Migraines and headaches present no risk to cognitive function

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Recent work, in particular the CAMERA study, has used MRI to study the brains of migraine sufferers and has shown that a higher proportion of these patients exhibit lesions of the brain microvessels than the rest of the population.

Lesions of the brain microvessels

Lesions of the brain microvessels, visible on cerebral MRI images, can be of various kinds: white-matter hyperintensities and, more rarely, silent infarcts leading to loss of white-matter tissue.

They result from a deterioration of the small cerebral arteries that supply blood to the brain's white matter, the material which ensures, among other things, the passage of information between different parts of the brain.

These lesions are observed in almost all elderly people. However, their severity varies greatly from one individual to the next. Moreover, it has been shown that they are more severe among hypertension sufferers and diabetics.

A large quantity of hyperintensities leads to many cerebral complications: cognitive deterioration, increased risk of Alzheimer's disease, depression, movement disorders and increased risk of stroke.

Moreover, according to several studies, the presence of a large quantity of this type of brain lesion increases the risk of cognitive deterioration (reasoning, memory, etc.) and of Alzheimer's disease. This is why the research team coordinated by Christophe Tzourio, director of the Inserm-Université Pierre et Marie Curie Mixed Research Unit 708 "Neuroepidemiology", advanced the hypothesis that migraines could "damage" the brain.

To test this hypothesis, the researchers evaluated the impact of migraine on cognitive function. The team used the EVA study-group of individuals aged over 65 years, recruited from the general population in Nantes, and monitored them over a 10-year period. Cerebral MRI was performed on more than 800 of the participants and these individuals were also questioned about their headaches by a neurologist. "The advantage of this cohort is that it involves relatively elderly individuals. However, since migraine often begins before age 30, if it did indeed have a deleterious and cumulative effect on the brain, then we should observe cerebral damage and a higher level of cognitive decline among the migraine sufferers", explains Christophe Tzourio.

The cognitive tests performed, involved an evaluation of the volunteers orientation in time and space, their short-term memory and their capacity and speed to correctly carry out specific tasks.

The results show that 21% of people suffer or have suffered from severe headaches over the course of their lives. For more than 70% of these, this involves migraines, some of which are with aura (see box below). The MRI scans for those participants having severe headaches confirm that they are twice as likely to have a large quantity of microvascular brain lesions as subjects without headaches.

In contrast, the cognitive scores were identical for individuals with or without severe headaches and for those having or not having cerebral

microvascular lesions.

Among participants having a migraine with aura (2% of the total sample), a specific increase in silent cerebral infarcts and certain lesions was observed, hence confirming previous studies, but without detectable cognitive harm.

"This is a very reassuring result for the many people who suffer from migraine. In spite of the increased presence of lesions of the brain microvessels, this disorder does not increase the risk of cognitive decline. Therefore, we have not observed negative consequences of migraine on the brain ", concludes Tobias Kurth, lead author of the study, who designed and carried out these analyses.

Migraine and brain lesions: a suspected link

Headaches (or cephalgias) are very common among the general population. This is particularly the case for migraine, a very painful, chronic and debilitating variety of headaches. It is estimated that around 12% of adults and 5 to 10% of children are afflicted, which represents 11 million migraine sufferers in France. There are two types of migraine, migraine without aura, by far the most frequent, and migraine with aura (15% of migraines). Migraine aura involves the appearance of, often visual, phenomena (zigzag lines of light, the impression of viewing the world through frosted glass, etc) in the minutes preceding the appearance of the headache.

The mechanisms of migraine and migraine aura are still largely unknown. However, it is suspected that a transitory contraction of the blood vessels could be responsible for a reduction of blood flow in the brain promoting the appearance of migraine aura. Much research elsewhere has shown that people suffering from migraine with aura have an increased risk of cerebral infarction (or strokes). Extremely

fortunately, this risk remains low among migraine sufferers. However, the research confirms the existence of a link between migraine and blood vessels in the brain.

More information: "Headache, Migraine, and Structural Brain Lesions and Function: the population-based EVA MRI Study " *British Medical Journal*, 342: doi:10.1136/bmj.c7357 (Published 18 January 2011)

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