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Effect of etiological factors on treatment success of pediatric facial paralysis

Success of facial paralysis in children

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Abstract

Facial paralysis is a clinical condition that causes anxiety in the family and is one of the reasons for urgent admission to the hospital. The purpose of this article is to evaluate to reveal the relationship between etiology and treatment results in childhood facial paralysis.

Thirty-three patients who presented with facial paralysis between May 2018 and May 2020, had adequate follow-up were included in the study. Data were reviewed age, gender, side, etiology, features of family, treatment, results, and recurrences.

The ages of the cases ranged from 21 months to 17 years, with the mean age was 13.1 years. Ten of the cases were male (30.3%), 23 of them were female (69.7%). It was observed that 15 (45.4%) of the paralysis were on the right half of the face, 17 (51.5%) were on the left side of the face, and 1 (3.1%) had bilateral involvement. However, it was learned from the story that 3 cases had recurrence. Thirty-two (96.9%) of the cases were peripheral and 1 (3.1%) had central facial paralysis. No cause could be found in the etiology of other peripheral paralysis cases and it was considered as Bell Paralysis. According to the House Brackmann Stage at the time of admission of 30 patients who were given steroid treatment, 10 patients were evaluated as stage 6, 15 patients as stage 5, and 5 patients as stage 4. After 6 months of follow-up, 27 patients were evaluated as stage 1 and 2 patients as stage 2. Recurrence was not observed in any of the patients who recovered.

It was concluded that etiology determines the success of treatment in facial paralysis.

Abbreviations: BP = Bell paralysis, FP = facial paralysis.

Keywords: child, etiology, facial paralysis, success, treatment

1. Introduction

Facial paralysis (FP) is a clinical condition that society is not alien to, but its occurrence in childhood causes anxiety in the family and is one of the reasons for urgent admission to the hospital. FP is divided into 2 as central and peripheral. The incidence of peripheral FP varies between 11.5 to 53.3/100,000 in children.[1–4] It constitutes 60%-75% of unilateral FPs.[3] It is most common in the ages of 15-40.[4] Its incidence under the age of 15 has been reported to be 14%.[3] The etiology of FP is not clear. However, 5 main causes of genetic, vascular, metabolic, autoimmune and infectious have been reported.[5] The most common cause is idiopathic FP and is called Bell palsy (BP).[5,6] BP was described by the Scottish anatomist Charles Bell in 1828.[1,7] BP is defined as acute idiopathic lower motor neuron FP. The main symptom of the disease is 1-sided partial or complete paralysis of the face, which begins acutely. Medical treatment is the first treatment that includes supportive therapy in FP. Surgical treatment modalities can be considered in cases that do not heal. FP clinic is a troubling situation for the family, however, most of the patients regain their old condition with medical treatment.

The aim of this study is to evaluate the patients who applied with FP and to reveal the relationship between etiology and treatment results. Dramatic improvement is observed with treatment in patients with no etiologic factor is found and therefore called BP.

2. Patients and methods

This study was carried out with 33 pediatric patients who applied to our hospital with FP between May 2018 and May 2020, were retrospectively analyzed. Ethics Committee Approval (ODU KAEK 2020/183) was obtained for the study, and the medical records of the cases were examined. All patients were questioned about upper respiratory tract history, family history, recurrence status, additional disease, and medications; blood tests and radiological tests were evaluated. The House Brackmann Staging was used to make FP grading at the first examination of the patients (Table 1).[8,9] A flow diagram of our study was given (Fig. 1). IBM Statistical Package for the Social Sciences Statistics for Windows (SPSS Inc., Chicago, IL, USA), version 21.0, was

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All data generated or analyzed during this study are included in this published article [and its supplementary information files].

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Table 1

House Brackmann Staging.

Grade	Functional impairment
I	Normal
II	Mild dysfunction (slight weakness, normal symmetry at rest)
III	Moderate dysfunction (obvious weakness but not totally disfiguring, complete eye closure with effort and symmetric at rest)
IV	Moderately severe dysfunction (disfiguring weakness, incomplete eye closure, and asymmetric at rest)
V	Severe dysfunction (extreme weakness with minimal executive function, no motion in forehead and incomplete eye closure)
VI	Total paralysis (no movement)

used for analyzing of data. While evaluating the study data; categorical variables were expressed as n (%), normally distributed continuous variables as mean ± standard deviation, and non-normally distributed continuous variables, as median and minimum-maximum.

