

EHS as a new pathological disorder which should be acknowledged by WHO

Exposure to low frequency and radiofrequency electromagnetic fields at low intensities poses a significant health hazard that has not been adequately addressed by national and international bodies such as the World Health Organizationⁱ. There is indeed increasing evidence the exposures can result in neurobehavioral decrements and that some individuals develop a syndrome of "electro-hypersensitivity" or "microwave illness", which is one of several syndromes commonly categorized as "idiopathic environmental intolerance". Although EHS is a detrimental health condition officially acknowledged by the World Health Organization its characterization as a new pathological disorder remains to be elucidated. However, while the symptoms may be non-specific, new biochemical indicators and imaging techniques allow diagnosis that excludes the symptoms as being psychosomaticⁱⁱ. This is what we have shown in recent studies that we have published in several peer-reviewed journals.

In a prospective bioclinical study we have indeed demonstrated for the first time that EHS in EHS self-reporting patients is associated in 30-50% of the cases with multiple chemical sensitivity (MCS); that EHS and/or MCS can in fact be characterized by several inflammation-related biomarkers; and that overall 80% of the EHS patients present with one, two or three detectable oxidative stress peripheral blood biomarkers (Fig 1), meaning that these patients as is the case for cancer, Alzheimer's disease or other pathological conditions-present with a true objective pathological disorderⁱⁱⁱ. Moreover, by using both ultrasonic cerebral tomography (UCTS) and transcranial Doppler ultrasonography to measure intracranial pulsations we have been able to further characterize several brain abnormalities in these patients.

