

Do diabetic patients with Bell's palsy benefit from corticosteroids?*

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Abstract

Objective: To evaluate the beneficial effect of steroid therapy in the treatment of diabetic patients with Bell's palsy (BP).

Methods: There were three patient groups in the present retrospective study. Group I consisted of diabetic patients with BP who were hospitalized for corticosteroid treatment, whereas Group II was composed of diabetic patients with BP who refused to receive steroid therapy after being informed about the adverse effects of the regimen. Thirty age- and sex-matched non-diabetic BP patients treated with steroid therapy on an outpatient basis constituted Group III. House-Brackmann (H-B) grades at onset and 12 months after facial paralysis, mean complete recovery time and the number of patients who demonstrated satisfactory recovery were compared between the groups.

Results: There was no statistically significant difference with regard to H-B grades, mean recovery time or number of patients with satisfactory recovery at onset and 12 months after facial paralysis among the study groups.

Conclusion: In diabetic patients with BP, the recovery of facial functions may be satisfactory without steroid therapy as long as the regulation of blood sugar and blood pressure levels are ensured with regular medical follow-up.

Keywords: Bell's palsy, diabetes mellitus, corticosteroids.

Özet: Bell palsili diyabet hastaları kortikosteroidlerden fayda sağlar mı?

Amaç: Bell palsili (BP) diyabet hastalarının steroid tedavisinden sağladığı yararı değerlendirmek.

Yöntem: Bu retrospektif çalışmada üç hasta grubu bulunmaktaydı. Grup I kortikosteroid tedavisi için hastaneye yatırılmış BP'li diyabet hastalarını, Grup II tedavi rejiminin olumsuz etkileri hakkında bilgilendirildikten sonra steroid tedavisini reddeden hastaları içermektedir. Yaş ve cinsiyete göre eşleştirilmiş, ayaktan steroid tedavisi görmüş 30 diyabetik olmayan BP hastası ise Grup III'ü oluşturmuyordu. Yüz felcinin başlangıcında ve 12 ay sonra House-Brackmann (H-B) skorları, ortalama toparlanma süresi ve tatminkâr iyileşme gösteren hasta sayısı gruplar arasında karşılaştırıldı.

Bulgular: Çalışma grupları arasında H-B derecesi, ortalama derlenme süresi, başlangıçta ve yüz felcinden 12 ay sonra tatminkâr iyileşme açısından istatistiksel olarak anlamlı bir fark yoktu.

Sonuç: BP'li diyabet hastalarında, kan şekeri ve kan basıncı düzeyleri düzenli medikal takiple ayarlandığı müddetçe steroid tedavisi uygulanmadan da yüz fonksiyonları tatminkâr derecede yeniden kazanılabilir.

Anahtar sözcükler: Bell palsisi, diabetes mellitus, kortikosteroidler.

Bell's palsy (BP) is an idiopathic acute-onset peripheral facial nerve dysfunction that constitutes the most common cause of lower motor neuron facial palsy.^[1] The annual incidence of BP is about 20–30 persons per 100,000 with no sex predilection.^[2] The etiology of BP has not yet been fully clarified; however, viral infection, vascular ischemia, autoimmune inflammatory disorders, and heredity have been proposed as underlying mechanisms.^[3–5] The progno-

sis is favorable, with 71% of patients with BP being reported to recover without any treatment.^[1] In the literature, corticosteroid therapy was found to have a beneficial effect in the treatment of BP with a high level of evidence according to randomized controlled trials.^[6] On the other hand, compelling evidence has not been reported to support antiviral therapy, physical therapy, acupuncture or surgical decompression over placebo in the treatment of BP.^[7–10]

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Microcirculatory failure of the vasa nervosum due to diabetic microangiopathy,^[11,12] and also direct nerve injury caused by hyperglycemia,^[13] indicated diabetes mellitus (DM) as an etiologic and prognostic factor in BP theoretically. However, studies investigating the relationship between BP and DM regarding incidence, disease severity and prognosis demonstrated conflicting results in the literature.^[14-18] Although corticosteroids have a well-known adverse effect on blood sugar levels, regulation of blood sugar can be ensured with the administration of adequate insulin and close monitoring of blood sugar during steroid therapy.^[15]

In the present study, we aimed to evaluate the beneficial effect of steroid therapy in the treatment of diabetic patients with BP.

