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RESEARCH

## EVALUATION OF TREATMENT OUTCOMES AND PROGNOSTIC FACTORS FOR IDIOPATHIC PERIPHERAL FACIAL PARALYSIS IN GERIATRIC PATIENTS

### ABSTRACT

**Introduction:** To evaluate the treatment outcomes and prognostic factors in geriatric patients undergoing corticosteroid therapy for idiopathic peripheral facial paralysis.

**Materials and Method:** The medical records of the patients treated for idiopathic peripheral facial paralysis with corticosteroids were analyzed retrospectively. The severity of IPFP in patients was assessed using House-Brackmann grading system, with grades from 1 to 6. The HB grades of the patients before the therapy and 6 months after therapy were determined and complete recovery rates were calculated. Complete recovery was defined as House-Brackmann grade I. The effects of diabetes mellitus and the duration between the onset of paralysis and the initiation of treatment on prognosis were investigated.

**Results:** The complete recovery rate of patients treated within 72 hours (86.7%) was significantly higher than the complete recovery rate of patients treated more than 72 hours after the onset of paralysis (55.5%). The complete recovery rate was 81.3% in patients with diabetes mellitus and 62.5% in those without diabetes mellitus. All diabetic patients in whom the therapy started within 72 hours had complete recovery, but only four of seven diabetics in whom therapy started after 72 hours completely recovered. No serious complications such as diabetic ketoacidosis developed after corticosteroid administration.

**Conclusion:** Complete recovery rate is high in geriatric patients, especially in those with diabetes, if corticosteroid therapy is administered within the first 72 hours of the onset of idiopathic peripheral facial paralysis. In addition to high complete recovery rates, low complication risk under close clinical monitoring supports the use of corticosteroids in the treatment of idiopathic peripheral facial paralysis in geriatric patients.

**Key Words:** Facial Paralysis; Recovery; Treatment Outcome; Diabetes Mellitus.



ARAŞTIRMA

## İDİYOPATİK PERİFERİK FASİYAL PARALİZİLİ GERİATRİK HASTALARDA TEDAVİ SONUÇLARININ VE PROGNOZİK FAKTÖRLERİN DEĞERLENDİRİLMESİ

### Öz

**Giriş:** İdiyopatik periferik fasiyal paralizi nedeniyle kortikosteroid tedavisi uygulanan geriatrik hastalarda tedavi sonuçlarının ve prognostik faktörlerin değerlendirilmesi.

**Gereç ve Yöntem:** İdiyopatik periferik fasiyal paralizi nedeniyle kortikosteroid ile tedavi edilen geriatrik hastaların dosya kayıtları retrospektif olarak incelendi. Hastalardaki idiyopatik periferik fasiyal paralizi şiddeti House-Brackmann derecelendirme sistemi kullanılarak, 1'den 6'ya kadar değerlendirildi. Hastaların tedaviye başlama anındaki ve tedaviden 6 ay sonraki HB dereceleri tespit edildi ve tam iyileşme oranları hesaplandı. House-Brackmann derece 1, tam iyileşme olarak tanımlandı. Diyabetes mellitusun ve paralizinin ortaya çıkışından tedavinin başlamasına kadar geçen sürenin prognoz üzerine etkisi araştırıldı.

**Bulgular:** Paralizinin başlamasından sonra ilk 72 saat içerisinde tedaviye başlanan hastalardaki tam iyileşme yüzdesi (%86.7), 72 saatten daha sonra tedaviye başlanan hastalardaki tam iyileşme yüzdesinden (%55.5) anlamlı olarak daha yüksekti. Tam iyileşme oranı diyabetes mellitusu olan hastalarda %81.3, diyabetes mellitusu olmayanlarda %62.5'ti. Diyabetes mellitusu olan ve paralizinin ortaya çıkmasından sonra ilk 72 saat içerisinde tedaviye başlanan hastaların tümü tam olarak iyileşti fakat ilk 72 saatten sonra tedaviye başlanan yedi diyabetik hastanın sadece dördü tam olarak iyileşti. Steroid tedavisini takiben diyabetik ketoasidoz gibi ciddi komplikasyonlar gelişmedi.

