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RESEARCH

GERIATRIC BELL'S PALSY; RISK FACTORS AND LABORATORY RESULTS

Abstract

Introduction: Idiopathic facial paralysis or Bell's palsy is the most common type of peripheral facial paralysis. Advanced age and systemic diseases, such as diabetes and hypertension are considered as negative prognostic factors for Bell's palsy still controversial. Here, we aimed to compare the epidemiologic features and prognostic factors of patients with Bell's palsy aged ≥65 years.

Materials and Method: Records of patients with Bell's palsy (age, ≥65 years) who were admitted to our clinic between January 2008 and December 2017 were evaluated.

Results: We included 89 (72.4%) patients with Bell's palsy. The patients' ages varied between 65 and 91 (72.70 ± 5.9) years. Paralysis was in the right side in 59.6% (n = 53) and in the left side in 40.4% (n = 36) of the patients. Three (3.4%) patients had progressive facial paralysis. One (1.1%) had positive family history. After at least 6 months of follow-up, 71 (79.8%), 10 (11.2%), 6 (6.7%), and 2 (2.25%) patients were diagnosed with grade 1 and 2, 3, 4, and 5 Bell's palsy, respectively. Furthermore, a statistically significant correlation was observed between the initial paralysis grade and neutrophil-to-lymphocyte ratio (p=0.001).

Conclusion: Although old age is considered as a negative prognostic factor in patients with BP, we observed satisfactory recovery rates in geriatric patients who received appropriate treatment. In addition, a significant correlation was observed between the initial grade of facial paralysis and neutrophil-to-lymphocyte ratio upon admission, which can be considered as a prognostic factor.

Keywords: Bell palsy; Geriatrics; Inflammation; Neutrophils; Blood platelets; Prognosis

ARAŞTIRMA

GERİATRİK BELL PARALİZİSİ; RİSK FAKTÖRLERİ VE LABORATUVAR SONUÇLARI

Öz

Giriş: İdiopatik fasiyal paralizi ya da Bell paralizisi (BP) tüm yaş gruplarında görülebilen göreceli olarak sık bir durumdur. Farklı çalışmalarda ileri yaş, diyabet, hipertansiyon gibi eşlik eden sistemik hastalıklar BP'de kötü prognostik faktör olarak belirtilmesine rağmen bu konular hala tartışmalıdır. Bu çalışmamızda 65 yaş ve üstü BP tanısı almış hastalarda epidemiyolojik özellikler ve prognostik faktörler incelendi.

Gereç ve Yöntem: Ocak 2008-Aralık 2017 tarihleri arasında, paralizi sonrası en az 6. ay kontrolleri olan BP tanısı ile tedavi ve takip edilen altmış beş yaş ve üstü hastaların dosyaları retrospektif olarak tarandı.

Bulgular: Çalışmaya BP tanılı 89 hasta dahil edildi. Hastaların yaşları 65 ile 91 arasında (72.70±5.9) idi. Paralizilerin sağ tarafta görülme oranı % 59.6 (n=53); sol tarafta % 40.4 (n=36) idi. Üç (%3.4) olguda progresif fasiyal paralizi saptandı. Bir (%1.1) olguda aile anamnezi pozitifti. En az altı aylık takip sonunda 71 hasta (%79.8) evre 1-2, 10 hasta (%11.2) evre 3, 6 hasta (%6.7) evre 4, 2 hasta (%2.25) evre 5 olarak saptandı. Başvuru evresi yüksekliği ile Nötrofil Lenfosit Oranı (NLO) arasındaki ilişki anlamlı saptandı (p=0.001).

Sonuç: BP prognozunda ileri yaş negative bir prognostik faktör olarak kabul edilse de, uygun tedavi ile geriatrik hastalarda tatmin edici iyileşme oranları elde ettik. Ayrıca, prognostik faktör olarak değerlendirilebilecek olan NLO ile başvuru esnasındaki yüksek fasiyal sinir paralizisi derecesi arasında anlamlı bir korelasyon gözlendi.

