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Bell's palsy. A prospective, longitudinal, descriptive, and observational analysis of prognosis factors for recovery in Mexican patients

Laura Sánchez-Chapul,* Susana Reyes-Cadena,* José Luis Andrade-Cabrera,† Irma A. Carrillo-Soto,‡ Saúl R. León-Hernández,§ Rogelio Paniagua-Pérez,* Hiram Olivera-Díaz,‖ Teresa Baños-Mendoza,¶ Gabriela Flores-Mondragón,* Norma A. Hernández-Campos*

* Laboratorio de Bioquímica Muscular,† Laboratorio de Patología Clínica, ‡ Servicio de Otorrinolaringología, § División de Investigación en Rehabilitación, ¶ Rehabilitación Neurológica, Instituto Nacional de Rehabilitación. ‖ Laboratorio de Biología Molecular, Instituto Nacional de Diagnóstico y Referencia Epidemiológicos.

ABSTRACT

Objective. To determine the prognosis factors in Mexican patients with Bell's palsy. **Material and methods.** Design: We designed a prospective, longitudinal, descriptive, and observational analysis. Two hundred and fifty one patients diagnosed with Bell's palsy at the National Institute of Rehabilitation were included. We studied the sociodemographic characteristics, seasonal occurrence, sidedness, symptoms, and therapeutic options to determine the prognostic factors for their recovery. Results. Thirty-nine percent of patients had a complete recovery and 41.5% had an incomplete recovery. Marital status, gender, etiology, symptoms, sidedness, House-Brackmann grade, and treatments did not represent significant prognostic factors for recovery. Age > 40 years (OR = 2.4, IC 95% 1.3-4.3, p = 0.002) and lack of physical therapy (OR = 6.4, IC 95% 1.4-29.6, p = 0.006) were significant prognostic factors for incomplete recovery. Familial palsy resulted to be a protective prognostic factor against an incomplete recovery (OR = 0.54, IC 95% 0.28-1.01, p = 0.039). This protection factor was only significant in female patients (OR = 0.41, p = 0.22) but not in male patients (OR = 1.0, p = 0.61). **Co**nclusions. The proportion of cases with incomplete recovery was high. The age > 40 years and lack of physical therapy were the only significant prognostic factors for an incomplete recovery.

P**arálisis de Bell. An**á**lisis pr**o**sp**ec**tivo, l**o**ngitudinal, d**e**scriptivo y **o**bservacional **d**e l**o**s factor**e**s pron**ó**stico para su **recuperación en pacientes mexicanos

*RES**U**MEN*

*Objeti**v**o. Determinar los factores pronóstico de la parálisis facial de Bell en pacientes mexicanos. **Material y métodos.** Diseño: Análisis prospectivo, longitudinal, descriptivo y observacional. Se incluyeron 251 pacientes diagnosticados con parálisis de Bell del Instituto Nacional de Rehabilitación. Se estudiaron características sociodemográficas, época del año, lado afectado de la cara, síntomas y las opciones terapéuticas para determinar los factores pronóstico para su recuperación. Resu**l**ta**d**os. El 39% de los pacientes tuvo una recuperación completa y 41.5% tuvo una recuperación incompleta. El estado civil, género, etiología, síntomas, lado afectado de la cara, grado de parálisis –según la escala de House-Brackmann– y el tratamiento no resultaron factores pronósticos significativos para la recuperación. La edad > 40 años (OR = 2.4, IC 95% 1.3-4.3, p = 0.002) y la ausencia de terapia física (OR = 6.4, IC 95% 1.4-29.6, p = 0.006) resultaron factores pronósticos significativos para la recuperación incompleta. La parálisis familiar resultó ser un factor pronóstico protector contra una recuperación incompleta (OR = 0.54, IC 95% 0.28-1.01, p = 0.039). Este factor de protección fue solamente significativo en los pacientes femeninos (OR = 0.41, p = 0.22), pero no en los pacientes masculinos (OR = 1.0, p = 0.61). **Co**nclu**si**one**s.** La proporción de casos con la recuperación incompleta es alta. La edad > 40 años y la ausencia de la*

terapia física fueron los únicos dos factores pronósticos significativos para una recuperación incompleta.