**Sonuç:** Geriatrik hastalarda, özellikle de diyabetes mellitusu olanlarda idiyopatik periferik fasiyal paralizi başlamasından sonra ilk 72 saat içerisinde kortikosteroid tedavisi başlanması ile yüksek tam iyileşme oranları sağlanabilmektedir. Yüksek tam iyileşme oranlarına ek olarak yakın klinik takip altında düşük komplikasyon riski, idiyopatik periferik fasiyal paralizili geriatrik hastaların tedavisinde steroid kullanımını desteklemektedir.

**Anahtar Sözcükler:** Fasiyal Paralizi; İyileşme; Tedavi Sonucu; Diyabetes Mellitus.



## INTRODUCTION

Idiopathic peripheral facial paralysis (IPFP), which is also known as Bell’s palsy, is an acute-onset disease characterized by asymmetrical facial deformity, and usually appears due to unilateral facial nerve involvement. Although factors such as Herpes virus infection, ischemia and autoimmunity have been blamed in its etiology, the real causative agent is not yet known (1,2). Diagnosis of acute IPFP is made after exclusion of all other etiologic factors that may cause facial paralysis. In IPFP, the motor loss can be a minimal paresis or complete paralysis depending on the degree of the facial nerve injury. Varying degrees of paresis caused by incomplete facial nerve injury and total paralysis caused by complete facial nerve injury must be differentiated with physical examination. It has been demonstrated that the prognosis of patients with incomplete IPFP, which shows itself with varying degrees of paresis, is better than that of patients with complete IPFP (3,4).

Studies investigating the factors that affect the IPFP prognosis such as the age of the patient, the time of onset of the therapy and diabetes mellitus (DM) have shown that these factors have significant effects on the severity of the paralysis and the healing process (3,5-7). It has been suggested that DM incidence, increasing with advanced age, increases both the risk of IPFP and the severity of the paralysis (2,8). Studies have shown that, although paralysis is more severe at the beginning in the elderly, their rate of improvement with systemic corticosteroids is better than the rate of improvement in the younger age groups (6). For this reason, administration of aggressive steroid therapy has been proposed in elderly patients. Although it has been shown that systemic steroids affect the healing process positively, the possibility of steroid-related side effects such as hyperglycemia, diabetic ketoacidosis, hypertension and infection has caused clinicians to hesitate before administering high dose steroids in the treatment of IPFP in geriatric patients. In the event of systemic steroid administration, these patients must be hospitalized and monitored closely, especially for blood glucose levels and blood pressure.

In this study, we aimed to investigate the treatment results, the effects of DM and the time of the onset of the therapy on the prognosis, and to document the complications related to corticosteroid therapy.

## MATERIALS AND METHOD

The study started after the approval of “Dokuz Eylül University Ethics Committee for Noninvasive Human

Research” (decree no: 2012/42-06). The files of patients with a diagnosis of IPFP who had been hospitalized and treated in Dokuz Eylül University Medical Faculty Ear Nose and Throat Department between 2000 and 2011 were analyzed retrospectively. The patients who were  $\geq$  60 years of age at the time of diagnosis and who were followed up regularly were included in the study. The patients who were diagnosed with DM as well as the ones without DM were identified. The duration between the onset of paralysis and the onset of therapy was calculated. The patients were divided into two groups, depending on the duration between the onset of the paralysis and the onset of therapy: those treated within 72 hours of the onset of IPFP and those treated after 72 hours. The severity of the facial paralysis was determined using the House-Brackmann (HB) grading system (9). The facial paralysis grades of the patients were determined at the beginning of therapy and 6 months after treatment (Table 1). An HB grade 1 was regarded as “complete recovery” 6 months after the treatment. The HB grades at the onset of therapy were compared for patients who had treatment within 72 hours of the onset of the paralysis and the ones who had therapy after 72 hours, in order to determine any differences in the severity of facial paralysis between the two groups. In order to analyze the effect of onset time of the treatment on prognosis, the HB grades of the two groups were compared at the beginning of therapy and 6 months after therapy. In both groups, the patients whose HB grades went back to grade 1 were identified, and complete recovery rates were calculated.