Anahtar sözcükler: Bell paralizisi; Geriatri; İnflamasyon; Nötrofil; Trombosit; Prognoz

INTRODUCTION

The possible causes of facial nerve paralysis (FNP) include genetic predisposition and vascular ischemia as well as inflammation due to viral infections, autoimmune diseases, temporal bone fractures, head and neck tumors, and lesions of the central nervous system (1). Idiopathic facial paralysis, also known as Bell's palsy (BP), is the most common type of peripheral facial paralysis (PFP) (1). Peripheral facial nerve paralysis is typically self-limiting and presents with an acute onset with unknown causes. Moreover, peripheral facial nerve paralysis affects all muscle groups in just one side of the face (2). The clinical findings of BP usually vary according to the localization of the facial nerve lesion. BP can be observed in all age groups and is relatively common with a frequency of 20–30/100,000 people aged 15–45 years (3). Its incidence among men and women is equal, and 9% of all patients have a history of previous paralysis; approximately 0.3% of all patients have bilateral paralysis (3). Based on several studies, concomitant systemic diseases, such as diabetes and hypertension; advanced age; late-onset medical treatment; and discontinuation of drugs are still considered the negative prognostic factors of BP; however, still controversial (1-3). Besides, there are very few studies focused on geriatric patients, who we think require special attention, both for multiple conditions that may accompany due to advanced age and possible treatment difficulties (1-3).

Thus, we aimed to investigate the epidemiologic features, accompanying diseases, and treatment responses of geriatric patients with BP. We also analyzed the laboratory results to find out a possible prognostic factor among blood markers.

MATERIALS AND METHOD

We evaluated the records of patients aged over 65 years who received treatment for peripheral facial palsy in our clinic between January 2008 and December 2017, with a minimum follow-up period of 6 months. The institutional review board of our institution approved this retrospective study (approval no: 01/01.08.2018). Age, sex, duration from the onset to the treatment, previous history of facial palsy, accompanying diseases such as diabetes mellitus, hypertension, coronary heart disease and malignancies, associated symptoms, such as pain and skin eruption around the affected ear, hyperacusis, upper respiratory tract infection history, family history of facial paralysis, neurootologic examination and laboratory tests (Hemogram, serum biochemistry panel, serologic tests for Herpes Simplex Virus-1 (HSV) and Varicella Zoster Virus (VZV), radiologic tests such as cranial magnetic resonance and/or computer tomography, and treatment results of all patients were evaluated. Patients with paralysis were considered as BP if any specific cause could not be detected. During the first consultation and evaluation of treatment outcomes, the House–Brackmann (HB) facial nerve grading system was used to identify the degree of paralysis (4) (Table 1). In patients diagnosed with progressive facial paralysis, only the last grade of facial paralysis was taken into account.

At our clinic, the treatment of BP includes oral or intravenous methyl prednisolone (1 mg/kg/day) at tapered doses for 14 days. Further, antiviral therapy was included for the treatment of patients with positive serologic tests for HSV and VZV. Moreover, all the patients were assessed by an ophthalmologist for possible ophthalmic complications and a physical therapist for a suitable physical therapy program that includes facial muscle training. All patients underwent an initial blood test prior to treatment; and the neutrophil-to-lymphocyte ratio (NLR), platelet-to-lymphocyte ratio (PLR), mean platelet volume (MPV), and fasting blood glucose (FBG, mg/dl) levels of all patients were examined. Radiographic imaging methods were used in patients who did not improve and/or progressed after 3 weeks.

Statistical Analysis

Descriptive statistics (arithmetic mean, median, minimum, maximum, standard deviation, and standard error) were first calculated on the basis

Table 1. House Brackman (HB) Facial Palsy Grading System.

