHID do not improve, or reappear after surgery (failed back surgery syndrome) [16].

Non-surgical treatment of CHID is effective and economical. Therefore, as a non-surgical, conservative treatment, Korean medicine including acupuncture, moxibustion, pharmacopuncture, thread-embedding therapy, chuna, and herbal medicine, is widely used. Amongst the traditional medicine treatments, it has been reported that acupuncture is a preferred treatment for low back pain. In 2012, in a review of 7 randomized studies of acupuncture treatment for low back pain, it was reported that acupuncture was better than no treatment [17], and recently in 2017, the global use of acupuncture treatment for low back pain over the last 20 years was reviewed and showed increasing interest in the practice of acupuncture, particularly in the USA [18].

Acupotomy is a relatively novel form of acupuncture methodology which combines acupuncture therapy with a scalpel needle to eliminate chronic lesions in soft tissue [4]. Acupotomy therapy is simpler than Western medicine surgery, therefore, is a good alternative for patients who do not show improvement using medication or other conservative treatments, and who are opposed to surgery [1]. However, studies using acupotomy treatment for herniated discs are mostly focused on lumbar herniated intervertebral disc, and there are no studies with statistical analysis of the effect of acupotomy treatment of CHID that have been published. Hence, this study aimed to identify the significance and treatment effect by statistically analyzing the sociodemographic characteristics, treatment effect, and satisfaction of patients who

were diagnosed with CHID and hospitalized to receive traditional Korean medicine treatment including acupotomy.

The patients in this study were diverse in sex, age, stage of disc herniation, existence of radiating pain, and stage of disease, and the study was inclusive of most clinical cases of CHID in the field. Amongst them, female patients in their 50's were the most common, and the stage of disc herniation were mostly in the bulging and protrusion stages. Radiating pain existed in 77.3% of patients, and most patients were in the chronic stage of CHID. The number of acupotomy treatments varied between patients, with an average of 5.90 ± 4.81 sessions of acupotomy therapy.

Comparing the NRS, EQ-5D, and EQ-VAS scores before and after treatment, statistical analysis using Wilcoxon's signed-rank test, showed that all treatment variables had a significant improvement after treatment. In addition, to test the significance of the treatment effect according to the stage of disc herniation, existence of radiating pain, and the stage of disease, Wilcoxon's signed-rank test was performed. As a result, it was determined that both bulging and protrusion stages of disc herniation responded well to treatment and showed significant therapeutic effects, suggesting that traditional Korean medicine including acupotomy treatment was effective in a patient group which most commonly presents in the medical field. In addition, it was observed that there was a significant therapeutic effect regardless of the existence of radiating pain. Radiating pain is common when CHID is diagnosed. Traditional Korean medicine treatment including acupotomy had a significant effect on the reduction of pain and improvement in the quality of life in the group of patients who complained of neck pain without radiating pain. In "acute" and "subacute," and "chronic" stages of CHID, significant therapeutic effects were observed. This showed that traditional Korean medicine including acupotomy treatment were effective, regardless of the stage of disease, at reducing the level of pain and improving the quality of life in patients with CHID. In addition, the Wilcoxon's signed-rank test was performed to compare the patients with less than 5 acupotomy treatments with those who had more than 5 treatments. As a result, it was determined that there was a significant therapeutic effect in both groups. This shows that a relatively small number of acupotomy treatments are effective.

In the evaluation of patient satisfaction, the ratio of patients who were satisfied amongst the total number of patients, was high (77.7%), and the willingness for further treatment also rated highly (77.3%). This may be due to the fact that acupotomy is simple, quick and relatively painless.

This retrospective study was different to the case reports in this field of research [6,7], because the number of patients in this study and range of patients with CHID allowed for statistical analysis. However, this study was based on data recovered from medical records, and the confidence level of the results determined was not high. This study was also limited because it was composed of a subjective patient survey as the index for evaluating the treatment effect and quality of life. In addition, there was a relatively small number of participants for this type of study, as well as being a retrospective study. In the future, randomized controlled trials or studies comparing the treatment effect, and quality of life of an individual therapy such as acupotomy treatment for CHID, are warranted.

Conclusion

In this study, the treatment effect of patients who received traditional Korean medicine including acupotomy treatment was statistically significantly effective at decreasing the pain, and elevating the quality of life of patients with CHID. The satisfaction and willingness of patients to receive further treatment also gained positive responses.

Conflicts of Interest

The authors have no conflicts of interest to declare.

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