The diabetic and non-diabetic patients were compared with respect to HB paralysis grades at the onset of the disease to investigate whether diabetes increased the severity of the paralysis at the beginning. The diabetic and non-diabetic patients were also compared with respect to onset times of treatment, in order to determine any differences in onset time

**Table 1**— Comparison of Initial and Final House-Brackmann Grades of the Patients.

Initial Grade	Final Grade						Total
	I	II	III	IV	V	VI	
II	2	-	-	-	-	-	2
III	10	-	1	-	-	-	11
IV	5	-	1	1	-	-	7
V	1	-	-	-	1	1	3
VI	-	-	-	-	-	1	1
Total	18	-	2	1	1	2	24



of treatment between two groups. After 6 months, the patients whose HB grades went back to grade 1 were identified, and complete recovery rates were calculated for diabetics and patients without diabetes. A Mann-Whitney U test was used to compare the HB grades and the onset times of treatment of each group and  $p < 0.05$  was considered statistically significant. The complications that occurred during systemic corticosteroid treatment were also analyzed.

## RESULTS

There were 24 patients with a mean age of 74.1 years (range: 60-84 years), 14 males and 10 females. Sixteen patients had been previously diagnosed with type 2 DM. Fifteen patients had therapy within the first 72 hours of the onset of the paralysis while nine had treatment after 72 hours. For treatment of IPFP, all patients were hospitalized and given 1 mg/kg oral prednisolone, which was tapered 8 mg/every other day and then stopped. Before starting treatment, all diabetic patients had a consultation with the Endocrinology Department to regulate their subcutaneous insulin doses. The patients with a previous hypertension diagnosis as well as the ones who had high blood pressure upon their admission to hospital had a consultation with the Cardiology Department to arrange their antihypertensive medications. Blood glucose levels and blood pressures of the patients were closely monitored during their oral prednisolone therapies. In eight of the 16 diabetic patients, high blood glucose levels could not be regulated with subcutaneous insulin, and a mini dose insulin infusion was administered. Only one patient developed urinary tract infection; further, none of the patients had serious complications such as diabetic ketoacidosis or uncontrollable hypertension. The

average length of hospital stay was 10.5 days (range: 7-19 days).

The mean HB paralysis grade at admission was  $3.27 \pm 0.79$  in the patients who had therapy within 72 hours of the onset of the paralysis, and  $4.11 \pm 1.05$  in those who had therapy after 72 hours; no statistically significant difference was found between these two groups ( $p = 0.052$ ). Complete recovery was evident in 13 of 15 (86.7%) patients who had therapy within 72 hours of the onset of the paralysis, while five of nine (55.5%) patients who had therapy after 72 hours had complete recovery.

The mean HB paralysis grade at the beginning of the paralysis was  $3.56 \pm 0.96$  in diabetics and  $3.63 \pm 1.06$  in nondiabetics. The difference between the two groups was not statistically significant ( $p = 0.89$ ). Analysis of complete recovery rates 6 months after treatment revealed that 13 of the 16 (81.3%) diabetic patients had complete recovery while five of eight (62.5%) non-diabetic patients had complete recovery (Table 2).

Nine of the 16 patients (56.2%) with diabetes had steroid treatment within the first 72 hours while seven of them had steroids after 72 hours. Six of eight (75%) nondiabetic patients had steroid treatment within the first 72 hours while two of them had steroids after 72 hours. The mean onset time of treatment was  $3.31 \pm 2.72$  in diabetics and  $2.87 \pm 3.04$  in nondiabetics. The difference between the diabetics and nondiabetics was not statistically significant ( $p = 0.38$ ). All nine (100%) of the diabetics who had therapy within first 72 hours completely recovered; however, four of the seven (57%) diabetics who had therapy after 72 hours had a complete recovery. Complete recovery was evident in four of six (66.6%) nondiabetics who had therapy within 72 hours of the onset of the paralysis, while one of two (50%) nondiabetic patients

**Table 2—** Comparison of House-Brackmann Grades at the Onset of Therapy, Onset Times of Treatment and Complete Recovery Rates Relative to Onset Time of Treatment Between Diabetic and Nondiabetic Patients.

