

Integrative Korean medicine as a possible conservative treatment for mild cervical spondylotic myelopathy

One-year follow-up case report (CARE-compliant)

Jisu Kim, KMD, MS^a, Jungjae Cho, KMD, MS^b, Dongwoo Nam, KMD, PhD^c, Jung Won Kang, KMD, PhD^c, Seunghoon Lee, KMD, PhD^{c,*}

Abstract

Rationale: Cervical spondylotic myelopathy (CSM) is the most common spinal cord disorder in older patients. The purpose of this case report is to introduce conservative treatment with integrative Korean medicine (KM) as a possible alternative to surgery in patients with mild CSM.

Patient concerns: An 81-year-old male with both hand weakness and dysesthesia was diagnosed with CSM and was recommended laminectomy. However, considering the patient's age and the underlying disease, he refused immediate surgery and preferred KM treatment

Diagnoses: The diagnosis of mild CSM was based on a modified Japanese Orthopedic Association (mJOA) score as well as the presence of compression on the spinal cord in magnetic resonance imaging findings

Interventions: Integrative KM treatment consisting of acupuncture, acupotomy, Bee venom herbal acupuncture, cupping therapy, moxibustion, and herbal medicine was provided during the 12-week admission.

Outcomes: Clinical improvement was detected with a mJOA score (11 to 17), a numerical rating scale for dysesthesia intensity (5 to 2), finger escape sign (+/+ to +/-), grip and release test (11/14 to 32/31) and grasp power measured by dynamometer (3.1/9.7 to 10.8/18.3kg) at 12 weeks. This improvement was maintained without surgery until 1 year.

Lessons: This case suggests that integrative KM was a possible conservative management option for mild CSM.

Abbreviations: CSM = cervical spondylotic myelopathy, HVD = herniation of intervertebral disc, KM = Korean medicine, mJOA = modified Japanese Orthopedic Association, MRI = magnetic resonance imaging, NRS = numeric rating scale.

Keywords: case report, cervical spondylotic myelopathy, conservative treatment, Korean medicine treatment, 1-year follow-up

1. Introduction

Cervical spondylotic myelopathy (CSM) describes a functional disturbance triggered by progressive spinal cord compression

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^a Department of Biofunctional Medicine and Diagnostics, ^b Department of Acupuncture and Moxibustion Medicine, Graduate School, ^c Department of Acupuncture and Moxibustion Medicine, College of Korean Medicine, Kyung Hee University, Seoul, South Korea.

* Correspondence: Seunghoon Lee, Department of Acupuncture and Moxibustion Medicine, College of Korean Medicine, Kyung Hee University, Seoul 02447, South Korea (e-mail: kmdoctorlee@gmail.com).

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with degenerative changes within the cervical spinal column.^[1] CSM is related to advancing age, and the annual incidence of patients with CSM treated surgically is 1.6 per 100,000 inhabitants.^[2] However, the actual incidence and prevalence of the disease remain unclear.^[2] Moderate strength evidence associated with the natural history of CSM suggests that 20% to 60% of patients will deteriorate neurologically eventually without surgical intervention.^[3] Surgery is usually recommended for cases of moderate-to-severe CSM.^[4] However, surgery is a high-risk intervention for elderly patients with multiple underlying diseases. Postoperative complications include wound infection, C5 palsy, pseudo arthrosis, recurrent laryngeal nerve injury, dysphagia, esophageal injury, and vertebral artery injury.^[1] Therefore, conservative treatment is indicated as the first-line therapy for mild CSM patients without neurological deterioration, or for poor surgical candidates with careful clinical monitoring.^[5]

Despite several conservative options such as nonsteroid anti-inflammatory medications, physical therapy, and hard cervical collar, a gold standard primary treatment has not been established.^[6] Korean medicine (KM) has been used as a nonsurgical treatment option for mild CSM in South Korea,^[7–10] but reports of its effectiveness and safety are rare. Therefore, we present the 1-year follow-up case of a patient with mild CSM to illustrate the role of integrative KM treatment in

ameliorating the neurological deterioration and improving the clinical outcome.

2. Case report

2.1. Clinical features

An 81-year-old male, with cervical spinal stenosis and herniated intervertebral disk of the cervical spine, presented with both hand weakness and dysesthesia. He fell down from his sofa suddenly, and aggravated his hand weakness and dysesthesia, and occurred in addition to weakness associated with right lower extremities. The patient was hospitalized and diagnosed with mild CSM based on a modified Japanese Orthopedic Association (mJOA) score as well as the presence of compression on the spinal cord in magnetic resonance imaging (MRI) findings. He was recommended to undergo a posterior cervical laminectomy and fusion operation by a neurosurgeon in the university hospital. However, considering his age and underlying diseases such as hypertension, hyperlipidemia and angina pectoris, he refused immediate operation and preferred integrative KM treatment as a conservative treatment.