Materials and Methods

This retrospective study was carried out from the medical records of patients with BP who were referred to the Department of Otorhinolaryngology Head and Neck Surgery of the Kayseri Training and Research Hospital between January 2012 and June 2016. Approval for the study protocol was obtained from the Ethics Committee of the university (2017/16) and written informed consent was obtained from the participants. There were three patient groups in the present study, and no children were included. Group I consisted of 44 diabetic patients with BP who were hospitalized for corticosteroid treatment, whereas Group II was composed of 29 diabetic patients with BP who refused to receive steroid therapy after being informed about the adverse effects of the regimen. Thirty age- and sex-matched non-diabetic BP patients treated with steroid therapy on an outpatient basis constituted Group III. All patients received corticosteroid treatment consisting of 1 mg/kg intravenous methylprednisolone for the initial three days, which was tapered 10 mg every second day until termination in Groups I and III. Serum glucose levels were measured six times a day with finger prick testing, and appropriate insulin treatment was administered under surveillance of the endocrinology depart-

ment in Group I during the hospitalization. The participants in Group II were administered medication for eye protection without corticosteroid regimen and were also referred for endocrinology consultation for the close follow-up to regulate blood sugar levels. All participants also received close medical follow-up for blood pressure control in this study.

Presence of hypertension, HbA1c values, hospital referral time, House-Brackmann (H-B) grades at onset and 12 months after facial paralysis, recovery status, mean recovery time and also side effects of the corticosteroid regimen were evaluated from the medical records of the patient groups. According to the final evaluation of facial functions, H-B grades I and II were considered as a satisfactory recovery.

The diagnosis of DM and hypertension was made according to the medical history and hospital records of the patients. The H-B system was utilized to grade the severity of facial nerve dysfunction in both groups.^[19] The grades of facial paralysis were evaluated at hospital referral for BP and one year after the onset of facial dysfunction. The patients with H-B grade 2 and patients who were referred to the hospital more than seven days from the onset of the disease were not included in the study.

Statistical analysis was conducted using the Statistical Package for the Social Sciences (v. 15; SPSS Inc., Chicago, IL, USA). Mann-Whitney U and Kruskal-Wallis tests were carried out to compare age, HbA1c values, the number of patients with hypertension, mean hospital referral time and mean recovery time between the groups. Chi-square test was used for categorical variables. Data are presented as mean±SD and a p-value less than 0.05 was considered significant for all comparisons.

Results

There was no statistically significant difference with regard to age, sex, HbA1c values, the number of patients with hypertension, mean hospital referral time and mean recovery time between the groups (Table 1). The recovery status

Table 1. Demographic and clinical characteristics of the study groups.

	Group I (n=44)	Group II (n=29)	Group III (n=30)	p-value
Age	61.3±9.5	57.4±8.1	57.2±10.1	.102
Gender (F/M)	29/15	18/11	17/13	.723
HbA1c	8.88±1.89	9.46±2.39		.717
Hypertension	27/44	19/29	15/15	.448
Mean hospital referral time (day)	2.7±1.1	2.9±2.3	2.5±1.1	.707
Mean recovery time (day)	47.5±20.4	54.5±36.6	39.8±16.9	.232

F/M: Female/Male.

Table 2. House-Brackmann grades at onset and 12 months after facial paralysis in the study groups.

		H-B 1-2/6	H-B 3/6	H-B 4/6	H-B 5/6	H-B 6/6
Group I (n=44)	Onset	0	25	15	1	3
	12 months	37	2	1	3	1
Group II (n=29)	Onset	0	13	10	3	3
	12 months	22	2	2	2	1
Group III (n=30)	Onset	0	16	10	3	1
	12 months	26	2	0	2	0

H-B: House-Brackmann.

according to H-B grades at onset and 12 months after facial paralysis in the groups is shown in Table 2. There was no significant difference at onset ($p=0.724$) and 12 months after facial paralysis ($p=0.736$) in terms of the number of patients classified according to H-B grades between the groups. The H-B grades of the patients without satisfactory recovery are shown in Table 3. There were eight patients without satisfactory recovery in both Groups I and II, which accounted for 18.2% and 27.6%, respectively. In Group III, there were four patients (13.3%) without satisfactory recovery, and the difference was not significant regarding the number of patients with satisfactory recovery between the groups ($p=0.377$). No adverse effect was recorded related to corticosteroid treatment.