3. Results

Along with the ages of the patients ranged from 21 months to 17 years, the average age was 13.1 years. Ten of the cases were male (30.3%), 23 of them were female (69.7%). It was observed that 15 (45.4%) of the paralysis were on the right half of the face, 17 (51.5%) were on the left side of the face, and 1 (3.1%) had bilateral involvement. Family history was not present in any case. However, it was learned from the story that 3 cases had recurrence. Thirty-two (96.9%) of the cases were peripheral, and 1 (3.1%) was central FP. A large vascular malformation focus was found in cranial imaging of the central FP, and its etiology was attributed to it. Two of the peripheral FP cases were congenital, and 1 was due to trauma after tooth extraction.

One of them was being followed up with a diagnosis of ulcerative colitis, and this case was accepted as Melkersson-Rosenthal Syndrome, because half of the face had edema and fissured tongue. No cause could be found in the etiology of other FP cases, and it was evaluated as BP. As a seasonal application, 13 patients (most frequently in October) were admitted during the autumn months and at least 5 patients in the winter months.

Acute cases were admitted within the first 48 hours. Steroid treatment at a dose of 1 mg/kg was administered to all patients, except for 2 congenital cases and 1 case with intracranial arteriovenous malformation. The treatment was given for a total of 10 days with the gradual withdrawal of the steroid. Gastro-protective treatment was applied to all patients who were given steroids. Antiviral treatment was not given to any patient. Eye closure at night and eye protection with artificial tear drops were applied to patients who could not completely close their eyes. The patient with intracranial arteriovenous malformation was operated and a significant clinical improvement was observed immediately after the operation. Two congenital cases continued in the same way.

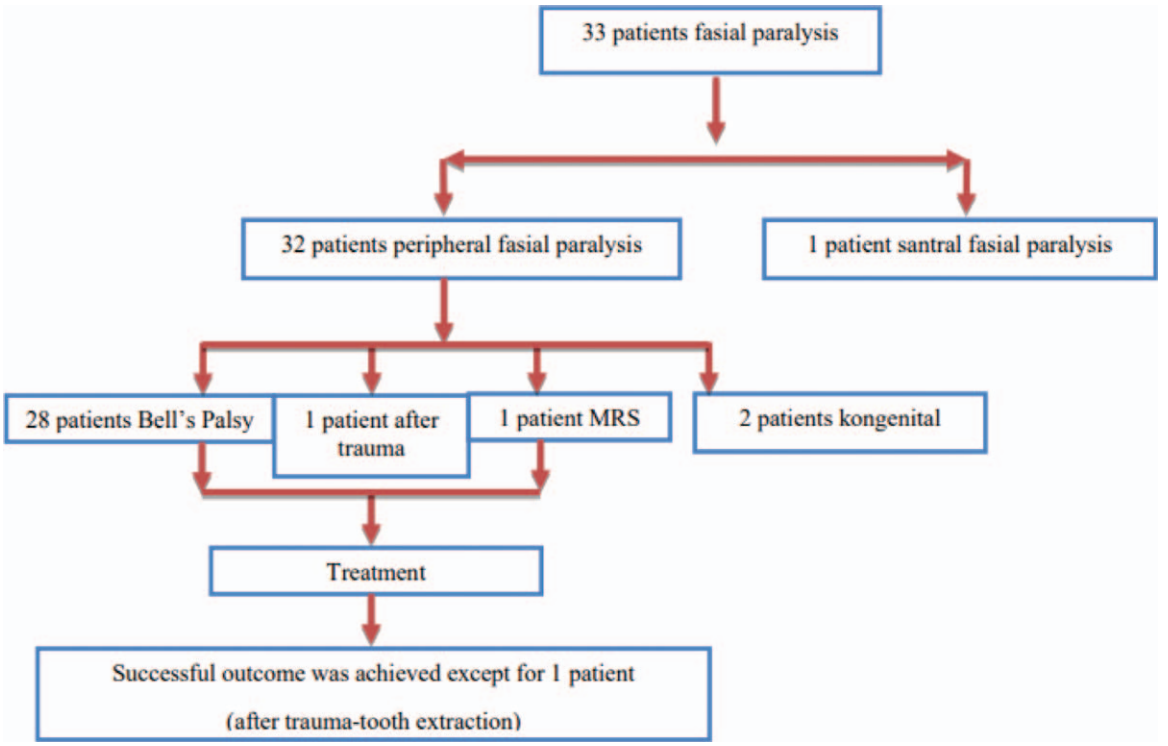

Figure 1. A flow diagram. MRS = Melkersson-Rosenthal Syndrome.

