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Case Report

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Korean Medicine Treatments in Threepatients with Bell's Palsy after Coronavirus Disease 2019 Infection: A Retrospective Case Series

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Bell's palsy is an acute facial paralysis caused by peripheral facial nerve dysfunction. The aim of this study is to assess the efficacy of Korean medicine in the treatment of three patients who were hospitalized and diagnosed with Bell's palsy within 2 weeks of coronavirus disease 2019 (COVID-19) infection. The patients were administered with Korean medicine treatments, steroids, and antiviral drugs. Moreover, the Korean medicine treatments include acupuncture, pharmacopuncture, moxibustion, physical therapy, and herbal medicine. Symptom improvement was evaluated daily using the Yanagihara facial nerve grading system, a facial function evaluation tool. Furthermore, it was suggested that the patients affected by Bell's palsy after COVID-19 infection may have a slower improvement in their treatment progress compared with those without COVID-19 infection in the acute stage.

Keywords: Bell's palsy; Case series; COVID-19; Facial palsy; Korean medicine treatment

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INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an infectious respiratory disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1]. The first case of COVID-19 was recorded in December 2019, while the first case in South Korea was reported on January 20, 2020 [1]. Not only respiratory but also neuroinvasive symptoms, such as smell and taste abnormalities, were reported after COVID-19 infection. Moreover, Bell's palsy is one of the reported neuroinvasive symptoms of COVID-19 [2,3].

Bell's palsy is an acute facial paralysis caused by peripheral facial nerve dysfunction [4]. The condition is believed to be attributed to facial nerve inflammation in the geniculate ganglion. However, the cause of inflammation is not confirmed [5]. The symptoms of Bell's palsy include facial nerve weakness, ear pain, hearing sensitivity, loss of taste, and lacrimation [6]. These symptoms follow the prodromal, paralytic, aggravating, parallel, and recovery stages or follow the acute (≤ 7 days), subacute (7–15 day), and chronic (≥ 15 days) stages [7]. The incidence of Bell's palsy is approximately 11–40 per 100,000 people per year. Furthermore, its incidence is similar between men and women [4].

Bell's palsy treatment is generally conservative as steroids and antiviral medications are given to patients within 3 days of symptom onset [5]. The Korean medicine treatments include acupuncture, moxibustion, electroacupuncture, auricular acupuncture, scalp acupuncture, pharmacopuncture, and herbal medicine [7,8].

Some studies have reported the affection of Bell's palsy after COVID-19 infection, which may decrease the chances of a complete recovery rate [2,3]. However, no case reports have yet investigated the efficacy of Korean medicine treatments for Bell's palsy after COVID-19 infection. In the present study, we reported the outcomes of Korean medicine treatments in three patients who affected Bell's palsy 7–12 days after COVID-19 diagnosis. The results revealed that the patients affected by Bell's palsy after COVID-19 infection may have a slower improvement in their treatment progress compared with those without COVID-19 infection in the acute stage [9].

CASE REPORT

1. Acupuncture

Acupuncture treatment was performed using disposable sterilized stainless-steel needles (0.20 × 30 mm, Dongbang Medical Co., Ltd.) twice a day for 15 minutes each session on the following acupuncture points: BL2, TE23, EX-HN4, ST2, EX-HN5, ST4, ST7, GB12, GB20, and ST6.

Electroacupuncture (STN-111; Stratech) was performed at 4 Hz for 15 minutes once daily on the following acupuncture points: BL2-EX-HN5, ST2-ST7, and ST4-ST6.

2. Pharmacopuncture

Pharmacopuncture treatment was performed using Soyeom pharmacopuncture solution (2 mL; Korea Research Institute of Pharmacopuncture). An insulin syringe (29 G × 12.7 mm; Shin Ahmed) was also used. Pharmacopuncture was performed once daily at 0.2 mL on the following acupuncture points: BL2, TE23, EX-HN4, ST2, EX-HN5, ST4, ST7, GB12, GB20, and ST6.

3. Moxibustion

Moxibustion was performed on the abdomen once daily for 20 minutes using *Artemisia moxa* (Mugwort Tan; Dongbang Medical Co., Ltd.).

4. Physiotherapy

Physiotherapy was performed using a low-frequency stimulator (Silver Spike Point) (Biomix HSP-601; Hanil) for 15 minutes once daily on the following acupuncture points of the affected side: BL2-EX-HN5, ST2-ST7, and ST4-ST6. Carbon light (SNO-1; Shinjin) was conducted on the affected side for 15 minutes once daily.

