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Prognostic Factors for Recovery in Bell's Palsy

ABSTRACT

Background: To evaluate prognostic factors and the effects of pharmacologic and non-pharmacologic therapeutic interventions on the recovery of patients with Bell's Palsy (BP).

Methods: Cross-sectional study of patients admitted to a tertiary hospital with a diagnosis of BP between January 2010 and December 2020. Variables assessed: affected hemiface, degree of BP, comorbidities, smoking history, pharmacological treatment, physiotherapy and degree of recovery at third month.

Results: A total of 87 patients were enrolled. No statistically significant difference was found between patients treated with corticosteroids and those treated with corticosteroids in combination with antivirals. Similarly, no statistically significant difference was observed between patients who received physiotherapy and those who did not. Hypertension, smoking, and higher grade H-B were associated with incomplete recovery ($P = .042$, .014, .028, and .037, respectively) and were identified as predictors of poor prognosis. A hypertensive patient is 3.020 times more likely to have an incomplete recovery than a normotensive patient ($P = .047$, CI: 1.017-8.967), while a smoker is 3.897 times more likely to have an incomplete recovery than a non-smoker ($P = .018$, CI: 1.263-12.208). Patients with H-B grade V are 10.714 times more likely to have an incomplete recovery than patients with H-B grade II ($P = .046$, CI: 1.046-109.784).

Conclusion: Hypertension, smoking, and higher H-B grade were significantly associated with incomplete recovery and poor prognosis. Patients treated with corticosteroids alone or in combination with antivirals showed no significant difference in the recovery rate. Similarly, no statistically significant difference was observed between patients who received physiotherapy and those who did not.

Keywords: Bell's palsy, prognostic factors, corticosteroids, antivirals

INTRODUCTION

Bell's palsy (BP), or idiopathic peripheral facial nerve palsy, is the most common cause of acute unilateral facial paralysis.[1] The annual incidence of this condition ranges from 20 to 30 cases per 100 000 people.[2-4] The peak incidence occurs between 15 and 40 years of age. Both sexes are equally affected, but pregnant women have a higher incidence rate (45 cases per 100 000). Bell's palsy is equally likely to occur on both sides of the face.[2]

The underlying pathophysiologic mechanism of this pathology remains uncertain, but the reactivation of the herpes virus has been identified as a causal factor.[5,6] Microcirculatory disturbances are known to cause ischemia followed by edema. Inflammation and edema of the facial nerve in the Fallopian tube lead to its compression and subsequent dysfunction. Corticotherapy has been used extensively in the treatment of BP due to its ability to reduce edema and inflammation, thereby reducing neurological damage and improving outcomes. The treatment of BP is primarily pharmacologic.[7-9] In addition to corticosteroids, antivirals have been suggested in the literature as a causal factor in viral reactivation.[5-9] The efficacy of various treatment options, especially non-pharmacological interventions, is controversial, which accounts for the differences in therapeutic approaches.[7-9]

Approximately 70% of people with BP recover completely within 6 months without treatment.[2] However, 30% experience sequelae such as residual paresis or paralysis, contractures, synkinesis, and ocular complications.[2]

Pedro Marques Gomes
Diogo Cunha Cabral
André Alves Carção
José Ferreira Penêda
Delfim Duarte
Paula Azevedo

Department of Otorhinolaryngology, Hospital Pedro Hispano, Unidade Local de Saúde de Matosinhos, Porto, Portugal

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E-mail: *pedrommarquesgomes@hotmail.com*
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Objectives

To evaluate prognostic factors and the effects of pharmacologic and non-pharmacologic therapeutic interventions on the recovery of patients with BP.

