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Original Article

A Clinical Study on the Factors Related with the Sequelae of Facial Palsy

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Objectives : In order to apply useful data to clinical practice, we undertook this study and tried to find factors related with sequelae of facial palsy in relation with patients' age and gender distribution, past history with the disease, condition before onset, duration of recovery time, existence of remaining sequelae, types of the sequelae, and duration for sequelae to disappear.

Methods : We evaluated patients' condition (fatigue, stress, chills, cold and so on), past history (diabetes mellitus, hypertension, stroke, herpes zoster, cancer and so on), duration of recovery time, types of the sequelae, age and sequelae distribution as to when the treatments were started as we examined 473 patients who were diagnosed with facial palsy, and visited the Out-patient Department of Acupuncture and Moxibustion of Bundang Oriental Medicine Hospital of Dongguk University through 2003 and 2004.

Results : The sequelae of facial palsy were not significantly relevant to the signs found before facial palsy occurred (fatigue, stress, chills, and cold), or to patients' past history (hypertension, diabetes mellitus, facial palsy, herpes zoster). The duration of recovery time was within 30 days for 45.3% of the patients examined in this study, and within 90 days for 72.6%. Evaluating the existence of sequelae in relation to age, we found more in the group comprised of patients aged 50 and over than under 50.

We found more sequelae in the group which is consisted of patients who had not been treated until 6 days after than within 5 days from the onset.

Conclusion : Attention to sequelae will be needed for patients aged 50 and over and who were not treated until 6 days after the onset, as they had more sequelae.

Key Words : facial paralysis, sequelae, treatment, age

Introduction

Facial palsy is either central type or peripheral type. Among several factors that cause facial palsy, Bell's palsy is designated as an idiopathic peripheral nerve disorder that happens without any cause like tumors, trauma, infection, or stroke, and it makes up about 85% of the occurrence of facial palsy. In general, one who happens to have Bell's palsy starts to recover two or three weeks after onset. It is reported that the probability that one with Bell's palsy fully recovers ranges from 75 to 85%[1,2].

It is important to minimize the sequelae of a patient with facial palsy, as long-lasting sequelae caused by abnormal regeneration of the facial nerve can occasionally be more distressing to the patient than facial palsy itself.

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In general, facial palsy features a rate of spontaneous patient recovery higher than most other diseases. However, a careful evaluation as to whether the patient would have sequelae or not is still needed as there are many patients who do not recover for a long time in clinical practice. The outer appearance of the patient is key, as facial palsy causes the injuries to the facial region. One with facial palsy not only has physical, but also mental distress.

Therefore, we undertook this study to apply the data to clinical practice by understanding the factors related with facial palsy like gender distribution or age distribution, past disease history, patients' condition, duration of recovery time, existence, types or duration of the sequelae of facial palsy, and relevance of the sequelae of facial palsy.

Methods

1. Subjects

We studied subjects who were diagnosed with facial palsy and visited the out-patient Department of Acupuncture and Moxibustion of Bundang Oriental Medicine Hospital of Dongguk University from January 1st, 2003 to the December 5th, 2004. 482 patients who visited the hospital were contacted by phone. We excluded 9 subjects who were diagnosed with facial palsy related to a disorder of the central nerve system or caused by trauma, and retained the remaining 473 as subjects appropriate for the study.

2. Methods

1) Data collection

We gathered data like the patients' age and sex through the computer network system used in the hospital. According to the form of the survey, the informant (patient) provided information such as patients' condition, experiences of receiving other kinds of treatments, symptoms at onset (gustatory, auditory, tactile disorder and so on), the physical state before onset (fatigue, stress, chills, cold and so on), past history of disease (diabetes mellitus, hypertension, stroke, herpes zoster, cancer and so on), date of onset, duration of recovery time, sequelae remaining after treatment, types of sequelae, and recurrence after treatment.