	Groups		p value <sup>a</sup>	All
	Diabetics	Nondiabetics		
n	16	8		24
Initial House-Brackmann grade, mean, (range)	$3.56 \pm 0.96$ (2-5)	$3.63 \pm 1.06$ (2-6)	0.89	$3.58 \pm 0.97$
Onset time of treatment, mean (range), days	$3.31 \pm 2.72$ (1-12)	$2.87 \pm 3.04$ (1-10)	0.38	$3.16 \pm 2.77$
Complete recovery (House-Brackmann grade 1)	81.3% (13/16)	62.5% (5/8)		75% (18/24)
Complete recovery relative to onset of treatment ( $\leq 72$ hours)	100% (9/9)	66.6% (4/6)		86.7% (13/15)
Complete recovery relative to onset of treatment ( $> 72$ hours)	57.1% (4/7)	50% (1/2)		55.5% (5/9)

n: number of patients, <sup>a</sup>Mann-Whitney U test.



**Table 3**— Complete Recovery Rates for Diabetic and Nondiabetic Patients.

Characteristics	Diabetic	Nondiabetic
n	16	8
Complete recovery (House-Brackmann grade 1)	81.3% (13/16)	62.5% (5/8)

who had therapy after 72 hours had complete recovery (Table 3).

## DISCUSSION

IPFP, also known as Bell’s palsy, is an acute-onset disease characterized by asymmetrical facial deformity that appears frequently due to injury of the facial nerve that innervates the facial muscles at the one side of the face (2). The weakness of the affected facial muscles causes both cosmetic and functional problems. The social life and quality of life of the patients are negatively affected due to these cosmetic and functional defects (10). Although it has been shown that approximately 80-85% of the patients with IPFP recover without any medical treatment, since both physicians and patients worry about the cosmetic and functional defects of a persistent facial paralysis, therapy is usually initiated immediately (2,8). Today, corticosteroids are the most commonly used agents in the treatment of IPFP. It has been suggested that the pathology in IPFP is ischemic nerve injury caused by the edema and inflammation of the facial nerve running in the Fallopian canal (11). This is why corticosteroids given in the early course of the disease are supposed to decrease edema, owing to their anti-inflammatory effects, and prevent progression of the ischemic injury (12-14). Previous studies have shown that corticosteroids administered within the first 72 hours of the appearance of paralysis increased recovery rates (6,12-15). Since corticosteroids have serious side effects such as deterioration of blood glucose levels and blood pressure regulation, their use is debated especially in elderly diabetic and hypertensive patients. On the other hand, in the elderly, it has been reported that paralysis is more severe at the beginning, and these patients benefit more from the corticosteroid treatment (5,6). These studies have shown that complete recovery in the elderly is significantly higher in those treated with corticosteroid therapy, compared to those who received a placebo (4-6).

Yeo et al. (5) studied the effect of the age of the patient on the prognosis of IPFP. They found that although patients

**Table 4**— Complete Recovery Rates of Diabetic Patients According to Onset of Treatment.

Characteristics	Diabetic ≤72 h	Diabetic >72 h
n	9	7
Complete recovery (House-Brackmann grade 1)	100% (9/9)	57.1% (4/7)

older than 61 years of age had more severe paralysis at the time of diagnosis, recovery rate was higher compared to the younger age groups. Therefore, they suggested use of aggressive corticosteroid therapy in patients who have severe facial paralysis at the time of diagnosis and are older than 61 years of age. Axelsson et al. (6) showed that 60-75-year-old patients treated with corticosteroids had significantly better outcomes compared to the ones who did not have corticosteroids. In this study, the authors also investigated the effect of the duration between the onset of the paralysis and the beginning of the treatment on the prognosis, and found that initiation of the steroid therapy within the first 48 hours resulted in significantly better recovery rates. Therefore, starting the therapy in the elderly as soon as possible has been proposed.

Our results showed that treatment started within the first 72 hours in 15 of 24 (62.5%) geriatric patients while 9 (37.5%) started treatment after 72 hours. At the 6 month follow up, complete recovery (HB grade 1) was evident in 13 of 15 (86.7%) patients who had treatment within the first 72 hours, while five of nine (55.5%) patients who had treatment after 72 hours had complete recovery. These results suggest that corticosteroid treatment must be started immediately after the onset of the facial paralysis in elderly patients.