MATERIAL AND METHODS

After approval of the study by the Hospital Pedro Hispano Clinical Research Ethics Committee (Approval no: 22 Date: 14/05/2022), a retrospective cross-sectional study was conducted between January 2010 and December 2020. Informed consent was obtained from all subjects. Patients with paralysis due to trauma, infectious middle ear complications (acute and chronic otitis media), zoster oticus, and cerebellopontine angle tumors were excluded from the study. Clinically, the following variables were evaluated: hemifacial involvement, initial assessment BP grade (according to the H-B scale), comorbidities (hypertension, diabetes mellitus, and dyslipidemia), smoking, pharmacological treatment (including corticosteroid and/or antiviral therapy), physiotherapy, and degree of recovery at 3 months (complete recovery = H-B grade I). No exclusion criteria were applied regarding the timing of pharmacological treatment or the initiation of physiotherapy. The data sample was characterized using descriptive analysis, with frequencies and percentages used for categorical variables and means and standard deviations for continuous variables. Normality of the data was assessed using the Shapiro–Wilk test. Nonparametric tests, Fisher's exact test, and Pearson's Chi-squared test were used to analyze the relationship between prognostic factors and overall recovery, with a significance level of $P < .05$. Logistic regression was used to predict the rate of complete or incomplete recovery, considering only the independent variables selected from the bivariate analysis ($P < .05$). Statistical analysis was performed using IBM SPSS version 28.0 (IBM SPSS Corp.; Armonk, NY, USA).

RESULTS

There were 115 cases of BP between 2010 and 2020. After exclusion due to incomplete clinical information, 87 patients were included in our study (Table 1). The mean age was 49.30 years, with a higher representation of females and patients older than 50 years. Of the total sample, 23.6% reported smoking, and 31.5% had hypertension. At the time of diagnosis, the majority of patients (67.8%) were classified as H-B class III/IV.

Table 1. Demographic and Clinical Characteristics (n = 87)

Variables	n	%
Gender		
Female	51	58.6
Male	36	41.4
Age		
<50 years	40	46.0
≥50 years	47	54.0
Diabetes mellitus	16	18.0
Dyslipidemia	25	28.1
Hypertension	28	31.5
Smoking	21	23.6
Affected side		
Right	59	67.8
Left	28	32.2
Grade of H-B		
I	0	0.0
II	16	18.4
III	26	29.9
IV	33	37.9
V	12	13.8
VI	0	0.0
	Mean ± DP	Median, variation
Age, years	49.30 ± 18.38	51.00, 18-93
Grade of H-B	3.47 ± 0.95	4.00, 2-5

The majority were treated with corticosteroids in combination with antivirals (92.0%). Almost the entire sample was referred to physiotherapy (95.4%). Complete recovery was observed in 80.5% of patients (Table 2).

Hypertension, smoking, and higher H-B grade were associated with incomplete recovery (Table 3; $P = .042$, .014, .028, and .037). There was no statistically significant difference between patients treated with corticosteroids alone and those treated with corticosteroids in combination with antivirals (Table 4; $P = .174$). There was also no statistically significant difference between patients who received physiotherapy and those who did not ($P = .778$).

Hypertension, smoking, and higher grades H-B were identified as predictors of poor prognosis (Table 5). A hypertensive patient

Table 2. Treatment and Degree of Recovery

Variáveis	n	%
Pharmacological		
Corticosteroid	7	8.0
Corticosteroid + antiviral	80	92.0
Physiotherapy	83	95.4
Recovery		
Incomplete	17	19.5
Complete	70	80.5

MAIN POINTS

- Bell's palsy, or idiopathic peripheral facial nerve palsy, is the most common cause of acute unilateral facial paralysis.
- The underlying pathophysiologic mechanism of this pathology remains uncertain, but the reactivation of the herpes virus has been identified as a causal factor.
- Treatment of BP is mainly pharmacological (corticosteroids with/without antivirals).
- Hypertension, smoking, and higher H-B grades were significantly associated with incomplete recovery and poor prognosis.
- Patients treated with corticosteroids alone or in combination with antivirals showed no significant difference in the recovery rate. Similarly, no statistically significant difference was observed between patients who received physical therapy and those who did not.