Key words. Bell's palsy. Idiopathic facial palsy. Prognostic factors. Physical therapy.

Palabras clave. Parálisis de Bell. Parálisis facial idiopática. Factores pronóstico. Terapia física.

INTRODUCTION

Bell's palsy is one of the most frequent causes of chronic discapacity.[1] It is an idiopathic, acute dysfunction of the seventh cranial nerve that results in the paralysis of facial muscles on the affected side of the face.[1] Although Bell's palsy is a relatively frequent disease worldwide, its etiology is still unclear.[1] A variety of theories have been proposed with regard to its etiology, including diabetes mellitus, hypertension, vascular dysfunction, viral infection, immunological disorders, and inflammation.[2-7] Increased evidence implies that the main cause of Bell's palsy is latent herpes virus (HSV-1 and 2, HHV-6 and VZV), which are reactivated from the geniculate ganglia leading to seventh nerve neuropathy.[8-11]

The prognosis for a satisfactory recovery of patients with facial palsy depends on the treatment with a combined therapy prednisone-acyclovir or vancylcovir in the first seven days of illness onset, which showed a significantly better outcome in patients with Bell's palsy as compared with patients without medical treatment;[12] however, it is difficult to establish a statistically significant benefit of treatment in controlled trials because of spontaneous recovery in many patients without a treatment, thus, there are other many factors that can affect the prognosis of facial palsy.[13] About 31% of patients with Bell's palsy who did not receive the appropriate treatment may suffer from incomplete recovery with residual facial muscle weakness with or without one or more of commonly encountered complications, such as synkinesis, hyperkinesis, and/or contracture that might cause secondary physiological sequels.[14]

Some factors may influence the prognosis of facial palsy such as gender, side of palsy, onset, previous symptoms (post auricular pain, eye symptoms, taste disorder, diabetes mellitus), Yanagihara facial grading system and antiviral drugs. In a study in which were examined some of these factors with a Cox's proportional hazards model revealed that only the Yanagihara score and antiviral drug use are statistically important factors that influence the progression of the facial palsy.[15] However, Yeo, *et al.*,[16] reported age, diabetes mellitus, essential hypertension, and vertigo as prognostic factors in Ramsay Hunt syndrome but not in Bell's palsy; as well as Peitersen[5] reported that age, time of beginning recovery of function, post auricular pain and topographical tests are important prognosis factors in Bell's palsy.

Concerning physical rehabilitation, it seems that local superficial heat therapy, massage, exercises, electrical stimulation, and biofeedback training have a place in the treatment of Bell's palsy; however, each modality has its indications.[14] In the case of medical treatment and according to two Cochrane reviews, the randomized controlled studies revealed that there are no significant benefit from treating Bell's palsy with corticosteroids alone or in combination with acyclovir or valanciclovir.[17,18] However for patients with zoster shine herpete, acyclovir appears to be effective.[19] Acupuncture is been used in the management of facial palsy but its specific efficacy needs further investigation.[20]

Bell's palsy is a disease without seasonal or gender predilection.[21] Men and women are equally affected, although the incidence is higher in pregnant women (45 cases per 100,000).[22] Regarding age distribution, the highest incidence of Bell's palsy is reported between 15 and 45 years of age. The disease is less common under the age of 15 and above the age of 60.[5]

Several rates of incidence have been reported in the medical literature depending on the geographical regions of the world. In most of this literature, incidence oscillates between 11-40 and 20-30 cases per 100,000 inhabitants per year.[23,24] In Mexico, facial palsy occupies one of the first 10 places of medical attention in rehabilitation clinics.[25] Data obtained from the National Institute of Rehabilitation (INR, for its initials in Spanish) reveals an important increase in cases of facial palsy and a great concern has arisen to improve the outcome; and to decrease the incidence of complications in facial palsy.

OBJECTIVE

The goal of the present study was to analyze clinical and epidemiological aspects to determine the

prognosis factors for recovery in Mexican patients with facial palsy.