Grade	Appearance	Forehead	Eye	Mouth
I	Normal	Normal	Normal	Normal
II	Slight weakness Normal resting tone	Moderate to good Movement	Complete closure Minimal effort	Slight asymmetry
III	Non-disfiguring weakness Normal resting tone	Slight to moderate Movement	Complete closure Maximal effort	Slight weakness Maximal effort
IV	Disfiguring weakness Normal resting tone	None	Incomplete closure	Asymmetric with Maximal effort
V	Minimal movement Asymmetric resting tone	None	Incomplete closure	Slight movement
VI	Asymmetric	None	None	None

of the obtained data. Spearman's rho correlation analysis, Kruskal–Wallis test, and Mann–Whitney U-test were performed in accordance with the data distribution. $p<0.05$ was considered statistically significant. The Statistical Package for the Social Sciences (SPSS, v.25.0) software was used for statistical analysis.

RESULTS

Of the total 123 patients with PFP who were aged≥65 years, 33 (27.6%) patients without BP were excluded. While paralysis was secondary to cerebrovascular disease in 12 (9.8%) of these patients, 8 (6.5%) were presented with Ramsey Hunt syndrome, 8 (6.5%) had chronic otitis media, 2 (1.6%) had malignant external otitis, 2 (1.6%) had temporal bone fracture secondary to trauma and 1 (0.8%) had temporal bone squamous cell carcinoma. The remaining 89 (72.4%) patients considered as BP were included in the study. The period from the onset of the disease to admittance to the hospital ranged from 1 to 7 (mean, 2.81 ± 1.89) days. Three (3.4%) patients were diagnosed with progressive facial paralysis. While one (1.1%) patient had a positive family history PFP, seven (7.8%) patients had a history of a recent upper respiratory tract infection. No recurrent and/or bilateral cases of facial paralysis were observed. The patients' ages ranged from 65 to 91 (mean, 72.70 ± 5.9) years. Of the patients, 48.3% (n = 43) were male and 51.7% (n = 46) were female. The average follow-up period ranged from 6 to 108 (mean, 41.31±26.07) months. Paralysis was observed on the right side in 59.6% of the patients (n = 53); while it was on the left side in 40.4% (n = 36) of them. Patients' initial paralysis grades were summarized in table 3.

At the end of at least 6 months of follow-up, 45 (50.6%), 26 (29.2%), 10 (11.2%), 6 (6.7%), and 2 (2.25%) patients presented with grade 1, 2, 3, 4, and 5 facial paralysis, respectively (Table 2). When facial paralysis was investigated in terms of seasonal distribution, 26 (29.2%), 24 (27%), 19 (21.3%), and 20 (22.5%) patients presented with paralysis during the spring, winter, summer, and fall months, respectively (Table 2). While 13 (14.6%) patients had diabetes mellitus (DM), 10 (11.2%) patients had hypertension (HT), 3 (3.4%) patients had coronary heart disease (CHD) 26 (29.2%) patients had DM, HT and CHD concomitantly, 8 (9%) patients had malignancies such as liver cirrhosis, acute lymphoblastic

Table 2. Patient characteristics.

	Frequency	Percent
gender		
woman	46	51.7
man	43	48.3
season		
winter	24	27.0
spring	26	29.2
summer	19	21.3
autumn	20	22.5
side		
right	53	59.6
left	36	40.4

leukemia, chronic lymphoblastic leukemia, laryngeal carcinoma, and bladder tumor; and 1 (1,1%) patients had chronic obstructive pulmonary disease, 2 patient (2,2%) of the had Alzheimer's disease, 1 patient (1,1%) had hypothyroidism. No systemic diseases were observed in the rest 25 (28.1%) of the patients (Table 3). When the correlation between the initial paralysis grade and the NLR, PLR, MPV, and FBG levels was assessed, a significant correlation was observed between the pre-treatment grade and NLR (p=0.00). Namely, as the grade increases, the NLR also increases. When treatment responses were evaluated, we found that, treatment response rates were higher in patients with advanced grade and high NLR ($p<0.05$). (Table 4)

No association was found between gender and pre-treatment ($p = 0.845$) and post-treatment grades ($p = 0.954$).

