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Relationship Between Ischemic Stroke Subtypes and Migraine with Visual Aura

İskemik İnme Alt Tipleri ve Görsel Auralı Migren İlişkisi

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Epidemiologic studies have shown that migraine with aura is associated with increased risk of ischemic stroke. A recent review on migraine and stroke provided neuroimaging and genetic evidence supporting the relationship between migraine with aura and ischemic stroke. Furthermore, subclinical infarcts have been associated with migraine. However, there is not enough information to illuminate the pathologic mechanism underlying increased risk of ischemic stroke in migraine with aura. For this reason, we aimed to examine the relationship between ischemic stroke and migraine with and without aura, and especially assess the association between ischemic stroke subtypes (thrombotic, cardioembolic, lacunar) and migraine with and without aura in the study 'Atherosclerosis Risk in Communities' (ARIC). Participants who completed the 3rd clinical visit of ARIC (n=12.882) between 1993 and 1995 were included in this longitudinal, community-based cohort study. Patients with first ischemic stroke before this date (n=87) and with no headache information (n=37) were excluded. Analyses were performed with a total of 12.758 participants and those without headache anamnesis were included in the control group. Participants were assessed using Modified International Classification of Headache Disorders; 3 beta questionnaires, which were administered at the 3rd ARIC visit. The demographic characteristics of the participants and the risk factors for stroke are shown in Table 1. Ischemic strokes due to vascular events were recorded during the follow-up period up to December 2012 and subtypes were identified.

At the end of the analysis, migraine headache was found in 13% of participants and visual aura in 4%. During follow-up, the rate of ischemic stroke in the whole population was 6%, whereas ischemic stroke was seen in 5% of patients with migraine (with/without visual aura) during the same period. When compared with participants without headache, a significant relationship was found between migraine with visual aura and ischemic stroke (p=0.008). Significantly increased risk of cardioembolic stroke was found in migraineurs with visual aura compared with those without visual aura (p=0.003).

This study suggests that there may be a common pathogenesis between cardiac embolism and migraine with visual aura, or that visual aura symptoms may be associated with distal embolism; it also emphasizes the need for further studies to evaluate predisposing factors that can cause cardioembolism in patients with migraine who have visual aura. The 'Women's Health Study' yielded that cryptogenic stroke was the most common stroke in patients with migraine with aura. On the other hand, patent foramen ovale (PFO), a common condition in autopsy series and seen in 25% of the population, is detected using transesophageal echocardiography in 40-50% of cryptogenic strokes. However, there are no data on cryptogenic stroke and PFO in the ARIC study. On the other hand, there are limitations to the algorithms that determined stroke subtypes in the study. Among the other limitations of the

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Table 1. The demographics and risk factors for stroke of participants included in the 'Atherosclerosis Risk in Communities' study

	Migraine with visual aura (n=463) n (%)	Migraine without visual aura (n=1159) n (%)	Non-migraine headaches (n=1.083) n (%)	No headache (n=10.053) n (%)
Mean age (years)	59	58	59	60
Female	376 (82)	874 (75)	672 (62)	5.184 (51)
White race	371 (81)	997 (86)	911 (84.7)	7.504 (74.7)
African American	85 (18.5)	160 (13.8)	165 (15)	2.513 (25)
Others	2 (0.5)	1 (0.2)	4 (0.31)	31 (0.3)
Obesity (BMI >30)	169 (37)	329 (28)	305 (28)	3.413 (34)
Hypertension	221 (48)	426 (37)	394 (36)	4.053 (40)
Diabetes	47 (10)	87 (7.5)	83 (7.7)	1.014 (10)
Smoking	242 (53)	616 (53)	634 (59)	6.004 (60)
Hyperlipidemia (LDL >100 mg/dL)	356 (77)	890 (77)	805 (74)	7.846 (78)
NSAID use	136 (30)	295 (25)	215 (20)	1.569 (16)
Physical activity*	257 (55)	714 (62)	648 (60)	6.233 (62)

BMI: Body mass index, LDL: Low density lipoprotein, NSAID: Non-steroid anti-inflammatory drugs, *3 hours/week for at least one month

study was that the headache questionnaires were designed in 1995, retrospective questioning was conducted at an older age, and the diagnosis of headache was made without a headache specialist (1).

Reference

1. Androulakis XM, Kodumuri N, Giamberardino LD, Rosamond WD, Gottesman RF, Yim E, Sen S. Ischemic stroke subtypes and migraine with visual aura in the ARIC study. Neurology 2016;87:2527-2532.