Table 3. Prognostic Factors and Association with the Degree of Recovery

	Recovery		
Prognostic Factor	**Incomplete**	**Complete**	***P***
Gender			
Female	10 (19.6)	41 (80.4)	.985
Male	7 (19.4)	29 (80.6)	
Age			
<50 years	7 (17.5)	33 (82.5)	.658
≥50 years	10 (21.3)	37 (78.7)	
Affected side			
Right	8 (13.6)	51 (86.4)	.080
Left	6 (21.4)	22 (78.6)	
Diabetes mellitus			
Yes	1 (6.3)	15 (93.8)	.138
No	16 (22.5)	55 (77.5)	
Dyslipidemia			
Yes	7 (28.0)	18 (72.0)	.206
No	10 (16.1)	52 (83.9)	
Hypertension			
Yes	9 (32.1)	19 (67.9)	**.041**
No	8 (13.6)	51 (72.9)	
Smoking			
Yes	8 (38.1)	13 (61.9)	**.014**
No	9 (13.6)	57 (86.4)	
Grade of H-B			
II	1 (6.3)	15 (93.8)	
III	2 (5.1)	24 (92.3)	**.028**
IV	9 (27.3)	24 (72.7)	
V	5 (41.7)	7 (58.3)	

Table 4. Type of Treatment and Association with the Degree of Recovery

	Recovery		
Treatment	**Incomplete**	**Complete**	***P***
Pharmacological			
Corticosteroid	0 (0.0)	7 (100.0)	.174
Corticosteroid + antiviral	17 (21.3)	63 (78.8)	
Physiotherapy			
Yes	16 (19.3)	67 (80.7)	.778
No	1 (25.0)	3 (75.0)	

is 3.020 times more likely to have an incomplete recovery than a normotensive patient (*P* = .047, CI: 1.017-8.967); a smoker is 3.897 times more likely to have an incomplete recovery than a non-smoker (*P* = .018, CI: 1.263-12.208); and a grade V H-B patient is 10.714 times more likely to have an incomplete recovery than a grade II H-B patient (*P* = .046, CI: 1.046-109.784).

DISCUSSION

While most cases of BP have a positive prognosis, approximately 10%-30% of cases result in permanent facial dysfunction.[2] Therefore, it is crucial to identify risk factors for poor prognosis and to provide timely treatment to high-risk patients. This study investigates the prognostic factors that increase the likelihood of persistent facial dysfunction and examines the efficacy of pharmacological (corticosteroid therapy with or without antiviral medication) and non-pharmacological (physiotherapy) treatments.

The study cohort had a mean age of 49.3 years, exceeding the peak incidence reported in a number of studies.[1,2] The literature suggests that the prevalence of this pathology is virtually the same in both sexes, but it is more common in women at older ages;[2] in our study, we observed a female prevalence. Neither of the aforementioned factors (age and gender) was found to be associated with the degree of recovery. However, some studies suggest that advanced age may be a poor prognostic factor for BP recovery.[1]

We used the H-B classification system because it is the most commonly used method for assessing the degree of paralysis in BP. A higher H-B grade (I-VI) at diagnosis was associated with poorer recovery, while a lower grade was associated with a greater chance of complete recovery (*P* = .028). These findings are consistent with those reported in similar studies.[2,10,11]

Our study revealed associations between incomplete recovery and hypertension and smoking (*P* = .041 and .014). A review of the literature revealed that few studies have evaluated this association,[12] and no association has been reported between hypertension and smoking and the degree of recovery. From a pathophysiological standpoint, smoking has been shown to exacerbate peripheral vascular disease due to its vasoconstrictive effects.[13] In BP, the compression of the facial nerve against the Fallopian canal appears to result in neurological ischemia,

Table 5. Multivariate Analysis of Prognostic Factors (Incomplete Recovery)

