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ORIGINAL ARTICLE

Prognostic role of neurophysiological testing 3–7 days after onset of acute unilateral Bell's palsy

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Summary
Objective. — Recovery from acute Bell's palsy (BP) is variable and there are few predictors of response. We evaluated the usefulness of a range of neurophysiological parameters to predict outcome in BP.
Methods. — Fifty-nine patients (age: 33.7 ± 15.4 years) with acute unilateral BP were recruited within 3–7 days of onset. They were evaluated with electroneurography, facial nerve excitability, and the blink reflex. House-Brackmann (HB) clinical scores were obtained at the same time and three months later. All patients received prednisolone treatment and regular rehabilitation.
Results. — At three months, 41 patients (69.5%) had good recovery, while 18 patients (30.5%) had poor recovery according to the HB scale. The facial nerve excitability threshold and threshold difference between sides were significantly lower in patients with good recovery than those with poor recovery (*P* values = 0.022 and 0.006 respectively). Facial nerve degeneration rate (1 − affected/unaffected amplitude of CMAP of muscle × 100%) recorded in frontalis (*P* = 0.002) and orbicularis oris (*P* = 0.038) were also smaller in good recovery than poor recovery patients. There were no differences in latency and amplitude of CMAPs recorded from frontalis or orbicularis oris muscle, nor in latencies of the components of the blink reflex. ROC analysis showed that patients who had a threshold side difference < 13 mA (35 cases), had a higher chance of good recovery (85.7% versus 14.3% poor recovery). Patients who had a degeneration rate < 50% (38 cases) also had a higher chance of good recovery (78.9%) versus 21.1% who had poor recovery, while

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patients with a degeneration rate > 50% (21 cases) had a 47.8% chance of good recovery versus 52.2% poor recovery ($P = 0.004$). Logistic regression analysis showed that the most significant predictive indicator of BP recovery was the facial nerve degeneration rate of frontalis muscle ($P = 0.011$).

Conclusion. — Facial nerve degeneration rate of frontalis muscle provides the most sensitive prognostic indicator of recovery from acute BP and may provide useful management strategies.

Introduction

Bell's palsy (BP) is the most common cause of acute unilateral peripheral facial weakness [8,18,23]. Although two-thirds of patients with BP make a full recovery within three months, residual symptoms may persist in about one-third of patients and approximately 5.0% are seriously handicapped with permanent sequels [23]. Factors such as gender, age, side of palsy, onset, and previous and associated symptoms may influence progression [15]. However other authors found no significant relationship between outcome and age, sex, clinical degree of facial palsy, or side of paralysis [5,12,24].

Prognostic evaluation of patients with BP is still controversial. Several tools have been proposed to predict patients' response to treatment in order to provide a rationale for management of treatment [26]. Electrophysiological measures have included the nerve excitability test (NET), maximum stimulation test (MST), blink reflex, and electroneurography (ENoG). The latter is thought to provide the most accurate prognosis [18] and measure the proportion of affected nerve fibers [25,27]. Complete and rapid functional recovery will occur If the degeneration rate (calculated from ratio between affected and unaffected sides) is less than 30% (CMAP amplitude reduced by less than 30% on the affected side) [20]. If the degeneration rate ranges from 30 to 70%, the recovery will take more time and some mild sequalae may be present. If the degeneration rate ranged from 70 to 90%, sequalae will be surely present. If the degeneration rate is more than 90%, there will be major sequalae or absence of recovery [29,30].

However, previous studies using predictors to guide BP management have produced controversial results due to marked differences in patient selection criteria, the cut-off values of the ENoG tests and the heterogeneity of the underlying etiology [22]. The purpose of the current study was to evaluate the prognostic value of three electrophysiological tests (facial nerve excitability study, ENoG, and blink reflex) performed within 3—7 days after BP clinical onset.

Methods

Study design and setting

The current study was a prospective experimental study conducted in the Neuropsychiatry and the Rheumatology and Rehabilitation Departments, Assiut University Hospital, during the period between November 2015 and June 2016.

Study participants

All the patients were studied within 3—7 days after onset of unilateral acute BP. Diagnosis of BP was based on clinically impaired ipsilateral movement of the affected side of the face, drooping of the eyebrow and corner of the mouth, loss of the ipsilateral nasolabial fold as well as Bell's phenomenon (upward movement of the eye on attempted closure of the lid) [28]. In accordance with the six-grade classification of the House-Brackmann (HB) scale, facial nerve injury was graded: normal, mild, moderate, moderate-severe, severe dysfunction and complete paralysis [4,14].

The recruited patients were between 18 and 70 years of age and had HB facial nerve grades from III to VI. We excluded those with other causes of facial paralysis as diagnosed by magnetic resonance imaging (MRI) or computerized brain scan (CT brain) (e.g. brain infarction, hemorrhage, multiple sclerosis, tumor, trauma, infection. and diabetes mellitus). Moreover, patients with otitis media, Ramsay Hunt syndrome (facial palsy associated with a red rash and blisters in or around the ear and eardrum and sometimes on the roof of the mouth or tongue), temporal bone pathologies, pregnant or breast-feeding mothers, those with uncontrolled hypertension (to avoid raising blood pressure with steroid therapy), prior history of steroid intolerance and those with impaired renal or liver functions or had abnormal glucose tolerance were also excluded.

All participants gave informed consent before participation in the study and after explanation of the investigation and the treatment that they would receive. Furthermore, the patients had been informed that participating in the study would not affect the treatment strategy he/she would receive in our service. The Institutional Ethical Review Board had approved the study protocol.

Medical treatment

All patients received prednisolone 60 mg/day for 7 consecutive days after which the dose was reduced by 10 mg every day for a total treatment time of 12 days.

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