We examined the onset period when the patients first showed symptoms of facial palsy, but did not analyze the patients' onset period. However, we could surmise the onset period by scrutinizing the treatment beginning days.

2) Sequelae data

In this study, we evaluated seven signs presented as the sequelae of facial palsy.

- mouth retracted toward the lesion side
- involuntary spasm of eyelid
- involuntary spasm of lip
- involuntary spasm of eyelid movement accompanying mouth movement
- involuntary lip movement accompanying eyelid movement
- involuntary tearing accompanying oral intake
- muscle atrophy

3) Treatment methods

- Acupuncture

The acupuncture used in this study was a combination of locating the acupoints near the lesion side (近位 取穴) and locating the acupoints far from the lesion side (遠位 取穴). According to the method of locating the acupoints near the lesion side, S2 (Sa-baek, 四白), S4 (Ji-chang, 地倉), S6 (Hyup-geo, 頰車), and S5 (Dae-young, 大迎), which are acupoints

of the Stomach Meridian (足陽明胃經) and located on the face, SI18 (Gwon-ryo, 顴髎), which is an acupoint of the Small Intestine Meridian (手太陽小腸經) also located on the face, and BL3 (Mi-chung, 眉衝) and BL2 (Chan-juk, 攢竹), which are the acupoints of Bladder Meridian(足太陽膀胱經), were used. As for the method of locating the acupoints far from the lesion side, LI20 (Yong-hyang, 迎香), LI4 (Hap-gok, 合谷) which is the acupoint of Large Intestine Meridian (手陽明大腸經) was used. As mentioned in the classics of Oriental Medicine, LI4 is the acupoint related with disorders occurring on the face.

Fifteen minutes were taken as the time for keeping needles steady on the acupoints (留鍼) after Deqi (得氣), the patient's sensation of the qi flow, were made. While keeping needles steady on the acupoints, the acupoints were stimulated by an electro-acupuncture device. Methods of reinforcing and dispersing qi were not used in this study.

The patients came to hospital to be treated with acupuncture every day in the first week of treatment, every other day in the second week.

• Herbal medication

At the same time patients received acupuncture, they also received treatment with herbal medication using the method of Differentiation and Diagnosing (辨證施治).

The herbal medication Yigigeopoongsan (理氣祛風散) was applied to patients with Wind and Cold (風寒), and Galgeuntang gamibang (葛根湯 加味方) was applied to patients with Wind and Heat (風熱). If the patients got facial palsy from stress or gangieul (肝氣鬱), Gamisoyosan (加味逍遙散) was applied, and if facial palsy occurred from general weakness or Heoro (虛勞), Bojoongyikgitang (補中益氣湯) was applied.

• Physical treatment

Apart from the acupuncture and herbal medication, there was also physical treatment applied to the patients. It was SSP (silver spike point) therapy that was performed on patients' faces, and it was usually applied in the second week of the patients' visit to hospital.

4) Recovery appraisal standard.

The test used in this study for evaluating patients of facial palsy was the test often used by the medical staff of the hospital. The test consists of 10 items, and we take it as normal when patients of facial palsy either do not show any sign that belongs to the 10 items from the test, or they are not seen asymmetrically. The 10 items are as follows.

- having gustatory disorder
- having acoustic hyperesthesia or post-auricular pain
- epiphora
- having food residue between teeth all the time
- differences of numbers of wrinkles shown on the right and the left frontal belly
- differences of numbers of teeth shown on the right and the left
- differences of numbers of wrinkles made on the right and the left when smiling
- degree of shifting of mid-line of philtrum
- evaluation for eye closure
- shape of lips when saying 'O'

3. Statistics

The statistics were done with SPSS 8.0, and chi-square tests were used to inquire into the relation to the sequelae, distribution by age and treatment beginning day. It was taken as significance, which showed $p<0.01$.