5. Herbal medicines

Ligigeopoong-sangagam (n = 3) was used during the paralyzing and aggravating stages, whereas Bojungikgi-tanggami (n = 2) was used during the parallel and recovering stages. The treatment duration was adjusted according to the degree of facial paralysis and the length of hospitalization. All herbal medicines were administered at 120 mL three times daily 30 minutes after meals (Table 1). Table 2 shows the details of the treatment methods used (Table 2).

6. Steroids and antiviral medication

Prednisolone (steroid medication) was administered orally twice daily 30 minutes after meals. The starting prednisolone dose was 60 mg, and the dose was tapered by 10 mg every 2 days for 5 days. Famciclovir (antiviral medication) of 250 mg was administered orally after meals three times daily for 7 days. Table 2 shows the details of the treatment methods used.

7. Evaluation

To investigate the patient's facial function, the Yanagihara score (Y-score) was used according to the study methods of Hato et al. [10]. The Y-score was measured by expressing 10 different aspects of facial function with a score of 0 (complete paralysis) to 4 (almost normal; maximum of 40 points) (Appendix 1) [10]. The Y-score was calculated at 7 AM daily from the day of hospitalization to the day of discharge.

Table 1. Ingredients of the herbal medicines

Ligigeopoong-sangagam		Bojungikgi-tanggami	
Herbal components	g	Herbal components	g
Radix Puerariae	8	Atractylodis Rhizoma Alba	8
Uncariae Ramulus Cum Uncis	8	Radix Paeoniae	6
Bombycis corpus	8	Radix Astragali	6
Atractylodes rhizome	6	*Crataegus pinnatifida*	6
Aurantii Nobilis Pericarpium	6	Aurantii Nobilis Pericarpium	6
Schizonepeta tenuifolia	6	*Raphanus sativus*	4
Pinelliae Rhizoma	4	Poria cocos	4
Arisaematis Rhizoma	4	Radix Ginseng	4
Crataegus pinnatifida	4	Radix Angelicae Gigantis	4
Aurantii Fructus	4	Radix Platycodi	3
Angelicae Koreanae Radix	4	Uncariae Ramulus Cum Uncis	3
Radix Ledebouriellae	4	Perilla frutescens	3
Aurantii immaturi pericarpium	4	Radix Angelicae Koreanae	3
Radix Platycodi	4	Radix Ledebouriellae	3
Radix Scutellariae	4	Bombycis corpus	3
Radix Angelicae Dahuricae	3	Radix Angelicae Dahuricae	3
Cnidium officinale MAKINO	3	Radix Bupleuri	2
Radix Glycyrrhizae	3	Cimicifugae Rhizoma	2
Aconitum koreanum	2	Pinelliae Rhizoma	2
Viticis Fructus	2	Radix Saussureae	2
		Massa Medicata Fermentata	2
		Amomum xanthioides	2
		Radix Glycyrrhizae	2

8. Case 1

OOO (female/40).

Affected side: Right.

Onset: April 2, 2022.

Admission period: April 8, 2022–April 18, 2022 (11 days).

History of past illness: None.

History of present illness:

- March 26, 2022: COVID-19 diagnosis.
- April 2, 2022: Facial paralysis.
- April 3, 2022: Bell's palsy diagnosis based on the brain computed tomography and magnetic resonance imaging and treatment initiation with steroids and antiviral drugs.
- April 8, 2022: Admission.

Treatment progress: The patient was hospitalized on April 8, 2022, and had a Y-score of 24. Moreover, the Y-score remained 24 from admission to discharge on April 18, 2022 (17th day of onset) (Figs. 1, 2).

9. Case 2

OOO (female/20).

Affected side: Right.

Onset: April 7, 2022.

Admission period: April 9, 2022–April 15, 2022 (7 days).

History of past illness: None.

History of present illness:

- April 2, 2022: COVID-19 diagnosis.
- April 7, 2022: Facial paralysis.
- April 7, 2022: Bell's palsy diagnosis and treatment initiation with circulation-improving agents, steroids, and antiviral medications.
- April 9, 2022: Admission.

Treatment progress: The patient was hospitalized on April 9, 2022, and had a Y-score of 22. The patient's eye movement improved on April 11, 2022 (5th day of onset). The Y-score remained 24 until discharge on April 15, 2022 (Figs. 1, 2).