MATERIAL AND METHODS

The present prospective, longitudinal, descriptive, and observational study was performed in 251 patients with Bell's palsy referred to the INR in Mexico City. The study was reviewed and the protocol was approved by the ethical and scientific committees of the INR. We obtained informed written consent from the patients.

Each case was characterized by season of onset based on the month in which Bell's palsy was first diagnosed. Seasons were classified as "cold" (November to February), "warm" (March to May) and "rainy" (June to October).

The patients were examined by an ear, nose, and throat specialist. When anamnesis indicated Bell's palsy, only a few laboratory tests were carried out which included blood test for glucose and measurement of blood pressure. In patients whom function was not restored within 4 months a MRI scan was done. The facial palsy was assessed according to the House and Brackmann facial function scoring system (HB system) which is an observed-based rating scale that measures facial symmetry under tree components: Rest, movement and synkinesis.[26]

The grade of functional recovery was classified as complete (House-Brackmann score = 1) and incomplete (House-Brackmann score = 3).[1] In complete recovery, there was a normal and symmetrical function in all areas of the face muscle. In incomplete recovery, there was weakness but not disfiguring, inability to lift eyebrow, complete and strong eye closure, asymmetrical mouth movement with maximal effort, obvious but not disfiguring synkinesis, and mass movement or spasm. The duration and the number of physical therapy sessions were three periods of 10 daily sessions of physical therapy followed by a muscular evaluation, always supervised by the physiotherapist.

Follow-up examinations were performed once a week during three months or until recovery of function was observed. Follow-up was discontinued after restoration of function. Great importance was given to the date of palsy onset, as well as the date of the first sign of functional recovery: presence of muscular contraction, determined after the clinical exam that included evaluation of static and dynamic facial asymmetry, manual muscle strength testing of frontalis, corrugator, orbicularis oculis, palpebral portion (OP) muscles, as well as zygomaticus, canines and orbicularis oris (OO) muscles, and, finally, presence of synkinesis within OP-zygomatic muscles and OO-OP muscles.

The questionnaire applied to the patients by the otorrhinolaringologist, regarding their history of Bell's palsy consisted in: Personal data (name, age, gender, telephone number, address, occupation, and civil state), date of palsy onset, remission date, previous facial palsy, relatives with facial palsy (parents, brothers, sisters and relatives), head trauma, diabetes mellitus, hypertension, Herpes virus infection (previous or recent), post-auricular pain, hyper-lacrimation, phonophobia, dysgeusia, headache, otitis and treatment.

The medical treatment, reported in the patient's clinical records, consisted of the administration of oral steroids (45-50 mg per day) to reduce swelling and inflammation of the facial nerve; oral acyclovir (Zovirax®) (800 mg for 5 days), a combined therapy steroid-acyclovir and B-complex vitamins (doses were not specified).

The physical therapy and facial retraining (feedback) reported in the patient's clinical records helped to minimize the asymmetrical appearance of the face and improved muscle mobility, and consisted of local superficial heat therapy with hot water compresses (in both halves of the face) for 15 min prior to electrical stimulation (ES), massage or exercises.

After heat therapy, the physical therapist massaged the patients' face and neck for 10 to 15 min; effleurage and kneading both sides of the face, and stretching exercises of the affected side followed to relieve mimetic muscles involved in synkinesis.

Patients were taught to recognize tension and to feel the difference between tension and relaxation in general and more specifically in the facial musculature, because synkinesis may increase muscle tone that can be exacerbated by stress. Patients were taught to make basic specific exercises to coordinate both halves of the face and to decrease synkinesis.

Basis exercises consisted of forehead wrinkle, eye closure, smile, snarl, lip pucker, with variations in amplitude and speed; exercises for one side of the face to control separated movements, relaxation of the lower jaw, exercises of the mouth (smiling, pouting), and the eye with simultaneous inhibition of synkinesis (slow, small movements and counteraction). A mirror was used for feedback. In case of logophtalmus, the upper eyelids were stretched. Lip closure exercises comprised exercises of the cheek (filling the cheeks with air) and eating and drinking exercises whilst keeping the affected eye open.