When he visited a Korean medical hospital in Seoul, he presented with hand weakness and was unable to perform fine movements including use of chopsticks and buttoning up of the shirt. Dysesthesia of his hand manifested as a tingling pain in the 4th and 5th fingers, and a dull pain on the lateral side of the 5th finger. He used a wheelchair for walking because of his right leg weakness (motor Grade IV+). The finger escape sign and grip and release tests were positive. He did not maintain his 4th and 5th finger adduction for several seconds or attach 5th finger to 4th finger of right hand with maximum power (Fig. 1A). He did grip and release under 10 times in 30 seconds. The MRI showed a focal compressive myelopathy at the C5-6 disk level of the spinal cord. A liver function test and other laboratory tests were normal. He also complained of severe constipation and used a laxative. This report just reviews a previous 1 case of observational data and did not involve any sensitive personal information; therefore, ethical approval was not necessary. Written informed consent was obtained from the patient for publication of this case.

2.2. Integrative Korean medicine

Integrative KM consisting of acupuncture, acupotomy, pharmacopuncture, cupping therapy, direct moxibustion, and herbal medicine was continued for the admission period (January 12, 2017 to April 1, 2017).

1. Acupuncture was conducted using disposable stainless steel 0.25×40 mm needles (DongBang Acupuncture Inc, Boryung,

South Korea) inserted on the EX-B2 at C3-C7 level, GB 21, SI14, and SI15, and 20 to 30 mm deep around the posterior cervical and the upper trapezius muscle and *Jeong-gen, Jeong-jong* with 10 mm depth around Achilles tendon once daily for 20 minutes. At the same time, electric stimulation (STN-111; Stratek, Anyang, South Korea) was applied to the EX-B2 at C3-C7 level with 4 Hz.

2. Acupotomy was administered to the posterior neck regions (EX-B2 at C3-C7 level bilaterally) using acupuncture needles 80 mm in length and a flat blade with 5 mm tip (DongBang Acupuncture Inc, Boryung, South Korea) twice weekly. The skin was sterilized with povidone iodine. The needle was inserted toward the facet joint. The blade tip of the needle was held parallel with an articular surface of the facet joint and handled up/down to incise adhesion around facet joint capsule.
3. After testing for allergic reactions to skin test, a single 0.5 cc dose of 1:30,000 bee venom was administered using a 1 cc disposable syringe (Hwajin medical 30 gauge; Hwajin Medical Co, Seoul, South Korea) in the posterior neck region, once daily. The dried bee venom 10 mg (Yoomil Garden, Hwasun, South Korea) was diluted with 300 cc (1:30,000) of saline (Joongwe Pharmaceuticals, Seoul, South Korea). The bee venom was prepared at the Korean medical pharmacy in the Kyung Hee University Korean Medical Hospital.
4. Dry and wet cupping (Hansol cupping apparatus; Hansol medical Co, Paju, South Korea) was administered on the posterior neck region and the upper trapezius muscle up to 6 points once a day for 5 minutes.
5. Direct moxibustion (Kang Hwa moxa powder; Ehwa dang, Seoul, South Korea) was performed 3 times at EX-UE9, SI3, SI4 about 15 minutes on both hands once daily.
6. Herbal decoctions mainly consisting of *Puerariae Radix*, *Scutellariae Radix*, *Platycodi Radix*, *Cimicifugae Rhizoma*, and *Angelicae Dahuricae Radix* were administered 3 times a day.

2.3. Clinical outcomes

During 12 weeks of KM treatment, a KM doctor evaluated mJOA, the finger escape sign, the grip and release test, a numeric rating scale (NRS) of dysesthesia at hand and grasp power using a dynamometer (Jamar Plus+; Sammons Preston, IL). The mJOA score increased from 11 to 17. The finger escape sign of the left hand (at 3 weeks of treatment) and right hand (at 1-year follow-up) disappeared (Fig. 1). The grip and release test number (11/14 to 32/31) and grasp power (3.1/9.7 to 10.8/18.3 kg) gradually increased. The NRS of dysesthesia of the hand decreased from 5 to 2 (Table 1).^[9-11] MRI of C-spine showed no aggravation of



Figure 1. Maximum adduction of fingers before and after Korean medicine treatment. (A: January 21, 2017, B: April 1, 2017, C: April 17, 2018).