Table 2. Treatment methods

Patient no.	Admission duration (d)	Herbal medicines	Steroid medication (d)	Antiviral medication (d)
1	11	Ligigeopoong-sangagam for 7 days Bojungikgi-tanggami for 4 days	17	7
2	7	Ligigeopoong-sangagam for 7 days	14	7
3	16	Ligigeopoong-sangagam for 11 days Bojungikgi-tanggami for 4 days	15	-

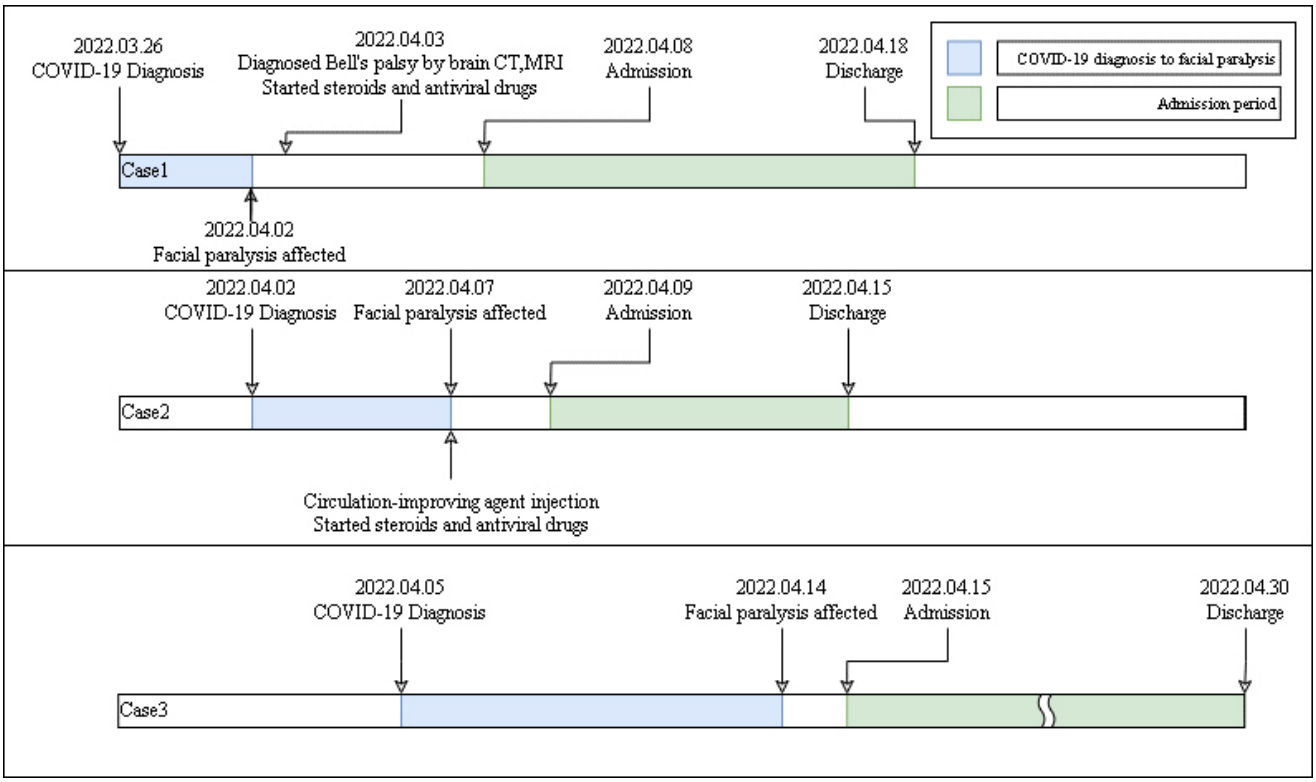

Fig. 1. Timeline of treatments. COVID-19, coronavirus disease 2019; CT, computed tomography; MRI, magnetic resonance imaging.

10. Case 3

OOO (male/53).

Affected side: Right.

Onset: April 14, 2022.

Admission period: April 15, 2022–April 30, 2022 (16 days).

History of past illness: Hypertension.

History of present illness:

- April 5, 2022: COVID-19 diagnosis.
- April 14, 2022: Facial paralysis.
- April 15, 2022: Admission.

Treatment progress: The patient was hospitalized on April 15, 2022, and had a Y-score of 27. The mouth movement aggravated on April 17, 2022, and their Y-score was 26. The eye movement aggravated on April 22, 2022 (9th day of onset), and their Y-score was 24 to maximal weakness. The patient's eye movement improved on April 26, 2022, and their Y-score remained 24 until discharge on April 30, 2022 (Figs. 1, 2).