Patients were also taught expression exercises, which consisted of working with the use of certain muscles towards an expression, or working from an expression as a starting point for a movement. Other expressions were evoked by asking the patients to open the eyes wide (surprise), lift the upper lip (disgust), or tighten the lips (anger).

Electrical stimulation was provided daily after heat therapy and massage. For stimulating muscles completely (or nearly completely) denervated, patients received interrupted galvanic stimulation of 100 milliseconds rectangular pulses to evoke 3 sets of 30 minimal contractions. During each session, ES was stopped once muscle fatigue occurred.

Data analysis

The statistical data analysis was performed with SPSS version 17.0 for Windows XP and included descriptive statistics (frequencies, percentages, averages and standard deviation); the internal stratified analysis was based on the outcome of complete and incomplete recovery. Hypothesis testing was accomplished by means of χ^2 test to compare the proportions of categorical data and the Mann-Whitney U test to compare the averages of age, as this did not have a normal distribution. The age distribution shape was contrasted with the Kolmogorov-Smirnov test. Significance was set at $p < 0.05$ for all contrasts. The magnitude of the association between the prognostic factors and the recovery outcome was estimated with odds ratios (OR) and 95% confidence intervals.

Factors considered as prognostic were analyzed first in separate, after identifying those that were significant, they were chosen to be introduced in the binary logistic regression analysis to predict the probability of incomplete or complete recovery. The best cutting point of 40 years (more or less) was established through a ROC (Receiver Operating Characteristic) curve, and by calculating the probability ratios according to age strata.

RESULTS

Population characteristics

Of the 251 patients, 63.7% (160) were women and 36.3% (91) were men. Gender did not represent any statistical difference concerning the grade of functional recovery ($p = 0.24$). We detected a higher frequency of palsy in the age-group ≥ 40 years than in < 40 years (the age average was of 45.1 with a standard deviation of 18.0 years (rank 2-96 years). The 104 patients with an incomplete recovery were 47.7 ± 17.1 year-old and those with complete recovery were 42.0 ± 19.6 year-old ($p = 0.02$). The frequency rates were higher in married individuals and among housewives (Table 1).

The variables analyzed per separate that did not associate significantly with the complete and incomplete outcome were: Gender, marital status, schooling, cause, symptoms, sidedness, degree of palsy, and type of drug treatment. Variables that associated with the recovery outcome were age, antecedents of familial facial palsy, and physical therapy; in consequence, only these last three variables were introduce into the logistic regression analysis, which confirmed that only age and therapy were significant to predict the recovery outcome.

Aethiology and symptoms

Idiopathic palsy was the most frequent etiology. The prognosis of having a complete recovery was more favorable in patients presenting familial Bell's palsy. This favorable prognosis associated with familial palsy was observed only in women (64.4% *vs.* 43.1%, $p = 0.22$, OR = 0.41) whereas, in men, complete or incomplete recovery was independent from the familial antecedents of Bell's palsy ($p = 0.61$; OR = 1.0) (Table 2). In patients with facial palsy related to diabetes mellitus-hypertension (DM-HT) and familial palsy, 75% had a complete recovery, contrasting with 28.6% of those who had no-familial palsy (OR = 0.13; $p = 0.048$) (Table 3). The incidence rate during the rainy months of the year was higher than in the cold and warm months. Regarding concomitant symptoms, 16.7% had the four characteristic symptoms (hyper lacrimation, dysgeusia, post-auricular pain, and photophobia); 63.4% presented one of the four, or combinations of two or three of the four symptoms. Almost half of the patients experienced post-auricular pain, simultaneously with the palsy or at 2 to 3 days before or after the onset of palsy. The pain was located deep in the mastoid region; it usually persisted for one to several weeks and required analgesia. There was not significant association between the symptoms and the grade of functional recovery ($p = 0.31$).