Studies investigating the relationship between DM and IPFP showed that the rate of DM was higher in patients who had IPFP compared to the ones who had not had IPFP (16). The prevalence of DM increases in geriatric patients, and it increases the risk of IPFP; moreover, DM affects the prognosis of the disease negatively (2,7,16). It has been suggested that an increased tendency of diabetics to angioneuropathy and infections cause more severe ischemic injury in the facial nerve and, related to that, more severe paralysis in these patients (8,17-19). A study performed by Peitersen, which analyzed 2500 patients with IPFP in a period of 25 years, investigated the effects of DM and hypertension on the prognosis of the disease (8). In that study it was demonstrated that although facial paralysis started as an incomplete paralysis in 62% of the diabetic patients, the prognosis was poorer when



compared to the non-diabetics. This was proposed to be related to vascular circulatory disorders and diabetic polyneuropathy in the diabetic patients.

Sixteen patients in our study had been previously diagnosed with DM, and eight were not diabetics. When the HB grade scores at the onset of the paralysis were compared, there was no statistically significant difference between the diabetics and non-diabetics. This result suggests that diabetes does not increase the severity of the facial paralysis at its onset. Comparison of the recovery rates revealed that 81.3% (16/13) of the diabetics had complete recovery (HB grade 1), while this rate was 62.5% (8/5) in the ones without DM. This result indicates that diabetic geriatric patients respond better to the corticosteroids than non-diabetic ones.

Adour et al. (16) stated that there were no significant differences between diabetics and non-diabetics treated for IPFP with respect to treatment outcomes. Kanazawa et al. (7) found that the recovery rate in diabetic patients was much lower than that in non-diabetic patients at 6 months after onset of paralysis. However, similar to our study, Sittel et al. (20) reported that the recovery rate was higher in diabetic patients who received corticosteroids. In that study, 14 of 16 (87.5%) diabetic patients with IPFP who had 250 mg/day intravenous prednisolone recovered completely. In our study, we used 16 mg prednisolone tablets at a dose of 1 mg/kg/day, tapered half a tablet (8 mg) every other day and then stopped. Although our corticosteroid dose was lower than the one administered in the Sittel et al. study (20), our treatment outcomes were similar to theirs. Although we cannot compare our patients to the ones who were followed up without treatment, due to the lack of a diabetic control group in our study, complete recovery rate of 81.3% in treated diabetic patients makes us suggest the use of corticosteroids in diabetic patients with IPFP. When we analyzed the effect of therapy onset time on the complete recovery in diabetic patients in our study, we demonstrated that all nine (100%) patients who started treatment within the first 72 hours recovered completely, but only four of seven (57%) diabetics in whom treatment started after 72 hours had complete recovery. This result suggests that corticosteroid treatment must be started as soon as possible after the appearance of paralysis symptoms in diabetic patients.

Due to possible side effects of high - dose corticosteroids such as hyperglycemia, diabetic ketoacidosis, hypertension and infection, geriatric patients in particular must be monitored closely during the treatment. These patients must be hospitalized during their corticosteroid treatments for the sake of close monitoring. All geriatric patients were hospital-

ized for administration of corticosteroids in our study, and all diabetics were referred to the Endocrinology Department and their subcutaneous insulin treatments were started. The ones who were diagnosed with hypertension previously or who had high blood pressure during treatment were referred to the Cardiology Department, and their antihypertensive medications were regulated. A mini dose insulin infusion was needed in eight of 16 diabetics due to unsuccessful blood glucose control with subcutaneous insulin. One patient developed a urinary tract infection, but none of the patients had serious complications such as diabetic ketoacidosis or uncontrollable hypertension.

The major disadvantage of corticosteroids used in the treatment of IPFP in geriatric patients is the need for hospitalization and a long hospital stay, especially for diabetics. However, the risk of complications is low if blood glucose and blood pressure are monitored closely. Besides low complication rates, high complete recovery rates suggest that corticosteroid treatment is appropriate for geriatric patients with IPFP. Still, further multicenter studies with higher geriatric patient numbers are needed to determine optimum treatment regimes and doses that can ensure maximum treatment efficacy with minimum morbidity.

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