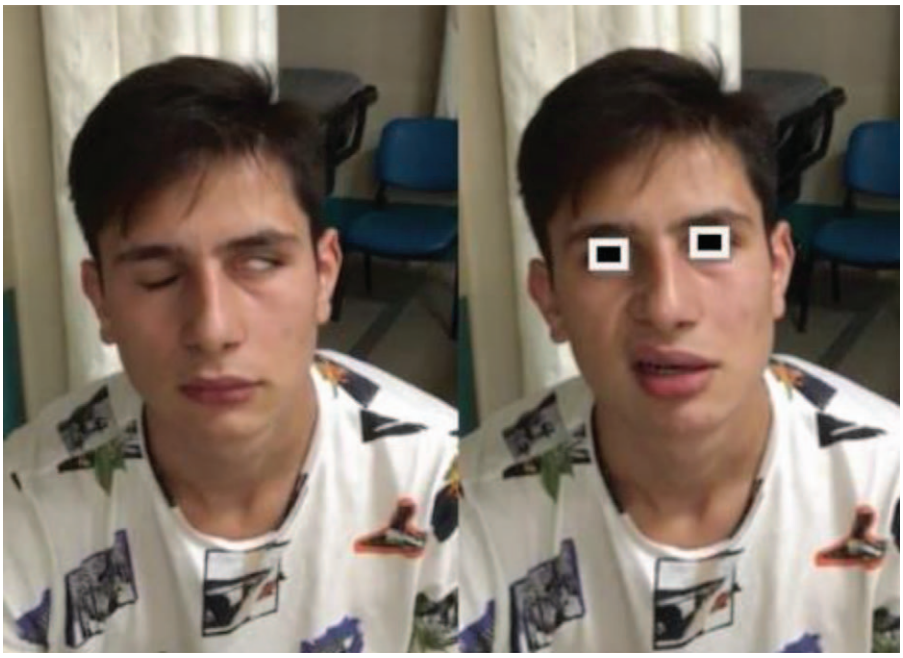

Figure 2. The patient who was 17 years old as stage 4 according to the House Brackmann Staging.

Facial exercises (chewing gum, balloon inflation, etc) were recommended to the patients who were able to apply due to their age. According to the House Brackmann Staging at the time of admission of 30 patients who were given steroid treatment, 10 patients were evaluated as stage 6, 15 patients as stage 5, and 5 patients as stage 4 (Fig. 2). No clinical improvement was observed in the patient who was evaluated as stage 6 in the first stage due to trauma after a tooth extraction. After 6 months of follow-up, 27 patients were evaluated as stage 1, 2 patients as stage 2. The final results were reached approximately 2 months after starting the treatment and the results were summarized in Table 2. Recurrence was not observed in any patient during the 6-month follow-up after treatment. But, it was learned that 3 patients had recurrence at the time of admission.

4. Discussion

Because FP passes through the canals by making curves, it is caused by the dysfunction of the 7th nerve, the facial nerve whose function is most frequently impaired.[10,11] Muscle weakness and asymmetry occur in the affected half of the face. As it may cause impairment in social communication, this situation causes emotional stress especially in adolescent children and anxiety in their families.[12,13] FP is divided into 2 as central and peripheral. The most common cause is peripheral, and also idiopathic FP.[14] Idiopathic peripheral FP is called BP and is defined as acute idiopathic lower motor neuron FP.

Non-idiopathic peripheral or central causes of FP; It may be caused by congenital, traumatic, surgical, infectious or malignancy.[1] Özkale et al[15] stated in their study that 65% of BP and 30% of infection were the etiological reasons. Due to the infectious causes, chickenpox and group A streptococci have been reported as rare causes.[8,16] Also, meningioma, which is rare in children, may be the cause of FP.[5] Two of our cases were diagnosed as congenital, 1 after tooth extraction and 1 in the brain.

FP is observed bilaterally in 0.3% of the patients, and when it is bilateral, various underlying causes should be investigated.[4]

Table 2

House Brackmann Staging at the time of admission of 30 patients who were given before and after steroid treatment. The mean time and range from diagnosis to resolution in all patients were given.

Before treatment	Follow-up 15 d	Follow-up 30 d	Follow-up 2 mo	Follow-up 6 mo
10 patients S-6	1 patients S-6	1 patients S-6	1 patients S-6	1 patients S-6
	2 patients S-4	2 patients S-3	2 patients S-2	2 patients S-2
	3 patients S-3	1 patients S-2	7 patients S-1	7 patients S-1
	2 patients S-2	6 patients S-1		
	2 patients S-1			
15 patients S-5	4 patients S-3	5 patients S-2	15 patients S-1	15 patients S-1
	9 patients S-2	10 patients S-1		
	2 patients S-1			
5 patients S-4	2 patients S-2	1 patients S-2	5 patients S-1	5 patients S-1
	3 patients S-1	4 patients S-1		

S = stage.