Table 1
Clinical outcomes after integrative Korean medicine treatment.

	mJOA*	Finger escape sign		Grip and release test		NRS†	Grasp power measured by dynamometer‡	
		Rt	Lt	Rt	Lt		Rt (kg)	Lt (kg)
1/14	11	+	+	11	14	5	3.1	9.7
2/18	17	+	—	16	18	2	8.0	14.8
3/18	17	+	—	29	29	2	10.7	19.2
4/1	17	+	—	32	31	2	10.8	18.3
4/17§	19	—	—	31	33	1	18.2	19.3

* mJOA=Modified Japanese Orthopedic Association, cutoff value for mild CSM: 12.^[9,10]
 † Numeric rating scale (NRS) of dysesthesia at hand.
 ‡ Average of grasp power greater than 75 in male: right hand—28.0 kg; left hand—29.8 kg.^[11]
 § Next year, 1-y follow-up.

lesion compared with baseline MRI. He maintained similar KM treatment twice a month at an outpatient clinic after discharge. At 1-year follow-up, the improvement maintained with no functional disturbance and no surgical treatment planned. The timeline of diagnosis and outcomes was illustrated in Fig. 2. The KM treatment also improved his daily living conditions. For example, prior to KM, the patient had no bowel movement for 3 to 4 days until laxative treatment. However, treatment with KM improved his gastrointestinal health, and his bowel movements were regularized. During the integrative KM treatment, the Mini-Mental State Examination-Korean score evaluating the patient’s cognitive function increased from 22 to 24 and resulted in fluency.

No severe adverse effects were observed during the treatment period. However, minor bleeding occurred at the acupuncture site or herbal acupuncture injection sites, and mild diarrhea was observed following intake of herbal medicine.

2.4. Patient perspective

“My family and I had deep concerns about having surgery done on my neck, so I postponed the surgery as long as possible and opted to try conservative treatment instead. One day I was told that there was a Korean medicine treatment option and I decided to be hospitalized in a Korean medicine hospital with a vague hope. During the hospitalization,

I received various treatments from morning to sundown. I was very satisfied with how the symptoms gradually improved. I especially felt my constipation getting better and memory improving. One year after the inpatient treatment, there is still a little numbness in my right hand, but there is no problem with my daily life”.

3. Discussion

This report suggested that KM was a possible treatment option for mild CSM. The possible mechanism of integrative KM in CSM has not been well established. However, the mechanism was hypothesized based on previous studies investigating individual interventions.

An experimental study showed that acupuncture ameliorated spinal cord injury by suppressing the Notch signaling pathway and stimulating the proliferation of endogenous neural stem cells.^[12] A recent systematic review suggested that acupuncture was effective for functional recovery, bladder dysfunction, and pain in spinal cord injury.^[13] Bee venom herbal acupuncture showed anti-neuro inflammatory effects by reducing interleukin-6 levels, increasing interleukin-10 concentration, and inducing recovery by minimizing locomotor deficits in the rat model of spinal cord injury.^[14,15] Acupotomy, which is a procedure combined acupuncture and surgical knife, used to treat chronic soft tissue injury and bone hyperplasia with a bladed needle that