Cranial magnetic resonance examination of 44 patients who did not exhibit complete recovery after 3 weeks of treatment revealed no pathologic intracranial lesions or facial nerve pathologies.

Table 3. Clinical grades and accompanying diseases of the patients.

	Frequency	Percent
Gradepre (HB)		
2	14	15.7
3	31	34.8
4	23	25.8
5	18	20.2
6	3	3.4
Gradepost (HB)		
1	45	50.6
2	26	29.2
3	10	11.2
4	6	6.7
5	2	2.2
Accompanying diseases		
Dm	13	14.6
Ht	10	11.2
chd	3	3.4
hypothyroidism	1	1.1
copd	1	1.1
alzheimer	2	2.2
malignancy	8	9.0
dm+ht+cad	26	29.2
no disease	25	28.1

House Brackmann (HB), Diabetes Mellitus (DM), Hypertension (HT), Coronary Heart Disease (CHD), Chronic Obstructive Pulmonary Disease (COPD)

Table 4. . Correlation analysis results.

	r	p
Gradepre-NLR	0.392	0.001
Gradepre-PLR	0.045	0.672
Gradepre-MPV	0.07	0.512
Gradepre-FBG	-0.02	0.853
NLR-PLR	0.076	0.481
NLR-MPV	0.049	0.647
NLR-FBG	0.071	0.509
PLR-MPV	-0.001	0.995
PLR-FBG	-0.078	0.468
MPV-FBG	-0.085	0.427

Neutrophil to Lymphocyte ratio (NLR), Platelet to Lymphocyte ratio (PLR), Mean Platelet Volume (MPV), Fasting Blood Glucose (FBG, mg/dl)

DISCUSSION

BP is the most common cause of unilateral facial paralysis and accounts for 60%–70% of all FNP cases (5). Surgical treatment is generally recommended for cases where no regeneration is observed on electrophysiological tests or no clinical recovery (5). Hence, the prognosis of BP is extremely good, approximately 85% of all patients exhibit significant clinical recovery within 3-4 weeks (5). Previous studies have reported that 71% of all patients exhibit complete recovery of mimic muscle function, whereas 29% of the patients experience some kind of sequelae, such as fatigue, contraction, hemifacial spasm, or synkinesis of the facial muscles (5). Corticosteroids (CSs) are the most common agents used for the treatment of BP (6). Treatment with CSs, which is particularly initiated during the first week of disease onset, leads to muscle function recovery and reduces the complication rates (6). The use of antiviral agents is beneficial for the treatment of facial paralysis caused by HSV-1; however, its benefits for the treatment of BP are limited (6). CSs are recommended in the treatment of BP because they reduce edema and regenerate the facial nerve; further, CSs have motor function healing properties (6). The benefits of using CSs are supported by several randomized controlled studies (6). Treatment with CSs within the first 3 days of paralysis in patients with BP results in complete recovery of facial functions within 3–9 months as compared with placebos (6). A study reported that patients who received high doses of intravenous prednisolone and vitamins within the first 72 of the onset of paralysis had a better facial recovery rate compared with the control group who only received vitamins (7). Axelsson et al. (8) reported a considerable increase in the recovery rate when prednisolone treatment was initiated within 48 hours in patients aged >40 years. Moreover, Yeo et al. (9) reported that prednisolone treatment results in a high recovery rate in patients aged >60 years. Some studies also reported that HT, old age, and high degree of facial paralysis are the negative prognostic factors of BP and that 39% of the patients aged >60 years had HT (9,10). Moreover, when treatment is initiated within 72 hours of onset, the recovery rate is reportedly high in all age groups (10). Other studies have also reported that old age and comorbidities, such as DM, HT, CAD are negative prognostic factors for BP (11-13).