Table 1. Age and Sex Distribution of Subjects

Age (years)	Male (%)	Female (%)	Total (%)
≤ 19	11 (4.7)	22 (9.2)	33 (7.0)
20-29	15 (6.4)	34 (14.2)	49 (10.4)
30-39	55 (11.6)	43 (18.0)	98 (20.7)
40-49	61 (23.5)	40 (16.7)	101 (21.4)
50-59	52 (22.2)	30 (12.6)	82 (17.3)
60-69	32 (13.7)	41 (17.2)	73 (15.4)
≥ 70	8 (3.2)	29 (12.1)	37 (7.8)
Total (%)	234 (100)	239 (100)	473 (100)

Table 2. Sides of Facial Nerve Paralysis

Side	Male (%)	Female (%)	Total (%)
Left	125 (53.4)	110 (46.0)	235 (49.7)
Right	109 (46.6)	129 (54.0)	238 (50.3)
Total (%)	234 (100)	239 (100)	473 (100)

Table 3. Duration of Recovery

Duration ofrecovery (days)	No (%)
	86 (18.2)%
15-30	128 (27.1)
31-90	129 (27.3)
91-364	74 (15.6)
>365	56 (11.8)
Total (%)	473 (100)

Results

1. Age and sex distribution

Of 473 patients, the number male and female was 234 (49.55%) and 239 (50.5%). Overall, the number of patients in their forties was 101 (21.4%), which forms the largest segment of the subjects. In their thirties were 98 (20.7%), in their fifties were 82 (17.3%), in their sixties were 73 (15.4%), their twenties were 49 (10.4%), in their seventies or more were 37 (7.8%), and patients aged nineteen and under were 33 (7%) (Table 1).

2. Distribution of the involved side

Overall, there was no significance as to which side was most commonly involved since patients with the left side involved were 235 (49.7%), and patients with right side involved were 238 (50.3%) (Table 2).

3. Duration of recovery

31 to 90 days were the duration of recovery for 129 patients (27.3%), 15-30 days for 128 patients (27.1%), within 14 days for 86 patients (18.2%), 91-364 days for 74 patients (15.6%), and more than a year for 56 patients (11.8%). The duration of recovery for 214 (45.3%) of the patients examined in this study was within 30 days, and it was within 90 days for 433 patients (72.6%) (Table 3).

Table 4. Sequelae Symptoms

Sequelae Symptoms	No (%)
Muscle atrophy	66 (44.9)
Mouth retracted toward the lesion side	42 (29.6)
Involuntary spasm of eyelid	20 (13.6)
Involuntary tearing accompanying oral intake	11 (7.4)
Involuntary spasm of lip	5 (3.4)
Involuntary eyelid movement accompanying mouth movement	2 (1.4)
Involuntary lip movement accompanying eyelid movement	1 (0.7)
Total (%)	147 (100)

Table 5. Previous Health Condition and Sequelae

Previous condition	Sequelae	No (%)	Yes (%)
Fatigue	No	205 (66.3)	104 (33.7)
	Yes	112 (68.3)	52 (31.7)
Stress	No	257 (66.6)	129 (33.4)
	Yes	60 (69.0)	27 (31.0)
Cold exposure	No	280 (67.2)	137 (32.9)
	Yes	37 (66.1)	19 (33.9)
Upper respiratory infection	No	295 (66.7)	147 (33.3)
	Yes	22 (71.0)	9 (29.0)

4. Sequelae

Sequelae of facial palsy were found in 147 (33%) of all 473 patients examined in this study. The patients with sequelae of muscle atrophy were 66 (44.9%), patients with the mouth retracted toward the lesion side were 42 (29.6%), patients with involuntary spasm of the eyelid were 20 (13.6%), patients with involuntary tearing accompanying oral intake were 11 (7.4%), patients with involuntary spasm of the lip were 5 (3.4%), patients with involuntary eyelid movement accompanying mouth movement were 2 (1.4%), and patients with involuntary lip movement accompanying eyelid were 1 (0.7%) (Table 4).