Regarding the affected side, 54.5% (137) of the patients presented left facial palsy (primary and recurrent) and 41.5% (104) had right facial palsy (primary and recurrent), and there was no association between the side of the palsy and the complete recovery ($p = 0.48$).

Table 1. Sociodemographic, clinical and etiological characteristics of the studied population with facial palsy at the INR (n = 251).

Characteristics	Frequency (%)
• Sex	
- Female	160 (63.7)
- Male	91 (36.3)
• Age (years)	
0-29	52 (20.7)
30-49	87 (34.7)
50-69	95 (37.8)
70-90	17 (6.8)
• Marital status	
- Married	133 (53.0)
- Single	66 (26.3)
- Other	52 (20.7)
• Occupation	
- Housewives	94 (37.5)
- Employed	35 (13.9)
- Unemployed	25 (10.0)
- Students	24 (9.6)
- Others	73 (29.0)
• Etiology	
- Idiopathic palsy	91 (36.3)
- Hypertension	35 (13.9)
- Hypertension-Diabetes mellitus (HT-DM)	29 (11.6)
- Herpes Zoster	14 (5.6)
- Diabetes mellitus	13 (5.2)
- Others/not specified	69 (27.4)
• Familial facial palsy	
- Yes	65 (25.9)
- No	132 (52.6)
- Not specified	54 (21.5)

Characteristics	Frequency (%)
• Season	
- Rainy	97 (38.6)
- Cold	83 (33.1)
- Warm	66 (26.3)
- Not specified	5 (2.0)
• Symptoms	
- Dysgeusia	9 (3.6)
- Phonophobia	2 (0.8)
- Hyper lacrimation	24 (9.6)
- Post-auricular pain	24 (9.6)
- Dys*-Ph*	1 (0.4)
- Dys-HypL*	16 (6.3)
- Dys-PAP*	9 (3.6)
- Ph-HypL	7 (2.8)
- Ph-PAP	6 (2.4)
- HypL- PAP	20 (7.9)
- Dys-Ph-HiperL	9 (3.6)
- Ph-HyperL-PAP	16 (6.3)
- Dys-Ph-HyperL-PAP	42 (16.8)
- Dys-HyperL-PAP	12 (4.8)
- DysPh-PAP	5 (2)
- Not specified	6 (2.4)
- None	43 (17.1)
• Face side	
- Left	
Primary	115 (45.8)
Recurrent	22 (8.8)
- Right	
Primary	87 (34.7)
Recurrent	17 (6.8)
- Not specified	10 (4.0)

***Dys**: Dysgeusia. **Ph**: Phonophobia. **Hyp**L: Hyper lacrimation. PAP: Post auricular pain.

Table 2. Stratified analysis between recovery and familial facial palsy.

Recovery	Familial Bell's palsy Yes (%)	Familial Bell's palsy No (%)	Total
Men			
Incomplete	8 (53.3)	26 (53.1)	34
Complete	7 (46.7)	23 (46.9)	30
Women			
Incomplete	16 (35.6)	37 (56.9)	53
Complete	29 (64.4)	28 (43.1)	57

Table 3. Stratified analysis between recovery and familial facial palsy in patients with DM-HT.

	Familial Bell's palsy Yes (%)	Familial Bell's palsy No (%)	Total
Incomplete	2 (25.0)	10 (71.4)	12
Complete	6 (75.0)	4 (28.6)	10
Total	8	14	22

Recovery time and functional recovery

Recovery time was significantly different according to the season in which the facial palsy appeared (with a distant distribution of normal K-S = 3.80, p = 0.0001). The recovery time was higher in the warm season (12.8 ± 17.7 months) than in the rainy (4.7 ± 6.0 months) and cold seasons (8.2 ± 8.0).

Table 4. Average of complete and incomplete recovery time by season and patients age.