DISCUSSION

Bell's palsy is an acute peripheral facial paralysis caused by lower motor neuronal dysfunction that is attributed to facial nerve inflammation [4,5]. It often progresses within 3 days to 1 week from the onset and gradually improves over the next 3 weeks to 3 months. In this study, approximately 71% of the patients presented with complete recovery; 29% with sequelae, such as facial muscle weakness; and 17% with facial muscle contractures [5].

In Bell's palsy, acupuncture and pharmacopuncture can help restore the paralyzed nerves by activating the venous and lymphatic circulation and stimulating the muscles to relieve nerve compression, which improves local blood circulation and nerve conduction [11]. Moxibustion and physical therapy can stimulate the facial blood supply and maintain muscle tone to prevent facial muscle atrophy [7]. Steroids are used because of their anti-inflammatory properties to minimize nerve damage that is caused by facial nerve inflammation. Moreover, antivirals are used to prevent the effects of viral infections, such as herpes simplex virus-1 [11]. Thus, Korean medicine treatments, steroids, and antivirals are recommended the treatment of Bell's palsy.

COVID-19 is an infectious respiratory disease caused by SARS-CoV-2 [1]. This virus causes neuroinvasive

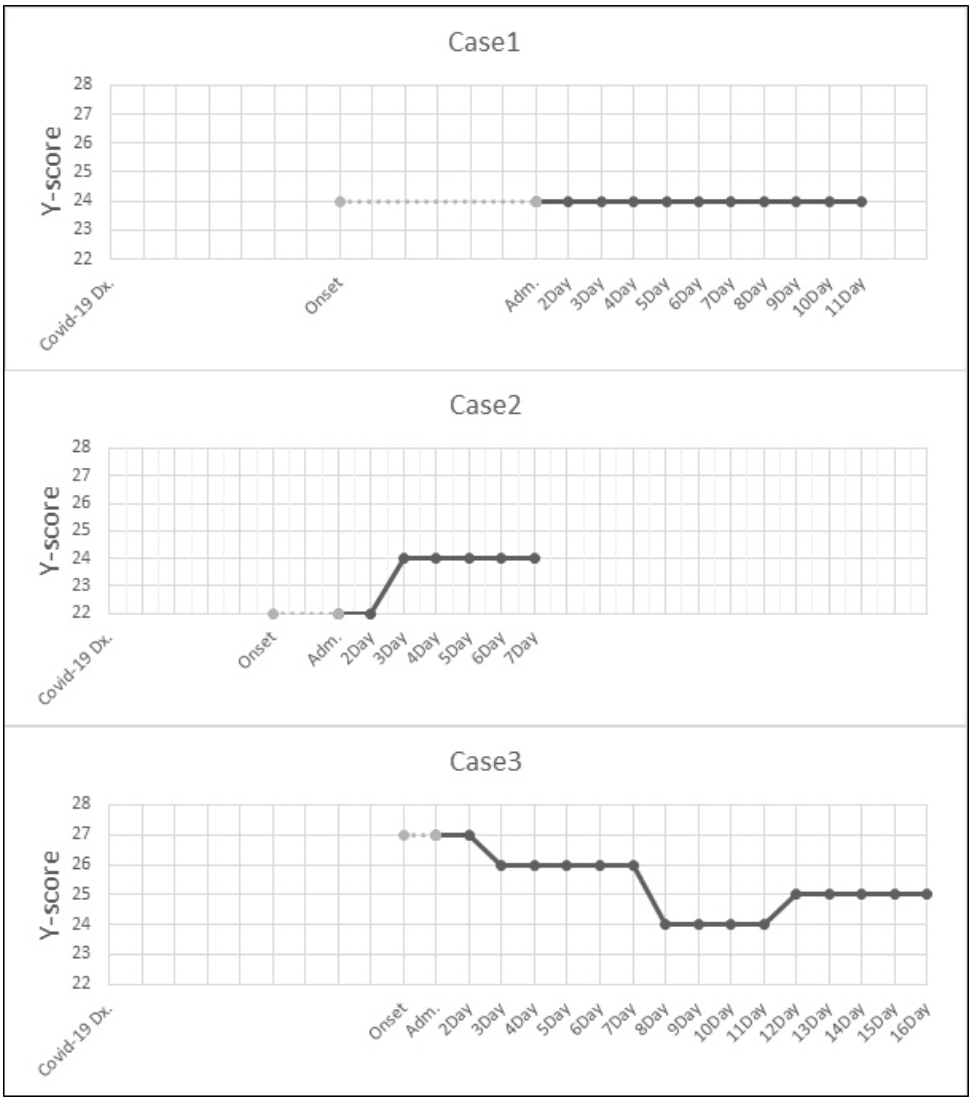

Fig. 2. Changes in the Y-score. COVID-19, coronavirus disease 2019; Dx., diagnosis; Adm., admission.

