Electroneurography cannot predict when facial synkinesis develops in patients with facial palsy

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Abstract: The objective of this study is to clarify when facial palsy patients with lower value of Electroneurography (ENoG) should begin the rehabilitation to prevent the development of facial synkinesis. For this purpose, we examined the relationship between the value of ENoG measured 10-14 days after facial palsy onset and the onset day of the development of oral-ocular synkinesis. Sixteen patients with facial palsy including 11 with Bell’s palsy and 5 with Ramsay Hunt syndrome (7 men and 9 women; 15-73 years old; mean age, 41.6 years) were enrolled in this study. There was no correlation between ENoG value and the onset day of the development of oral-ocular synkinesis (p = .09, p = .73). Oral-ocular synkinesis began to develop in 4.0 ± 0.7 months (mean ± SD; range: 3.1–5.0 months) after facial palsy onset regardless of ENoG value. In conclusion, ENoG value cannot predict when facial synkinesis develops in patients with facial palsy. We recommend that facial palsy patients with a high risk for the development of synkinesis begin the biofeedback rehabilitation with mirror to prevent the development of facial synkinesis 3 months after facial palsy onset. J. Med. Invest. 67: 87-89, February, 2020

Keywords: facial palsy, facial synkinesis, electroneurography, onset, predictive factor

INTRODUCTION

The most unpleasant sequela of peripheral facial palsy is facial synkinesis, which develops after facial nerve aberrantly regenerates in affected facial muscles. Because facial nerve function hardly recovers completely once facial synkinesis is established (1), preventing synkinesis with biofeedback rehabilitation is effective for its better outcomes. Indeed, in our previous study, facial biofeedback rehabilitation using a mirror that began when the first signs of facial synkinesis developed resulted in a decrease of facial synkinesis (2). We also showed that facial palsy patients with lower value of electroneurography (ENoG) have a high risk for the development of facial synkinesis (3). These findings suggested that facial palsy patients with low value of ENoG should receive the biofeedback rehabilitation with mirror to prevent the development of facial synkinesis.

In the present study, an attempt was made to clarify when facial palsy patients with lower value of ENoG should begin the rehabilitation, because it was controversially reported that facial synkinesis began to develop in 3-14 months (1), 4-8 months (4), or 4-7 months (5) after the onset of facial palsy. For this purpose, we examined the relationship between the value of ENoG measured 10-14 days after facial palsy onset and the onset day of the development of oral-ocular synkinesis in patients with facial palsy to use ENoG as a predictive indicator of facial synkinesis development.

MATERIALS AND METHODS

This study was approved by the Committee for Medical Ethics of Tokushima University Hospital. This study was conducted in accordance with the principles of the Declaration of Helsinki.

Patients

Sixteen patients with facial palsy were included in this study. In 16 patients (7 men and 9 women; 15-73 years old; mean age, 41.6 years), of them 11 had with Bell palsy and 5 with Ramsay Hunt syndrome. Our previous study showed that 46.5% of ENoG was the cut off value as a predictor for the development of oral-ocular synkinesis (3). Based on this result, facial palsy patients with less than 46.5% of ENoG value were enrolled in this study. Corticosteroid was administered to those with Bell's palsy, while corticosteroid with anti-viral agent was administered to with Ramsay Hunt syndrome within 7 days after the onset of facial palsy. Each patient then visited our clinic once a month to be examined for the onset day of the development of oral-ocular synkinesis. No patients received any facial rehabilitation. No decompression surgery was performed in all patients.

Development of oral-ocular synkinesis

In the present study, we defined the first sign of development of oral-ocular synkinesis by visual assessment as any involuntary contraction of the orbicularis oculi muscle in the affected side during three designated mouth movements, lip pursing [u], teeth baring [i], and cheek puffing [pu] (2,3).

Electroneurography

Electroneurography was performed 10-14 days after the onset of facial palsy. A rectangular 0.2 msec impulses of 1000 Hz with stepwise increase of the stimulating current from 35 mA to 50 mA was given by a bipolar stimulator placed on the skin over the stylomastoid foramen, and the maximal compound action potential were recorded through the surface electrodes placed on the skin in the nasolabial fold (6, 7). The percentage ratio of

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the peak to peak amplitude of the maximal compound action potential of the affected side relative to that of the normal side was calculated as value of ENoG. This ENoG value indicates the percentage of fibers without degeneration in facial nerve axons (7).

Statistical Analysis
Spearman’s rank correlation coefficient was used for statistical analysis (SPSS 22.0 for Windows; SPSS Inc, Chicago, Illinois). \( p < 0.05 \) was considered significant.

RESULTS

There was no correlation between ENoG value measured 10-14 days after facial palsy onset and the onset day of the development of oral-ocular synkinesis in patients with facial palsy (\( p = .09, p = .73 \) [Fig 1]. Oral-ocular synkinesis began to develop in 4.0 ± 0.7 months (mean ± SD; range: 3.1-5.0 months) after facial palsy onset regardless of ENoG value.

In conclusion, ENoG value cannot predict when facial synkinesis develops in patients with facial palsy. Since facial synkinesis began to develop 3.1-5.0 months after the onset of facial palsy regardless of the value of ENoG, facial palsy patients with a high risk for the development of synkinesis should begin the biofeedback rehabilitation with mirror to prevent the development of facial synkinesis 3 months after facial palsy onset.

CONFLICT OF INTEREST

The authors declare not having any financial support or relationship that may pose a conflict of interest.

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