Recovery Season	Age group (years)	Recovery time* (Average/SD)	N
Incomplete			
Cold	≥ 40	8.9 (2.1)	26
	< 40	3.6 (3.2)	11
Warm	≥ 40	22.9 (2.6)	16
	< 40	11.1 (3.2)	11
Rainy	≥ 40	4.4 (1.8)	34
	< 40	4.2 (5.3)	4
Complete			
Cold	≥ 40	9.7 (3.4)	10
	< 40	8.3 (2.6)	16
Warm	≥ 40	9.3 (2.5)	18
	< 40	6.0 (3.1)	20
Rainy	≥ 40	5.8 (2.2)	23
	< 40	3.4 (2.6)	16

* Months.

Table 5. Characteristics of handling and resolution of facial palsy in the population studied at the INR (n = 251).

Characteristics	Frequency (%)
• Treatment	
B-complex vitamins	85 (33.9)
Steroids/ B-complex	67 (26.7)
Others	25 (10.0)
Steroids	17 (6.8)
Combinations (steroids-B-complex-antiviral)	17 (6.8)
No treatment	22 (8.8)
Not specified	18 (7.2)
• Physical therapy	
Yes	218 (86.8)
No	19 (7.6)
Not specified	14 (5.6)
• Recovery	
Incomplete	104 (41.5)
Complete	98 (39.0)
Not specified	49 (19.5)

Table 6. Binary logistic regression to predict the probability of incomplete recovery from the facial palsy in patients treated at the INR.

Variables	B coefficient	OR	CI 95%	p
Age ≥ 40 years	0.809	2 24	1.2-4.1	0.010
No physical therapy	1.926	6.85	1.4-32.1	0.015
Constant	- 4.869	0.008	-	0.003

The averages in the recovery time of the patients who presented facial palsy in the warm season were significantly different from those of the rainy (p = 0.0001) and cold seasons (p = 0.023); nevertheless, those of the rainy and cold season did not differ significantly (p = 0.15) (Table 4).

The time for recovery was age dependent (p = 0.023) and on the relation between season and type of recovery (p = 0.010). The mean time for recovery was longer in the > 40 years group, independently from the season of symptoms onset. The cases initiated in the cold season took less time for incomplete recovery and more time for complete recovery. In contrast, the cases that had the onset in the warm season took a very short time for complete recovery and a very long time when recovery was incomplete. Finally, the rainy season cases (the most frequent ones) showed short full recovery times and took slightly longer for complete or incomplete recovery.

Drug therapy prescribed was as follows:

- 33.9% (85) of patients received vitamin-B-complex only.
- 26.7% (67) received both, steroid and vitamin-B-complex.
- 6.8% (17) received only steroids.
- 6.8% (17) steroids plus vitamin-B-complex and acyclovir.
- 8.8% (22) received no treatment.
- 7.2% (18) received non-specified treatment.

There was no association between the treatment and complete recovery (p = 0.43) (Table 5).

After evaluation of all the parameters studied, logistic binary regression showed that only age (> 40 years) and lack of physical therapy were significantly associated with incomplete recovery (Table 6).

DISCUSSION

It is clear that hospital-based studies of Bell's palsy must be treated with extreme caution when considering descriptive epidemiology. It has been suggested that the low hospital referral rate may have resulted in failure to identify the real causes of facial pal-

sy which have repercussion on their physical management and medical treatment.

The present study revealed that the incidence of idiopathic facial palsy is higher in women than in men in a proportion of 1.75:1, as has been reported by Campbell and Brundage.[27] We found no association between gender and the grade of functional recovery ($p = 0.24$), suggesting that this factor does not influence the prognosis of the disease.

Age is a parameter that influences the prognosis of the disease. We observed that the highest number of cases occurred in the age-group ≥ 40 years. This age range was strongly associated (OR = 2.4; CI 95 % from 1.3 to 4.3, $p = 0.002$) and could be a useful prognosis factor for incomplete recovery. The prognosis proved to be more favorable in the younger age range (< 40 years), as has been reported in the literature.[5]

The idiopathic palsy was the most frequent etiology. Genetics may play an important role since different authors agree with the fact that facial palsy transmits with an autosomal dominant inheritance pattern; however, which factors are actually inherited remains unknown.[28,29] We found that the prognosis of having a complete recovery was more favorable if the patients presented familial Bell's palsy; therefore, this antecedent resulted in a protective prognosis factor towards an incomplete recovery (OR = 0.54; CI 95% from 0.28 to 1.01, $p = 0.039$). This could be due to the fact that patients seek medical care immediately and, consequently, receive treatment within the acute stage of the disease.