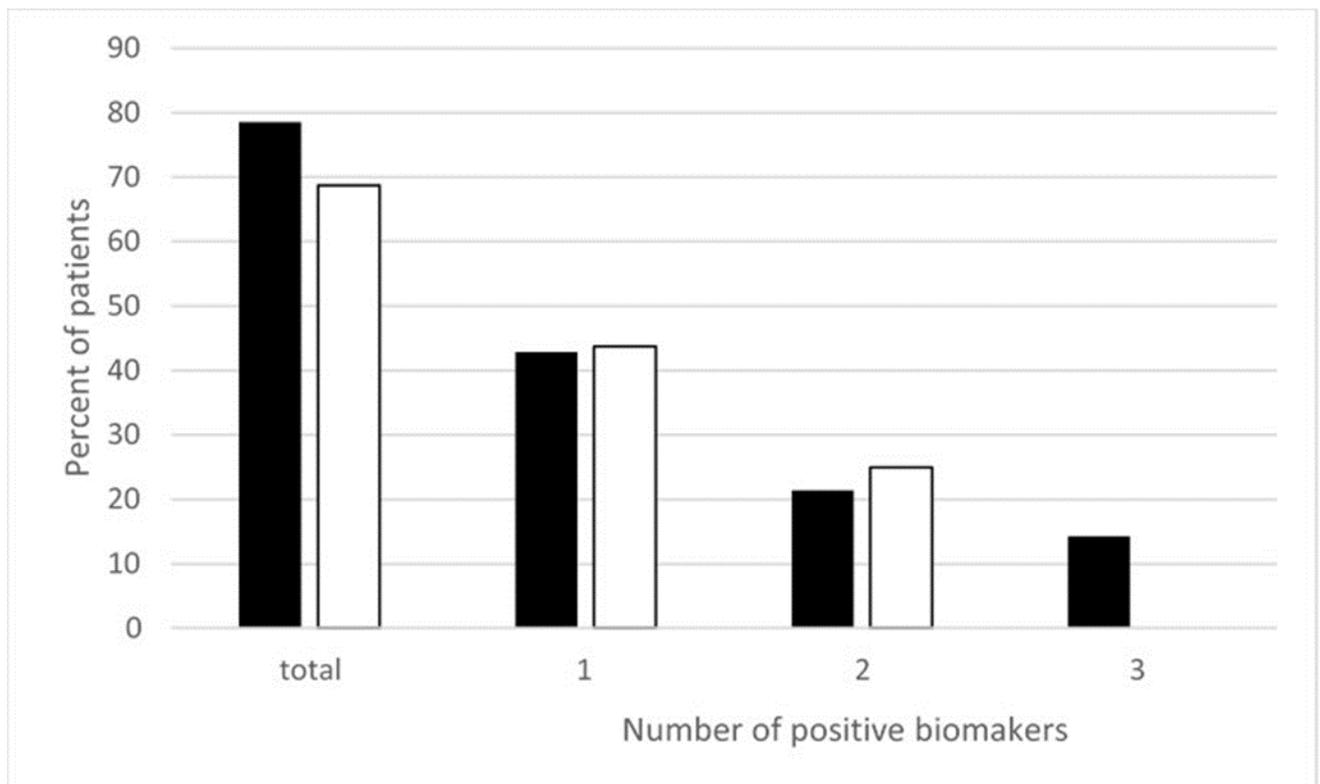


Figure 1: Percentage of EHS self-reporting patients having positive TBARs, GSSG and/or NTT oxidative stress biomarkers measured in the peripheral blood. “Positive” biomarkers corresponds to markers having shown levels above the upper normal limits and “total” corresponds to the patients having at least 1 positive biomarkers, i.e. having 1, 2 or possibly 3 positive biomarkers.

■ corresponds to the whole 3 biomarkers ; □ corresponds to TBARs and GSSG analyzed. TBARs: thiobarbituric acid-reactive substances; GSSG: oxidized glutathione; NTT: nitrotyrosine.

In this still ongoing new study we have described the UCTS imaging technique and reported the results obtained in 565 EHS and EHS/MCS cases so far enrolled, among which 535 are presently fully evaluable according to previously established criteria^{iv}.

There were 353 patients with EHS (66%) and 182 with both EHS and MCS (34%). Overall, relative to normal controls the results show a significant decrease ($p < 0.00001$) in the mean tissue pulsometric

index (PI) in the middle cerebral artery (MCA)-dependent areas of temporal lobes, predominantly in the capsulo-thalamic and adjacent areas in more than 80% of the patients.

Since mean tissue PI decrease in temporal lobes may reflect decrease in MCA brain blood flow and/or neuronal metabolic dysfunction, and the capsulo-thalamic area contains both the limbic system and the thalamus, we have suggested these two particular brain structures could be associated with some vascular and metabolic impairment in EHS-bearing patients. We thus have shown that UCTS is a simple ultrasound-based technique that can be used routinely in addition to EHS-related biomarker measurement and other imaging techniques for the diagnosis of EHS in EHS and/or EHS/MCS self-reporting patients. Furthermore we have shown that administration of fermented papaya preparation (FPP) is associated with some clinical improvement and anti-inflammatory and antioxidative stress effects^v, suggesting that in addition to protection against electromagnetic fields, EHS self-reporting patients can be efficiently treated with FPP.

Finally our recent studies lead us to conclude that EHS or what has been termed idiopathic environmental intolerance attributed to electromagnetic fields (IEI-EMF) is in fact a real new pathological disorder which should be included in the WHO international classification of diseases.

Contact :

Pr. Dominique Belpomme: contact.belpomme@gmail.com

Philippe Irigaray: philippe.artac@gmail.com

ⁱ Belpomme D, Hardell L, Belyaev I, Burgio E, Carpenter DO. Thermal and non-thermal health effects of low intensity non-ionizing radiation: An international perspective. Environ Pollut. 2018 Nov;242(Pt A):643-658.

ⁱⁱ Belpomme D, Campagnac C, Irigaray P. Reliable disease biomarkers characterizing and identifying electrohypersensitivity and multiple chemical sensitivity as two etiopathogenic aspects of a unique pathological disorder. Rev Environ Health. 2015 Dec 1;30(4):251-71.

ⁱⁱⁱ Irigaray P, Caccamo D, Belpomme D. Oxidative stress in electrohypersensitivity self-reporting patients: Results of a prospective in vivo investigation with comprehensive molecular analysis. *Int J Mol Med*. 2018 Oct;42(4):1885-1898.

^{iv} Irigaray P, Lebar P and Belpomme D (2018) How Ultrasonic Cerebral Tomosphygmography can Contribute to the Diagnosis of Electrohypersensitivity. *J Clin Diagn Res* 6: 143. doi:10.4172/2376-0311.1000142

^v Irigaray P., Garrel C., Houssay C., Mantello P., Belpomme D. Beneficial effects of a Fermented Papaya Preparation for the treatment of electrohypersensitivity self-reporting patients: results of a phase I-II clinical trial with special reference to cerebral pulsation measurement and oxidative stress analysis. *Functional Foods in Health and Disease* 2018; 8(2):122-144.