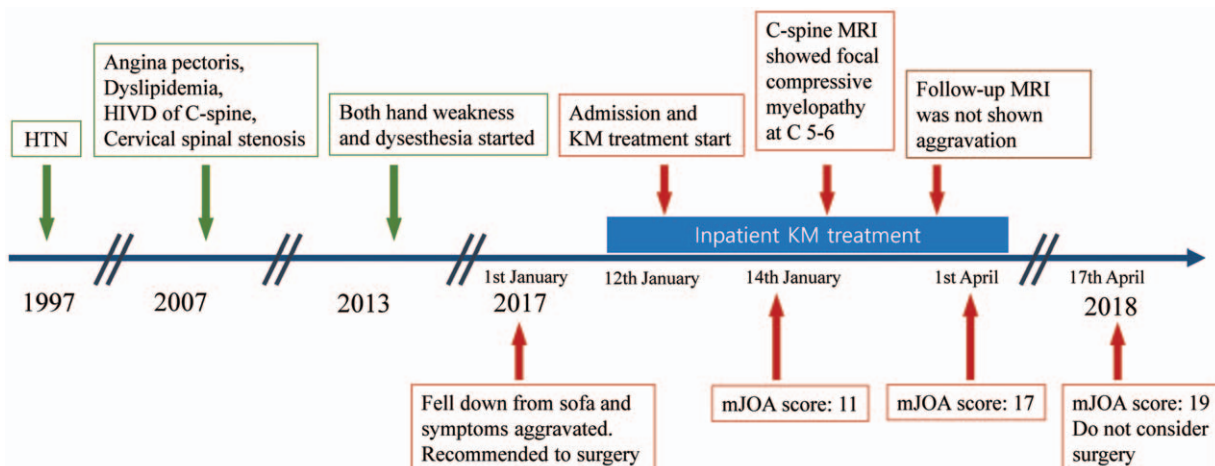


Figure 2. Timeline. HIVD of C-Spine=herniated intervertebral disk of cervical spine, HTN=hypertension, KM=Korean medicine, mJOA=modified Japanese orthopedic score, MRI=magnetic resonance imaging.

has a thick flat-head and a cylindrical body.^[16] It is usually combined with acupuncture for lumbosacral herniation of intervertebral disc (HIVD) and spinal stenosis.^[17] A meta-analysis of cervical spondylotic radiculopathy showed that the acupotomy was better than the manual acupuncture on clinical response rate.^[18] Cupping therapy increases blood circulation; it activates the immune system and stimulates the mechanosensitive fibers. It is frequently applied to the neck and for shoulder pain in KM.^[19] Direct moxibustion has been studied to elucidate its analgesic, immunostimulatory, and antiaging effects.^[20] A case has been reported in which direct moxibustion improved hand function of CSM.^[8] *Radix Puerariae* and *Scutellariae Radix* are major compounds in the herbal medicine named Galgeunhaegitang that was used in this case. *Radix Puerariae* is known to improve microcirculation, increase blood flow, prevent coronary artery disease, and lower hypertension.^[21] Herbal decoctions, consisting of *Radix puerariae* as a major compound, have been successfully used for the treatment of cervical spondylosis and cervicogenic headache.^[21] *Scutellariae Radix* has been known for its antiallergic, antioxidant, antiapoptotic, anti-inflammatory, and neuroprotective effects.^[22] In the rat model of spinal cord injury, *Scutellariae Radix* improved functional recovery by inhibiting inflammation and oxidative stress after injury.^[23] The components of KM may have a synergistic effect resulting in positive clinical outcomes.

Retrospective evaluation of CSM after surgery indicated that surgery should be considered in moderate-to-severe CSM patients, with a mJOA score below 11, with persistent spinal symptoms impairing activities of daily living, and immediate surgery is not warranted for mild CSM in the absence of neurological deterioration.^[24,25] A longitudinal study failed to reveal significant differences in clinical outcomes, such as mJOA score, timed 10-m walk and the score for daily activities recorded by video, between patients who were surgically treated and conservatively managed over a 36-month follow-up.^[26] Multivariate analysis revealed that the duration of initial conservative treatment did not affect the rate of improvement after surgery.^[5] Therefore, prompt and intensive conservative treatment is recommended for patients with mild CSM without neurological deterioration for clinical effectiveness.^[5] This patient was a good candidate for integrative KM treatment rather than immediate surgery because his mJOA score was mild and disease duration was short. He also had several underlying diseases such as angina pectoris, hypertension, and dyslipidemia.

The patient maintained his daily activities without any assistance and surgery during the 1-year follow-up. The integrative KM treatment also improved his general condition, such as constipation and mild cognitive impairment.

This case report has a few limitations. First, because the patient received a combination therapy, we could not determine the efficacy of the individual interventions included in the integrative KM treatment. Second, a longer follow-up period of more than 1 year would be needed to determine if the KM treatments could manage CSM without the need for surgery, because disease progression of mild CSM may manifest as a slow or stepwise decline. Third, we could not rule out the possibility of a natural history of disease progression for the observed effects of CSM without a control group. The natural history of CSM progression is known to be prolonged with long periods of quiescence.^[27]

Given the promising outcomes in our findings, integrative KM treatment could be a valuable option for patients with mild CSM who are reluctant to undergo surgery due to comorbidities. Further rigorous randomized studies with long follow-up period

and large sample size are warranted to confirm the effectiveness and safety of integrative KM treatment for mild CSM.

Author contributions

Conceptualization: Seunghoon Lee.

Data curation: Seunghoon Lee, Jungjae Cho.

Formal analysis: Seunghoon Lee, Dongwoo Nam.

Investigation: Jisu Kim, Seunghoon Lee, Dongwoo Nam.

Methodology: Jung Won Kang.

Supervision: Seunghoon Lee.

Writing – original draft: Jisu Kim, Seunghoon Lee.

Writing – review & editing: Jungjae Cho.

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