When bilateral, Lyme disease, sarcoidosis, leukemias, malignancies, intracranial mass, mononucleosis disease may be involved in etiology. In the literature, bilateral FP has been reported as a symptom in some variants of Guillain Barré syndrome.[17] 20% of the patients who had bilateral FP were evaluated as idiopathic BP.[17] Bilateral involvement was present in only 1 (3.1%) of our cases.

The rate of incidence of men and women is equal.[4] Differently, most of our cases were female cases. In the literature, 9% of the patients have a history of previous paralysis.[4] It was learned from the stories that 3 of our cases (9%) had previous paralysis in accordance with the literature. There are different opinions about seasonal difference in the literature. While some researchers stated that there was no seasonal difference, some researchers reported a frequency in the winter months.[3] This situation was thought to trigger pathology as a result of exposure to cold.[4] Our cases were seen most frequently in autumn and at least in winter.

Regardless of the reason, FP generally reaches its maximum level in the first 72 hours and then regeneration begins in the facial nerve. Synkinesis and hyperkinesia occur in the muscles, so patients with FP have higher levels of communication stress in the acute period.[12] House Brackmann Staging was developed to make a clearer measurement in the evaluation of patients with FP. Cha et al[18] reported that 62.5% was stage 5 in their series. In our series, 10 patients were evaluated as stage 6, 15 patients as stage 5, and 5 patients as stage 4, according to the staging at the time of admission of 30 patients who received steroid treatment.

The treatment of FP in children depends on the etiology and severity of the condition.[14] The first step in FP treatment is medical treatment. Most of the patients regain their old condition with medical treatment. Administration of nonsteroid drugs in acute FP cases in medical treatment has shown a positive effect in most studies. In some studies, it was stated that there was no difference with the group that was not given treatment. Eye care and treatment is important in patients who cannot close their eyes, and entail administration of artificial tear, sun protection and rarely tarsorrhaphy.[19] Again, the benefit of the facial exercises recommended in the treatment according to the frequency of application varies from person to person.

Although the current treatment method for BP is not clear, it is controversial.[20] The main treatment is steroid therapy.[1] However, it has not been proven that steroids benefit children.[21] Because Unuvar et al[22] reported that the majority of the cases recovered in both groups with and without steroid use. Likewise, in a study conducted in the pediatric age group, it was observed that steroid did not show a significant benefit compared to those who did not receive treatment.[8] But Cochrane Review showed significant benefit from treating with steroids.[23] Early administration of steroids in adults with FP has been observed to shorten the recovery period of FP and decrease the frequency in cases that never return.[8] Even though there is a wide variety of steroid use in Australia and New Zealand, prednisolone is the most commonly used steroid, and the dose is routinely given at 1 to 2 mg/kg/d (max 60 mg/kg).[2] Steroid treatment of 1 mg/kg was applied to all patients, except for 2 patients who were congenital in treatment and 1 patient with intracranial arteriovenous malformation, for 10 days. The addition of acyclovir to the treatment has been suggested in some studies in the literature.[20] Because our patients did not have signs of viral infection, it was not used routinely for treatment.

Surgical intervention is performed in cases of congenital FP and medical treatment is ineffective. Surgical applications, however, are performed as primary muscle repair on the affected side and facial nerve release or muscle transfer on the affected side.[4] In our series, surgery was performed on a patient with central FP who had an intracranial mass.

BP is generally seen as sporadic, but recurrences are more frequent in people with BP. Whereas most authors stated that secondary attack had a worse prognosis, some authors stated that there was no difference in terms of prognosis.[4] The recurrence rate has been reported as 7% in the literature.[8] Recurrence was not observed in any of our cases. However, it was learned that there were secondary attacks in 3 cases. One of them was a patient with Melkersson-Rosenthal Syndrome.

Our study has some limitations. At first, it is a retrospective study. Another limitation is the absence of groups that have been treated with different treatment methods.

5. Conclusion

In our study, it was concluded that the prognosis of idiopathic peripheral FP in the pediatric age group was quite good in accordance with the literature, but etiological factors determined the success of FP treatment to the greatest extent.

Author contributions

All steps: Sevgi Çıraklı.
Conceptualization: Sevgi Çıraklı.
Data curation: Sevgi Çıraklı.
Formal analysis: Sevgi Çıraklı.
Methodology: Sevgi Çıraklı.
Writing – original draft: Sevgi Çıraklı.
Writing – review & editing: Sevgi Çıraklı.

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