

Received: 2019.05.01
Accepted: 2019.06.05
Published: 2019.08.17

Infant Facial Paralysis Associated with Epstein-Barr Virus Infection

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Study Design A
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Statistical Analysis C
Data Interpretation D
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Conflict of interest: None declared

Patient: Male, 23 months
Final Diagnosis: Peripheral facial paralysis associated with Epstein-Barr virus infection
Symptoms: Facial paralysis
Medication: —
Clinical Procedure: Microbiology diagnosis
Specialty: Infectious Diseases





Objective: Rare disease
Background: Peripheral facial paralysis is a clinical presentation which, in most cases, is benign. It is relatively frequent, although less so in pediatric patients, where clinical diagnosis is more difficult. This clinical condition can be congenital, neurological, infectious, neoplastic, traumatic, or metabolic in origin.

Case Report: This report describes the case of a male infant of 23 months of age with peripheral facial paralysis due to Epstein-Barr virus (EBV) upper respiratory infection. A hemogram showed the presence of leukocytosis and lymphocytosis, and a peripheral blood smear indicated the presence of stimulated lymphocytes. Serological tests were compatible with recent EBV infection: IgM anti-VCA (capsid antigen) was positive, while IgG anti-VCA and anti-EBNA (nuclear antigen) were negative. EBV genome was detected in pharyngeal swab and in serum, where viral load was 5.08 log copies/1000 cells and 3.72 log copies/mL, respectively.

Conclusions: Whilst the most common cause of facial paralysis is idiopathic paralysis, such problems of the facial nerve may have many origins, including an infectious nature such as infection with viral agents. Rapid determination of the etiology of the problem allows the most appropriate management of the condition and quick follow-up to be implemented, which is essential for the evaluation of treatment response and the avoidance of permanent consequences.

MeSH Keywords: Epstein-Barr Virus Infections • Facial Paralysis • Infant

Full-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/917318>

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Background

Peripheral facial paralysis is a clinical presentation which, in most cases, is benign. It is relatively frequent, although less so in pediatric patients, but is difficult to diagnose or determine its cause, and the condition may evolve in a variety of ways [1,2]. The condition is characterized by facial muscular weakness which is attributable to the involvement of the facial nerve (VII cranial nerve) after the central nucleus, and includes idiopathic facial paralysis (Bell's palsy). In between 69% and 93% of cases the cause is unknown [3]. This work describes an infant with unilateral peripheral facial paralysis during infection with Epstein-Barr virus (EBV).

Case Report

A male infant of 23 months of age was taken to the Emergency Department (ED) with left-sided facial paralysis which had been evident for less than 24 hours. The child presented with catarrrh but was afebrile, although the previous day his temperature had reached 38°C and he had been listless.

Physical examination showed the child to be in good general health, but presenting non-productive oropharyngeal hyperemia and laterocervical and inguinal adenopathy (<0.5 cm) which were mobile and not adhering to deep planes.

The patient was receiving no medication and had no history of previous trauma.

Neurological examination revealed a score of 15 on the Glasgow scale. The right-hand corner of the mouth was observed to droop, as was the patient's inability to fully close the left eye (left-sided lagophthalmos), though the patient was able to track objects. The patient was also able to walk without problems and had no loss of muscle tone or strength.

Microbiological tests were requested: a pharyngeal exudate sample was sent for viral testing and serum was sent for serological testing.

The patient was discharged with a diagnosis of idiopathic facial paralysis (Bell's palsy) following the consultation, and prior to the results of the microbiological tests being received. The patient was recommended to see the family community pediatrician for follow-up 24 hours post-discharge. Treatment with steroids was prescribed: prednisone drops at a dose of 1.7 mL every 12 hours for 7 days.

The results of the hemogram showed the presence of leukocytosis ($20.7 \times 10^3/\mu\text{L}$) and lymphocytosis ($13.01 \times 10^3/\mu\text{L}$) (64.6%)

and the peripheral blood smear indicated the presence of stimulated lymphocytes.

Twenty-four hours later, the parents presented the child once again in the ED as he was very lethargic. The attending medical staff requested the involvement of the otolaryngology department, whose diagnosis was that the infant was suffering from grade III left-sided peripheral facial paralysis, with good movement in the right side of the face, within a clinical picture of viral infection. The recommendation was made to continue the steroid treatment, at a higher dose, for a total of 10 days, and then gradually reducing the dose.

An electroencephalogram was carried out at 1-month post-initial presentation which proved to be within normal parameters for the age of the patient.

With respect to the microbiological findings, the pharyngeal exudate was processed following the laboratory protocols for viral culture and genomic amplification. The following viruses were included in the differential diagnosis: influenza A, B, and C, Syncytial respiratory virus, parainfluenza virus, metapneumovirus, enterovirus, rhinovirus, herpes simplex 1 and 2, and herpes varicella zoster, as well as cytomegalovirus (CMV), all of which tested negative. The possible etiological involvement of EBV was also investigated, and its presence was confirmed, with a viral load of 5.08 log copies/1000 cells.