In our study, the largest number of cases occurred during the rainy season followed by the cold season, contrasting with the findings reported by Gregg,[30] who found an increase of facial palsy during the warm season, and by De Diego, *et al.*,[31] who reported the highest number of cases during the cold season. Incidence of facial palsy varies largely in different parts of the world, which could reflect changes in the onset of the disease along the years and the diverse geographical areas. Campbell and Brundage[27] suggest that changes in temperature, ultraviolet radiation, exposure to cold, dry, or humid air present in the winter and summer months can exert a traumatic effect on the membranes of the nasopharyngeal mucosa, which could induce reactivation of infections due to herpes.[27]

Evaluation of the treatment and physical therapy is difficult due to the usually high percentage of spontaneous recovery. Many patients show signs of functional recovery as early as 10 days after onset, even without treatment. Conservative treatment was of course designed to reduce edema, ischemia, congestion and compression, and thus to prevent total degeneration.[14] The success of steroids and/or antiviral in improving the prognosis of Bell's palsy depends on their early intake (preferably within the first 24 hour from the onset of paralysis) in the appropriated doses.[14] In our study, the treatment prescribed based on steroids, B-complex vitamins, and acyclovir had no significant association with the complete recovery; this could be due to the fact that most of the patients did not seek immediate medical attention, that is why they received treatment after one or three weeks of the onset of the palsy.

The beneficial effect of the physical therapy that improves facial symmetry has been reported to be an effective method for rehabilitating facial musculature.[32,33] Stimulation with direct excitation of muscle fibers has failed to achieve any objective clinical validation and some authors have opposed its use for fear of enhancing contracture or interfering with reinnervation[34-38] and with neural regeneration post peripheral nerve injury.[39,40] Although electro stimulation has no demonstrable beneficial effect in enhancing the functional or cosmetic outcomes in patients with Bell's palsy[41] it continues to be used in treatment of facial palsy.[42-46]

Under this context, electro stimulation was found to enhance axonal regeneration in facial nerve lesion[47] and it was also suggested that early initiation of electro stimulation after denervation injury, might maintain normal motor unit characteristics, and might improve functional recovery.[48] Therefore, electro stimulation seems to be benefit, and the decision for using it in facial palsy may be left for the opinion of the treating physiatrist. We agree with the fact that it is necessary further research on this field, because there are few controlled clinical trials to support its effectiveness in facial palsy.

Although we did not evaluate the effects of electrical stimulation alone in our patients, we found that the lack of physical therapy including the application of electrical stimulation, raised the risk of incomplete recovery up to 6.4-times of that achieved with physical therapy (CI 95% from 1.4 to 29.6, $p = 0.006$); therefore, individualized facial neuromuscular re-education was more effective in improving facial symmetry than conventional therapeutic measures.

Concerning the outcome measure of severity of palsy using the House-Brackmann Facial Grade System (HBFGS), although there are other scoring systems such as Yanagihara grading system, the Sunnybrook scales and various others that have good

repeatability with more reliable results; the most widely applied is the HBFGS which is the standard test and has been shown to have a good inter-rate reliability; although its sensitivity to change in facial symmetry is low.[49-51]

CONCLUSIONS

We conclude that the proportion of cases with incomplete recovery in our population is high, so it is important that patients seek medial attention within 72 hrs of initiated the facial palsy. Age and lack of physical therapy were the only two significant prognosis factors for an incomplete recovery.

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Correspondence and reprint request:

Laura Sánchez-Chapul, PhD
Laboratorio Bioquímica Muscular
Instituto Nacional de Rehabilitación
Av. México-Xochimilco Núm. 289
Col. Arenal de Guadalupe
14389, México, D.F.
Tel.: 5999-1000 Ext. 19505
Fax: 5603-9127
E-mail: lchapul@yahoo.com

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