Prognostic Factor	***B* Coefficient**	**Standard Error**	**Odds Ratio**	**95 % CI**	***P***
Gender	0.487	0.803	1.628	0.337-7.854	.544
Age	0.675	0.833	1.963	0.384-10.049	.418
Affected side*	−1.309	0.690	0.270	0.070-1.044	.058
Diabetes mellitus	−1.594	1.259	0.203	0.017-2.395	.205
Dyslipidemia	−0.138	0.945	0.871	0.137-5.5456	.884
Hypertension	1.227	0.864	3.020	1.017-8.967	**.047**
Smoking	1.448	0.909	3.897	1.263-12.208	**.018**
Grade of H-B**	−3.137	1.415	10.714	1.046-109.784	**.046**

*Left side used as the reference category.
**Grade V of H-B used as the reference category.

which is exacerbated by the vasoconstrictive effects of tobacco. In addition, hypertension is a significant factor in both vasoconstriction and ischemia,[14] further exacerbating the neurologic distress caused by facial nerve compression. In addition to their association with incomplete recovery, hypertension, smoking, and higher grade H-B have been identified as predictors of poor prognosis, resulting in higher odds of incomplete recovery.

There was no statistically significant difference between patients treated with corticosteroids and those treated with corticosteroids plus antivirals ($P = .174$). According to the American Academy of Otolaryngology-Head and Neck Surgery[7] guidelines, corticosteroid therapy is indicated in patients over 15 years of age with new-onset BP (within the first 72 hours). The use of antivirals alone is not recommended. These premises are reinforced by the guidelines of the French Society of Otolaryngology[8] and the Canadian Society of Otolaryngology and Head and Neck Surgery.[9] Antivirals in combination with corticosteroids have not been shown to be beneficial in the treatment of BP according to recent randomized controlled trials and prospective studies,[15,16] but some retrospective studies have not completely excluded their benefit.[17] Because of the potential small benefit in terms of recovery and the relatively low risk of this type of drug, the American Academy of Otolaryngology-Head and Neck Surgery[7] has concluded that combination therapy can be started in patients seen within 72 hours of onset. In addition, the guidelines of the French Society[8] and the Canadian Society[9] state that this combination should be reserved for patients with severe BP (grade H-B ≥ V); acyclovir 400 mg 5 times a day or valacyclovir 1 g 3 times a day are suggested. In our study, almost all patients were treated with corticosteroids in combination with antivirals, regardless of the severity of BP at diagnosis.

There was no statistically significant difference between patients treated with and without physiotherapy ($P = .778$). A recent systematic review[18] concluded that there is no high-quality evidence of benefit for any type of physical therapy for BP. These conclusions were supported by the American Academy guidelines.[7] On the other hand, the French Society guidelines[8] state that physiotherapy may be useful in cases of severe BP or incomplete recovery (expert opinion); the Canadian Society guidelines[9] suggest physiotherapy only in cases of incomplete recovery (expert opinion). In our study, almost all patients were referred to physiotherapy, regardless of the severity of the BP or the progression of the disease.

Ultimately, a complete recovery rate of 80.5% was achieved, indicating that 19.5% of patients had persistent facial paralysis after treatment. This rate is consistent with previous findings.[2,10,11]

The study has several limitations, including a retrospective design and potential selection bias due to the assessment of the degree of BP by multiple otolaryngologists. Third, the degree of paralysis was assessed using the H-B scale, but the poor prognostic factor of synkinesis was not evaluated. It should be noted that no exclusion criteria were applied regarding the timing of pharmacological treatment, which represents a limitation of the study, and the recovery period was taken as 3 months instead of 6 months. Finally, it is important to note that the sample was obtained from a single center and may not be fully representative. These limitations could be addressed by conducting large-scale multicenter prospective studies or meta-analyses.

Hypertension, smoking, and a higher H-B grade were significantly associated with incomplete recovery and predicted a poor prognosis. No significant difference in the recovery rate was observed between patients treated with corticosteroids alone and those treated with corticosteroids in combination with antivirals. Physiotherapy was not significantly associated with improved outcomes.

Ethics Committee Approval: This study was approved by the Ethics Committee of Pedro Hispano Hospital (Approval no.: 22, Date: 14/05/2022).

Informed Consent: Informed consent was obtained from the patients who agreed to take part in the study.

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