The serological tests were analyzed with LIAISON[®]XL assays (DiaSorin, Italy), which employed chemiluminescence (CLIA) for the qualitative determination of the respective specific antibodies. The results were compatible with recent EBV infection: IgM anti-VCA (capsid antigen) was positive at very high concentrations (>160 U/mL, manufacturer's recommended cut-off 30 U/mL), while IgG anti-VCA and anti-EBNA (nuclear antigen) were negative. IgM against varicella was negative, and although IgM antibodies against CMV, herpes simplex, and Lyme disease were found, they were very close to the manufacturer's recommended cutoff of 20 U/mL for CMV, and 1 I/mL for herpes simplex and Lyme disease). Given the LIASION results for Lyme disease, an immunoblot test (Virotech Diagnostic GmbH, Rüsselsheim, Germany) was also carried out to discount a diagnosis of Lyme disease. In terms of IgG, as might be expected given the negative LIASION result, no positive bands were found, while for IgM, bands for VlsE, BmpA were positive along with the band corresponding to EBV, which is a highly specific marker for EBV primary infection.

EBV involvement in the clinical picture was confirmed by the detection of viral genome in the serum sample (3.72 log copies/mL), whilst no genomic material of CMV or herpes simplex 1 and 2 was found in the serum, thus confirming their non-viremic state.

Given these results, the diagnosis of left-sided peripheral facial paralysis due to EBV infection was confirmed.

In addition to the 10 days of steroid therapy, 10 sessions with a physiotherapist and pulse ultra-sound were also prescribed. Despite the drug treatment, the paralysis persisted during the first month, albeit that it was not perceptible while the child was quiet and at rest, but was noticeable when he talked or smiled, and the left-sided lagophthalmos also persisted. However, at one and a half months post-initial presentation, the child was able to fully close the left eye, and the droop of the mouth disappeared at 2 months.

Discussion

The frequency of peripheral facial paralysis in children is less than in adults, but the clinical diagnosis is more difficult [4]. The annual incidence of peripheral facial paralysis in the general population is between 30 and 40 cases per 100 000. In children the rate varies between 5 and 21 cases per 100 000 [5–7] and the incidence of this condition increases with age in the pediatric population (between 5 and 11 years of age) with no differences between the sexes [8,9].

Diagnosis was by exclusion, based on clinical findings. Generally, this is a benign condition, and although recovery is variable, complete recovery usually occurs within 2 to 3 weeks, although there is a possibility of function loss over the following 2 to 3 months, which results from structural damage to the axons and myelin [10]. However, on occasion there is a 10% to 70% risk of long-term consequences depending on the number of fibers damaged and the origin of the paralysis.

Treatment combines physical therapy and steroid treatment, although occasionally rehabilitative surgery and muscular training is necessary.

The origin of the condition can vary greatly and more than 90% of cases are considered to be idiopathic “a frigore” paralysis, or Bell’s palsy, which is usually triggered by changes in micro-circulation. It may also, however, be congenital in origin, or stem from neoplasia (5% of cases), neuralgia, or be a secondary symptom of systemic illness, the frequency of these explanations differing between studies. In 5% to 30% of cases the paralysis is the result of infection, which may be viral, bacterial, or fungal. In fact, infectious etiology is the most common origin of this condition in young children [11,12], and this can be the result of a number of agents, among the most frequent being herpes simplex 1 and varicella-zoster. However, other viruses might be implicated, albeit less frequently, such as coxsackie, polio, influenza, human immunodeficiency virus (HIV) or EBV [4,13]; EBV was found in this case.

Fast diagnosis and the determination of the causal agent are very important in the early stages of treatment, and correct diagnosis both improves prognosis and reduces the likelihood of permanent consequences.

In the case presented here, trauma as the origin of the condition was discounted given there was no reported fall or blow. The exhaustive investigation by the otolaryngology department, and the fact that the child also presented with breathing difficulties, was indicative of an infectious causative agent from the outset. These suspicions were confirmed by the results of the microbiological blood tests which identified the presence of IgM against EBV in the absence of IgG, as well as by the detection of genomic material of EBV in the pharyngeal exudates and serum, along with the identification of stimulated lymphocytes in the peripheral blood smear. IgM antibodies against CMV, Herpes simplex and Lyme disease values were very close to the cutoff and were thus considered to be non-specific results which are routinely observed in clinical practice as a result of the polyclonal activation of lymphocytes [14].

The 1-sided nature of the symptoms, along with the lack of full recovery within 6 weeks also point to the infectious nature of the origin of the condition.

EBV has been described in the literature as a possible causative agent of such a clinical picture, although there are in fact scant references for this virus actually being detected and identified as the causative agent in either pediatric or adult cases. Hence this case study is a valuable addition to the literature on EBV as the origin of peripheral facial paralysis [2,15–17]. The patient’s recovery was slow, but positive.

Conclusions

In summary, whilst the most common cause of facial paralysis is idiopathic paralysis, such problems of the facial nerve might have many origins, among them those of an infectious nature, including viral agents. The fast determination of the etiology of the problem allows the most appropriate management of the condition and follow-up to be implemented, which is essential to the evaluation of treatment response and the avoidance of permanent consequences.

Acknowledgments

We thank Ronnie Lendrum for her assistance with the English translation.

Conflict of interest

None.

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