# Does migraine produce facial palsy?

## For whom the Bell tolls

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Bell palsy (also known as Bell's palsy) is an acute, ipsilateral, facial nerve paralysis of unknown etiology that results in weakness of the platysma and muscles of facial expression.[1] Bell palsy affects 11 to 40 persons per 100,000 each year, with peak incidence between the ages of 15 and 50 years and both sexes are affected equally. Pregnant women, persons with diabetes, the elderly, and patients with hypothyroidism are at increased risk.[2]

Migraine is a common and disabling disorder with an annual global prevalence of approximately 10% and a female/male ratio of 2–3:1.[3] An association with isolated peripheral facial palsy has been rarely reported.[4,5]

In this issue of *Neurology*®, Peng et al.[6] report on the association between migraine and Bell palsy and examine the effects of age, sex, migraine subtype, and comorbid risk factors for Bell palsy. A population-based nationwide cohort study was conducted using data from the Taiwan National Health Insurance Research Database (NHIRD). The accuracy of diagnoses listed in the NHIRD has been validated for several diseases.

The study involved 2 cohorts: the migraine cohort composed of all patients in Taiwan with neurologist-diagnosed migraine from 2005 to 2009; and the non-headache control cohort (individuals free from diagnosis of migraine, tension-type headache, and headache), extracted from a random sample of the original NHIRD. Only participants aged 18 years or older were included in this study; those with antecedent Bell palsy or in whom migraine and Bell palsy were both diagnosed within a 30-day period were excluded. Each patient in the migraine cohort was matched with a control patient with similar demographic characteristics, calculated using multivariate logistic regression analysis and baseline covariates.

All participants were followed until the end of 2010, death, or the occurrence of a Bell palsy event. Cox proportional hazards regression was used to calculate the adjusted hazard ratios (aHRs) and 95% confidence intervals to compare the risk of Bell palsy between groups. During a mean follow-up period of 3.2 ± 1.6 years, 671 patients (424,372 person-years) in the migraine cohort and 365 patients (438,677 person-years) in the control cohort were newly diagnosed with Bell palsy (incidence rates, 158.1 and 83.2/100,000 person-years, respectively). The male/female ratio of Bell palsy was 1.4:1 in the migraine cohort and 1.1:1 in the control cohort. Patients with migraine were at greater risk of developing Bell palsy (aHR 1.91; 95% confidence interval, 1.68–2.18; $p < 0.001$). Migraine, diabetes mellitus, hypertension, and older age were associated with higher adjusted absolute event rates. The association between migraine and Bell palsy remained significant in sensitivity analyses, and tests of interaction failed to reach significance in all subgroup analyses. The finding of higher adjusted absolute event rates of Bell palsy in patients with hypertension or diabetes mellitus, compared with those without these conditions, is also in agreement with the documentation of these conditions as risk factors for Bell palsy.[7,8]

This study indicated that the risk of Bell palsy is approximately doubled in patients with migraine compared with matched control subjects. This association was not affected by sex, migraine subtype, or other risk factors for Bell palsy. The annual incidence rate of Bell palsy in controls (83.2/100,000 person-years) was higher than previously reported (13.1–53.3/100,000 person-years).[9–11] This discrepancy might be accounted for by the accessibility and global coverage of the NHI in Taiwan.

The major strengths of this study include the large sample, and enrolling only patients with neurologist-diagnosed migraine. An age- and propensity score–matched control cohort was used to minimize selection bias and any imbalance in medical care–seeking behavior.

There were some limitations. The diagnosis of Bell palsy is primarily clinical and limited clinical information could be obtained from the database. All patients enrolled in the migraine cohort had active migraine, leading to the underrepresentation of persons with non-active migraine. Foremost, they used a neurologist-diagnosed migraine cohort. This cohort might be subject to Berkson bias, i.e., a migraine patient with neurologic consultation might be more likely to be diagnosed with Bell palsy; however, the aHRs of Bell palsy determined

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by neurologists and nonneurologists were similar. Finally, the control cohort may have included patients with migraine who did not seek medical assistance, potentially leading to underestimation of the risk of Bell palsy in the migraine cohort.

The results of this study have several implications. Besides suggesting a role for migraine as a risk factor for Bell palsy, the authors raise a number of hypotheses about the presence of common mechanisms underlying both diseases. The possibility that inflammation, infection, and vascular changes may be implicated in sustaining the association between migraine and Bell palsy is worthy of further investigation to obtain insight about new therapeutic strategies.

## DISCLOSURE

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