5. The patients' condition and sequelae

We asked the patients in what condition they were before the occurrence of facial palsy, and 164 (34.7%) said that they felt fatigue before the occurrence, which was the condition that most patients had before the occurrence of facial palsy. 87 patients (18.4%) had stress, 56 (11.8%) had chills, and 31 patients (6.5%) had a cold. The patients' condition did not make a great difference as to whether the patients had the sequelae or not (Table 5).

6. Past history with disease and sequelae

The patients with hypertension were 164 (34.7%), ones with diabetes mellitus were 8 (18.4%), ones

Table 6. Past History and Sequelae

Sequelae Past history		No (%)	Yes (%)
Facial palsy	No	281 (66.0)	145 (34.0)
	Yes	36 (76.6)	11 (23.4)
Diabetes mellitus	No	288 (67.5)	139 (32.5)
	Yes	29 (63.0)	17 (37.0)
Hypertension	No	271 (67.6)	130 (32.4)
	Yes	46 (63.9)	26 (36.1)
Herpes zoster	No	315 (67.0)	155 (33.0)
	Yes	2 (66.7)	1 (33.3)

Table 7. Sequelae Distribution by Age

Sequelae Age	No (%)	Yes (%)	P-value[1)]
≦49	204 (73.1)	75 (26.9)	0.001
≧50	113(58.2)	81(41.8)	

P value was obtained from chi-square analysis[1)]

with facial palsy were 56 (11.8%), and ones with herpes zoster were 3 (0.6%). Past history was not significantly related with the sequelae (Table 6).

7. Sequelae distribution by age

We analyzed sequelae distribution by age, and there was a significant difference among ages. There were 75 patients (26.92%) with the sequelae in the group of patients aged under 49. There were 81 patients (41.8%) in the group of patients aged over 50. These results were statistically significant ($p<0.01$) (Table 7).

8. Sequelae distribution according to treatment beginning day

We analyzed relationship between the sequelae and treatment beginning day after the occurrence of facial palsy. Patients with the sequelae who had been treated within 5 days were 86 (27.4%), while patients with sequelae who had not been treated until 6 days after onset were 70 (42.4%). These results were statistically significant ($p<0.01$) (Table 8).

Discussion

Facial palsy is usually classified as central type or peripheral type. The central type is caused by brain tumor, poliomyelitis, or cerebrovascular disease occurring in the upper part of the nucleus and the facial nucleus. The peripheral nerve type occurs by injuries to the lower part of the facial nucleus; purulent inflammation, herpes zoster, tumor and so on cause this type of facial palsy. However, Bell's palsy, which occurs without any cause found to provoke it, is the type of facial palsy that most patients exhibit.

Facial palsy only can occur in some cases. However, disorders of gustatory sense, hyperacusis, or decrease of lacrimation can occur according to which part of the nerve system is injured. Postauricular pain often accompanies facial paralysis either before or after the onset of facial palsy. Patients can suffer from headache, disorder of the facial sense, increase of lacrimation, or pain in the larynx or shoulder region according to what symptoms they have.

71% of the patients with facial palsy come to have properly working muscles of expression as they had before the onset, and 83% show fair recovery from facial palsy[1)]. Fast recovery from facial palsy, age, acoustic reflex, epiphora, and postauricular pain are important for the prognosis of facial palsy[1,2)]. In other studies, it is reported that one or more signs of postauricular pain, gustatory disorder, and dry eye at the initial examination are ominous for prognosis of facial palsy[3)].

Table 8. Sequelae Distribution by Treatment Beginning Day

Sequelae Treatment Beginning Day	No (%)	Yes (%)	P-value[1)]
≦5	228 (72.6)	86 (27.4)	0.001
≦6	95 (57.6)	70 (42.4)	

P value was obtained from the chi-square analysis[1)]

In general, facial palsy is known as a disorder from which patients can recover themselves naturally. However, it is necessary for a doctor in clinical practice to make a careful evaluation of the patient, as it is not unusual to come across patients who do not recover easily, and have the disorder for a long time before recovery.