Discussion

Corticosteroid therapy in diabetic patients with BP has been investigated in several studies with various results in the literature.^[14-17] In the study of Kanazawa et al.,^[14] which involved 19 diabetics and 57 non-diabetic BP patients treated with corticosteroids, the facial movement was found to be significantly poorer in the diabetic group than the non-diabetic group at three and six months after the onset of paralysis. They also showed that the recovery rate in the diabetic group was much lower than that in the non-diabetic group. In contrast, Akkuzu et al.^[15] reported that DM was not a poor prognostic indicator if treated with corticosteroids in diabetic BP patients. Riga et al.^[16] demonstrated full recovery at six months after the onset of facial paralysis in 17 of 20 diabetic patients with BP who were treated with steroid therapy. They stated that pre-existing nerve ischemia may act as a preconditioning nerve lesion and may explain the good recovery of diabetic patients, similar to non-diabetic patients. Saito et al.^[17] showed that high dose steroids were highly effective in treating diabetes-accompanied Bell's palsy. The conflicting results in the studies investigating the influence of DM

on the severity and prognosis of BP may arise from a number of facts including the differences between the studies in terms of corticosteroid dosing regimens, number of participants, and the presence of comorbid diseases such as hypertension and multiple predisposing factors (i.e. ischemia of the facial nerve, genetic factors, inflammation and viral infections) relevant to BP, which constitute a challenge in adjusting covariables.

In the present study, although the satisfactory recovery rate and mean recovery time were better in Group I than those in Groups II and III, the difference was not significant between the groups. These results were different from the previous studies that showed a beneficial effect of corticosteroids on prognosis in diabetic patients with BP.^[14-17] The discrepancy between our study and the previous studies was possibly due to differences in the study design. In the studies of Kanazawa et al.^[14] and Akkuzu et al.,^[15] the comparison was performed between diabetic and non-diabetic BP patients, whereas Riga et al.^[16] reported the results of steroid therapy for BP within the group of patients who had DM, hypertension, and hyperlipidemia in their study. Saito et al.^[17] had a high cure rate in diabetic patients with the administration of a higher dose steroid regimen than our study. Unlike these studies, there was a third group (Group II) that consisted of diabetic patients who refused steroid administration due to adverse effects and also there was no significant difference with regard to

Table 3. Number of patients without satisfactory recovery in the study groups.

	H-B 3/6	H-B 4/6	H-B 5/6	H-B 6/6	Total
Group I (n=44)	3	1	3	1	8/44
Group II (n=29)	3	2	2	1	8/29
Group III (n=30)	2	0	2	0	4/30

H-B: House-Brackmann.

the presence of hypertension and hospital referral time between the groups in the present study. It is also noteworthy that patients with hypertension received close medical follow-up for controlling blood pressure in our study. Although there was no administration of steroid therapy in Group II, the satisfactory recovery rate and mean recovery time was not significantly different than those in Groups I and III, which may be explained by the fact that patients in Group II received close medical follow-up for DM and hypertension in order to regulate blood sugar and blood pressure levels. Even short-term amelioration in glycemic control has been reported to have an additive, independent and durable effect on the restoration of nerve function in patients with diabetic polyneuropathy.^[20] Therefore, we concluded that in diabetic patients with BP, the recovery of facial functions might be satisfactory without steroid therapy as long as regulation of blood sugar level and pressure are ensured with regular medical follow-up. Corticosteroid therapy was initiated with 1 mg/kg intravenous methylprednisolone in Groups I and III, and none of the participants received antiviral therapy, physical therapy, acupuncture and/or surgical decompression in the present study. Although various corticosteroid dosing regimens are recommended in clinical practice guidelines for the treatment of BP,^[21-23] no universal consensus exists in the literature regarding the optimal dose of corticosteroid therapy in patients with BP. Especially in diabetic patients with BP, administration of high dose corticosteroid therapy should be considered with caution due to the adverse effects of steroids on blood glucose levels, though this issue needs further investigation. On the other hand, none of the participants received antiviral therapy, physical therapy, acupuncture and/or surgical decompression, as these treatment options are not included in the routine management of patients with BP in our clinic, since there is no clinical evidence of the superiority of these therapies over placebo in the literature.^[8-11]

Our study has some limitations. First, due to the retrospective design of the study, we were not able to adjust all variables such as duration of DM, type of antidiabetic treatment including oral antidiabetic or insulin before the onset of BP and the presence of other metabolic comorbidities including hyperlipidemia between the groups. Also, facial nerve functions were evaluated only with the H-B system, which has been criticized for insufficient sensitivity in detecting recovery since the patients with BP may have contrasting degrees of function in different parts of the face.^[23,24] Despite the H-B grading system being a

simple and reliable method in clinical practice for assessing facial function,^[25] electrophysiological studies such as electroneurography may provide a quantitative assessment of the degree of facial dysfunction.

Conclusion

To the best of our knowledge, the present retrospective study is the first report comparing the recovery status between corticosteroid administered and non-administered diabetic patients with BP. In diabetic patients with BP, the recovery of facial functions may be satisfactory without steroid therapy as long as the regulation of blood sugar level and pressure are ensured with regular medical follow-up.

Conflict of Interest: No conflicts declared.

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