

Endothelial progenitor cells: a new key for endothelial dysfunction in migraine

Xiana Rodríguez-Osorio¹, Tomás Sobrino, David Brea, Francisco Martínez, José Castillo, Rogelio Leira

Affiliations

PMID: 22815557 DOI: [10.1212/WNL.0b013e31826170ce](https://doi.org/10.1212/WNL.0b013e31826170ce)

Abstract

Objective: We aimed to study endothelial function with biochemical and ultrasonographic markers and its relation with endothelial progenitor cells (EPCs) in patients with migraine.

Methods: We performed a case-control study including 47 patients with episodic migraine (International Headache Society 2004 criteria) and 23 control subjects. We analyzed flow-mediated dilation (FMD) in the dominant brachial artery, calcitonin gene-related peptide (CGRP), and vascular endothelial growth factor (VEGF) levels by ELISA, nitric oxide stable metabolites (NOx) by high-performance liquid chromatography, and EPCs in peripheral blood samples, obtained during interictal periods (n = 47) and migraine attacks (n = 19). Frequency, severity, duration of attacks, and time of evolution of migraine were also recorded.

Results: Patients with migraine showed lower numbers of EPCs than control subjects (9.4 ± 5.0 vs 17.9 ± 6.0 colony forming unit-endothelial cells [CFU-ECs]; $p < 0.0001$) and higher levels of CGRP (164.2 ± 139.1 vs 37.1 ± 38.5 pg/mL), VEGF (473.4 ± 398.7 vs 72.6 ± 56.6 pg/mL), and NOx (1225.2 ± 466.1 vs 671.9 ± 358.6 μ M) (all $p < 0.05$). During attacks, higher levels for CGRP (298.2 ± 100.3 pg/mL) and NOx ($1,656.8 \pm 259.5$ μ M) and lower numbers of EPC (7.2 ± 3.2 CFU-ECs) were observed (all $p < 0.05$). No changes were found for FMD in interictal periods or during headache. In relation to clinical parameters, EPCs decreased with the time of evolution of migraine ($r = -0.592$; $p < 0.0001$).

Conclusions: Patients with migraine show reduced numbers of EPCs and increased levels of CGRP, NOx, and VEGF than control subjects. Furthermore, EPC counts decrease as migraine progresses in time. These findings suggest altered endothelial function in patients with migraine.