For this reason, information was gathered from 473 subjects diagnosed with facial palsy at the Out-patient Department of Acupuncture and Moxibustion of Bundang Oriental Medicine Hospital of Dongguk University from January 1st, 2003 to December 5th, 2004. Data was gathered on the patients' present condition, experiences of getting other kinds of treatments, symptoms at the onset period, condition before the occurrence of facial palsy, past history, data of onset, duration of recovery time, existence of sequelae remaining after being treated, types of sequelae, and recurrence of facial palsy after the treatments with use of the survey. After gathering the data, we evaluated whether the data were related with the sequelae of facial palsy or not.

Of 473 patients examined for this study, men were 234 (49.5%), and women were 239 (50.5%). Overall, patients in their forties were 101 (21.4%), and made up the greatest portion of the subjects. Patients in their thirties were 98 (20.7%), and in their fifties, 82 (17.3%) (Table 1). Patients aged from 30 to 59 were 59.4% of the subjects, and the involved side was the left on 235 (49.7%), and the right on 238 (50.3%); there was not a great difference as to whether the most commonly involved side is the right or the left (Table 2).

In half the cases, the lesion reached the maximum by 48 hours after the occurrence of facial palsy. With the passage of 5 days after the occurrence of facial palsy the lesion reached the maximum in most cases. Within a few weeks or 2 months, about 80% of the patients recovered from facial palsy. However, recovery may not take place even after the passage of 3 months after the occurrence, and it can take 2 years or so to recover from facial palsy if there is any clinical finding of injury to the nerve system. Even if the patient starts to show signs of recovery 2 years after the occurrence of facial palsy, he or she would not fully recover in 6 to 8% of all the cases, and it is known that facial palsy can commonly recur within ten years[4,5].

The test used in this study for evaluating the recovery from facial palsy consisted of 10 items, and we took it as normal when the patient with facial palsy either did not show any sign belonging to the 10 items, or they were not seen asymmetrically. The 10 items were as follows.

1) having gustatory disorder 2) having acoustic hyperesthesia or post-auricular pain 3) epiphora 4) having food residue between teeth all the time 5) differences of numbers of wrinkles shown on the right and the left frontal belly 6) differences of numbers of teeth shown on the right and the left 7) differences of numbers of wrinkles made on the right and the left when smiling 8) degree of shifting of mid-line of philtrum 9) evaluation for eye closure 10) shape of lips when saying 'O'

In this study, the time taken to reach full recovery was within 30 days for 45.3% of the patients, and within 90 days for 72.6% (Table 3).

In general, 75 to 85% of the patients with Bell's palsy naturally recover without getting any kind of treatment, and 95% of the patients with incomplete palsy can expect themselves to fully recover. However, 50% of the patients with complete palsy cannot expect themselves to fully recover[6]. The sequelae of facial palsy were

found in the cases of 156 patients (33%) out of 473 subjects examined in this study. 67% of the patients affected spontaneously recovered, and it is speculated that such results come out as we surveyed the patients with complete palsy accompanied by the patients with incomplete palsy.

It is reported that 16% of the patients with Bell's palsy who had spontaneous recovery had permanent dysfunction as well as contracture, synkinesis, epiphora, muscle atrophy, and so on [7]. According to recent studies, it is known that 17% of the patients with Bell's palsy have contracture, and 16% have dysfunction of synkinesis[1]. In this study, we evaluated signs presented as the sequelae of facial palsy such as contracture, spasm, synkinesis, spasm of the lips, synkinesis of the lips, epiphora, muscle atrophy and so on (8). The sequelae of facial palsy were found in 156 patients out of 473 examined in this study. Among the patients with sequelae, muscle atrophy was found in 66 (42.3%), mouth contracture in 42 (26.9%), eyelid spasm in 20 (12.8%), epiphora in 11 (7.1%), dysaesthesia in 9 (5.8%), lip spasm in 5 (3.2%), eyelid synkinesis in 2 (1.3%), and lip synkinesis was 1 (0.6%). As sequelae of facial palsy, muscle atrophy was found in 66 (42.3%), and mouth contracture was found in 42 (26.9%). The patients with muscle atrophy together with the patients with mouth contracture made up 69.2% of all the patients (Table 4).

