All in the family: A genetic link between epilepsy and migraine

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New research reveals a shared genetic susceptibility to epilepsy and migraine. Findings published in *Epilepsia*, a journal of the International League Against Epilepsy (ILAE), indicate that having a strong family history of seizure disorders increases the chance of having migraine with aura (MA).

Medical evidence has established that migraine and epilepsy often co-occur in patients; this co-occurrence is called "comorbidity." Previous studies have found that people with epilepsy are substantially more likely than the general population to have migraine headache. However, it is not clear whether that comorbidity results from a shared genetic cause.

"Epilepsy and migraine are each individually influenced by genetic factors," explains lead author Dr. Melodie Winawer from Columbia University Medical Center in New York. "Our study is the first to confirm a shared genetic susceptibility to epilepsy and migraine in a large population of patients with common forms of epilepsy."

For the present study, Dr. Winawer and colleagues analyzed data collected from participants in the Epilepsy Phenome/Genome Project (EPGP)—a genetic study of epilepsy patients and families from 27 clinical centers in the U.S., Canada, Argentina, Australia, and New Zealand. The study examined one aspect of EPGP: sibling and parent-child pairs with focal epilepsy or generalized epilepsy of unknown cause. Most people with epilepsy have no family members affected with epilepsy. EPGP was designed to look at those rare families with more

than one individual with epilepsy, in order to increase the chance of finding genetic causes of epilepsy.

Analysis of 730 participants with epilepsy from 501 families demonstrated that the prevalence of MA—when additional symptoms, such as blind spots or flashing lights, occur prior to the headache pain—was substantially increased when there were several individuals in the family with seizure disorders. EPGP study participants with epilepsy who had three or more additional close relatives with a seizure disorder were more than twice as likely to experience MA than patients from families with fewer individuals with seizures. In other words, the stronger the genetic effect on epilepsy in the family, the higher the rates of MA. This result provides evidence that a gene or genes exist that cause both epilepsy and migraine.

Identification of genetic contributions to the comorbidity of epilepsy with other disorders, like migraine, has implications for epilepsy patients. Prior research has shown that coexisting conditions impact the quality of life, treatment success, and mortality of epilepsy patients, with some experts suggesting that these comorbidities may have a greater impact on patients than the seizures themselves. In fact, comorbid conditions are emphasized in the National Institutes of Health Epilepsy Research Benchmarks and in a recent report on epilepsy from the Institute of Medicine.

"Our study demonstrates a strong genetic basis for migraine and epilepsy, because the rate of migraine is increased only in people who have close (rather than distant) relatives with epilepsy and only when three or more family members are affected," concludes Dr. Winawer. "Further investigation of the genetics of groups of comorbid disorders and epilepsy will help to improve the diagnosis and treatment of these comorbidities, and enhance the quality of life for those with epilepsy."

More information: "Evidence for a Shared Genetic Susceptibility to Migraine and Epilepsy." Melodie R. Winawer, Robert Connors and the EPGP Investigators. *Epilepsia*; Published Online: January 7, 2013 (DOI: 10.1111/epi.12072).