FNP related to HT may be caused by microhemorrhage in the facial nerve and vascular lesions (13,14). Moreover, DM also causes neuropathy (14). Although there is no proven correlation between DM and BP, some studies support the fact that the presence of DM is a possible etiologic factor of BP, which is found in 5%–20% of all patients (15,16). Inflammation and edema in a region where in the facial nerve passes through a narrow passage, such as the labyrinthine segment, stretch due to an impaired microvascular circulation related to DM and ischemic reasons are thought to be predisposing factors for paralysis (15,16). DM can also be a predisposing factor for PFP owing to the immunosuppressive effects of VZV (Ramsay Hunt syndrome) (16). Furthermore, it is more challenging to plan treatment with CS patients with DM (14-16). Bosco et al. (15) reported on DM for the first

time in 29 (19%) of 148 patients (age range, 47–65 years) with BP. In the present study, we identified DM, HT and/or CAD in 53 (59.5%) patients but these conditions did not alter our treatment plan since we hospitalized all of these patients with high risk for close monitorization.

Several studies concerning the relationship between BP and climate have shown that the incidence of BP increases during winter. Frequent and prolonged exposure to cold causes vasomotor changes in the facial region, thereby leading to reflex ischemia and edematous neuritis or reactivation of the HSV-1, which is in the latent state in the ganglion cells (17,18).

Progressive facial paralysis might be observed in some cases with BP. Kasse et al. (17) reported fulminant progressive facial paralysis rates between 27.5% and 72.5% among 1521 BP cases; they concluded that the progressive course is considerably correlated with a negative prognosis. In the current study, two (n=2.3%) patients presented with progressive facial paralysis. Both patients were presented with HB grade 3 and increased to grade 4 and 5, and they both had DM. After 6 months, one patient completely recovered, and the other regressed to grade 2.

Although the literature suggests the possibility of bilateral occurrence, we did not encounter such a case in our series. Most studies did not observe differences in terms of sex and side of the paralysis, as we found in our study (17-19).

Cha et al. (19) reported that 91.6% of the patients regressed to HB grade 1 and 2 at the end of 6 months. In the present study, approximately 80% of the patients regressed to grade 1 and 2. This relatively lower incidence may be attributed to the high incidence of accompanying risk factors among geriatric patients.

Several pathogens, such as the Epstein–Barr virus, cytomegalovirus, mumps virus, rubella virus, VZV, coxsackie virus, M. pneumoniae, and HSV-1 play roles in the etiology of PFP (20). Therefore, antiviral agents are frequently used to treat PFP. In the double-blind study conducted by Adour et al. (21), patients with BP were treated with acyclovir and prednisolone for 10 days. Compared with placebos and prednisone treatment, such treatments are considerably more effective in restoring facial muscle functions within 3 days of treatment onset. We identified HSV-1 DNA serology in 2 of the 7 patients with a history of upper respiratory tract infection. In patients with herpes simplex, acyclovir and standard steroids were administered for 10 days. Both patients had DM and were admitted with grade 3 and 4 paralysis. Complete recovery was observed in both patients at the end of 6 months.

Several recent studies have utilized the NLR and MPV as inflammation markers. Moreover, a high NLR was reported in studies involving patients with BP (22,23). Bucak et al. (22) reported that the NLR is considerably higher in patients with facial paralysis who did not recover even after the 1-year follow-up period compared to those who recovered. Kum et al. (23) reported a significant relationship between the grades of facial paralysis and NLR. In a similar study, Özler et al. (24) reported considerably high levels of NLR in patients who did not recover from facial paralysis within 3 months of treatment follow-up. Moreover, a correlation was found between the grades of facial paralysis and NLR upon admission. We observed significantly high rates of the NLR in patients with a high onset grade of facial paralysis ($p<0.01$); however, no significant correlation was observed between the MPV, TLR, and FBG levels and facial paralysis degree. We also found that higher NLR rates were associated with poor prognosis (Table 4.).

CONCLUSION

Although old age is considered a negative prognostic factor of prognosis in patients with BP, we observed satisfactory recovery rates in geriatric patients who received appropriate treatment. In addition, a significant correlation was observed between the grades of facial paralysis and NLR upon admission, and this can be considered a prognostic factor. Further multicenter studies with a larger sample size are warranted to confirm these results.

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