Before the occurrence of facial palsy, fatigue was a symptom which 164 patients (34.7%) felt, and it was the most common symptom. Stress took place in the cases of 87 patients (18.4%), chills in the cases of 56 (11.8%), and cold in the cases of 31 (6.5%) (Table 5). These symptoms were irrelevant to causing the sequelae of facial palsy. This result is consistent with other studies which show the most common symptom taking place before the occurrence of facial palsy is fatigue[9,10,11].

Some studies on facial palsy patients' past history showed that the presence of pain, cardiovascular diseases, diabetes mellitus, and old age are the ominous factors for prognosis of facial palsy[12,13], but other studies showed that those factors are not significantly related (14, 15). We surveyed the patients' past history. 164 (34.7%) had hypertension, 8 (18.4%) had diabetes mellitus, 56 (11.8%) had facial palsy, and 3 (0.6%) had herpes zoster. These were not significantly relevant to causing the sequelae of facial palsy (Table 6).

Some studies showed that prognosis of facial palsy becomes worse as patients' age range increases[12,13], while others showed that prognosis of facial palsy is not significantly related with age[14,15]. We analyzed sequelae distribution by age, and there was a significant difference among ages. There were 75 patients (26.9%) with sequelae in the group of patients aged under 50; there were 81 (41.8%) in the group of patients aged 50 and over. These results means that the group comprised of people aged 50 and over had more sequelae than those under 50. This was statistically significant ($p<0.01$) (Table 7).

We analyzed the remaining sequelae in relation to how much time passed before getting treatment after the signs of facial palsy were found. The patients with sequelae who had been treated within 5 days were 86 (27.4%), while patients with the sequelae who had not been treated until 6 days after onset were 70 (42.4%). We thus found more sequelae in the group comprised of patients who had not been treated until after 6 days than within 5 days from onset. This was

statistically significant ($p<0.01$) (Table 8).

Therefore, attention to sequelae will be needed for those aged 50 and over and who have not been treated until 6 days after onset.

Conclusion

We examined 473 patients who were diagnosed with facial palsy at the Out-patient Department of Acupuncture and Moxibustion of Bundang Oriental Medicine Hospital of Dongguk University from January 1st, 2003 to December 5th, 2004, and studied data on these patients such as duration of recovery time, types of sequelae, age, and sequelae distribution according to when the treatment had been started. We came to the following results as below.

1. The patients' condition before facial palsy (fatigue, stress, chills, and cold) and their past history (hypertension, diabetes mellitus, facial palsy, and herpes zoster) were not significantly related with the sequelae of facial palsy.

2. The time taken for fully recovery was within 30 days for 45.3% of all the patients examined in this study, and within 90 days for 72.6%.

3. We could see 156 patients (33%) out of 473 having sequelae of facial palsy. Among these patients, those with muscle atrophy were 66 (44.9%), those with mouth contracture were 42 (29.6%), those with eyelid spasm were 20 (13.6%), those with epiphora were 11 (7.4%), those with lip spasm were 5 (3.4%), those with eyelid synkinesis were 2 (1.3%), and those with lip synkinesis were 1 (0.6%).

4. We analyzed the existence of the sequelae by age range, and the group of the patients 50 and over had more remaining sequelae than those younger than 50 ($p<0.01$).

5. We analyzed the existence of sequelae by treatment beginning day, and the group of patients who had been treated 6 or more days after had more remaining sequelae than those treated within 5 days from onset ($p<0.01$).

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