

On nitroglycerin, cardiovascular homeostasis and...bam, migraine!

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A clinical investigation recently published in the journal *Cephalalgia*, the official journal of the International Headache Society, suggests that migraine patients may exhibit a systemic pathophysiological alteration. The study, entitled "Abnormal cardiovascular response to nitroglycerin in migraine", was conducted by Dr. Willebrordus PJ van Oosterhout, from Leiden University Medical Centre, Department of Neurology, Leiden, The Netherlands.

Nitroglycerin (NTG) is a potent vasodilator and is known to induce [migraine attacks](#) in [migraine](#) patients. Because of its vasodilating properties, NTG is used in cardiovascular research to test cardiovascular adjustments in face of changes in blood pressure secondary to blood venous pooling. For example, NTG is used to test baroreflex function in individuals with vasovagal syncope, which is more common in migraine patients.

Dr. van Oosterhout and colleagues assessed cardiovascular parameters through photoplethysmography (blood pressure, heart rate, stroke volume, [cardiac output](#), peripheral resistance) before (-10 min.), during the infusion of NTG intravenously (20 min.), and after the NTG infusion (10 min.) They compared differences between migraine patients who had NTG-triggered attacks and healthy people. The presence of vasovagal syncope was assessed as well.

Ten healthy participants and 16 migraine patients were included in the study. Thirteen out of 16 patients (81.3 %) had migraine attacks

following NTG infusion, against none from the [control group](#). No vasovagal syncope was provoked. Migraine patients showed higher [heart rate](#) response to NTG infusion. In a subgroup analysis with migraine patients group split into patients with early-onset attacks (those whose attacks occurred < 270 min.), stroke volume and cardiac output were reduced in both migraine groups compared to healthy control group, with more pronounced reductions in the early-onset migraine attacks group.

The authors' interpretations of these data are cautious, as the study was underpowered with a small sample. In a speculative tone, Dr. van Oosterhout says: "The enhanced response of the systemic circulation to nitroglycerin in migraineurs suggests that the systemic vasculature is more susceptible to its (vasodilatory) effects". And follows: "Sensitivity to [nitric oxide](#) (NO) may be enhanced, possibly due to higher perivascular concentrations of NO synthase". Finally, although no participant had vasovagal syncope, the authors do not rule out a common susceptibility of migraine attacks and vasovagal syncope, as some patients in this study had also experienced vasovagal syncope in life.

More information: Willebrordus PJ van Oosterhout et al, Abnormal cardiovascular response to nitroglycerin in migraine, *Cephalalgia* (2019). [DOI: 10.1177/0333102419881657](https://doi.org/10.1177/0333102419881657)

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