symptoms, including Bell's palsy [2]. However, the impact of Bell's palsy after SARS-CoV-2 infection has not been investigated. Turki et al. [12] reported a complete recovery rate of 62.5% in 32 patients with Bell's palsy after COVID-19 infection, which is similar to the complete recovery rate of 71% [5] for patients with Bell's palsy that were not diagnosed with COVID-19. However, Uysal and Güllüoğlu [13] reported that the complete recovery rate decreased from 88.2% before the COVID-19 pandemic to 28.9% during the COVID-19 pandemic. Moreover, the complete recovery rate of nine patients with Bell's palsy after COVID-19 infection was 11.1%, which was lower than the complete recovery rate of 34.5% for 29 patients with Bell's palsy that were not diagnosed with COVID-19 [13].

Furthermore, Wan et al. [14] have found that its high affinity for the ACE2 receptor may cause functional changes in the ACE2 receptor, leading to an inflammatory response. In addition, Egilmez et al. [2] revealed that COVID-19 infection may induce hypercoagulability, which reduces the efficacy of steroids, resulting in a lower rate of complete recovery when compared with patients with Bell's palsy that were not diagnosed with COVID-19. The functional change of the ACE2 receptor [14] may affect the effectiveness of acupuncture and pharmacopuncture in restoring paralyzed nerves. Hypercoagulability due to COVID-19 infection [2] may inhibit the effectiveness of acupuncture, pharmacopuncture, moxibustion, and physical therapy to stimulate the facial blood supply.

This was a retrospective case report of three patients who were affected by Bell's palsy within 2 weeks of

COVID-19 infection, revealing a change in Y-score between -2 and 2. Furthermore, patients affected by Bell's palsy after COVID-19 infection showed a slower improvement in their treatment progress than those without COVID-19 infection in the acute stage [9]. In Case 1, the patient's Y-score (24 points) remained unchanged from admission to discharge; in Case 2, the Y-score was slightly improved by two points; and in Case 3, the Y-score was reduced by two points. The mean Y-score only showed modest improvement, with a mean of 0.33 ± 1.25 after 7 days of treatment and a mean of 0 ± 2.83 from admission to discharge. However, this finding is inconsistent from that of Park et al. [9] and Jeong et al.'s [15] studies. Park et al. [9] showed a marked improvement in the Y-score after 7 days of treatment (2.95 after Korean medicine treatments and 6.7 after Korean medicine treatments and steroid therapy). Jeong et al. [15] showed a marked improvement in the Y-score after 7 days of treatment (1.87 after Korean medicine treatments and 5.07 after Korean medicine and cervical Chuna treatments).

However, this study has several limitations. First, the number of participants was small, and only three patients were included. Second, only the Y-score was used to assess the degree of facial paralysis. Third, no follow-up assessment of the Y-scores in outpatients after discharge was conducted. Nevertheless, this case report is still significant because it assessed the patients who were affected by Bell's palsy after COVID-19 infection and who received Korean medicine treatments. Moreover, this case series suggests that COVID-19 infection may delay the improvement of Bell's palsy in the acute stage. Considering the limitations of the present study, future studies with a larger number of cases are needed to confirm our findings.

AUTHOR CONTRIBUTIONS

Conceptualization: PJP, JHJ, YIK. Formal analysis: PJP. Investigation: PJP. Methodology: PJP. Writing – original draft: PJP. Writing – review & editing: All authors.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

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ETHICAL STATEMENT

This study was exempt from the Daejeon Korean Medicine Hospital of Daejeon University Institutional Review Board (IRB no.: DJDSKH-23-E-15).

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Appendix 1. Yanagihara facial nerve grading system

	Grading score				
	Complete paralysis				Almost normal
At rest	0	1	2	3	4
Wrinkled forehead	0	1	2	3	4
Closes eyes normally	0	1	2	3	4
Closes eyes forcefully	0	1	2	3	4
Closes eye on the involved side	0	1	2	3	4
Wrinkled nose	0	1	2	3	4
Can blow out cheek	0	1	2	3	4
Whistles	0	1	2	3	4
Grins	0	1	2	3	4
Depressed lower lip	0	1	2	3	4