

What's the Diagnosis, Doctor?

Scott Eberle, MD

Case Study

A 56-year-old high-functioning professional man presents with a recent decline in mental capacity, coupled with daily headaches and insomnia. He has a history of chronic carbon monoxide (CO) poisoning in 2010, manifesting as rapid mental decline and severe headaches, which improved dramatically hours after identifying and removing the CO source, a faulty gas heater. He had a slow, incomplete recovery over the next year, as measured by an improved capacity to do focused mental work.

After a second year of relative stability, he began getting worse during the third year out, 2013. Mental resilience is again declining and appears noticeably worse after he spends time in the office building where he has worked for 15 years. Nonfocal headaches and insomnia are also frequent. He has no significant physical symptoms from the neck down. He exercises almost daily and has noticed no significant decline in strength or endurance.

The Patient's Story

"What's the diagnosis, doctor?"

For weeks on end, I asked myself that question several times a day. You see, that previously high-functioning professional was me, and by early 2013 I was not functioning well at all.



I did lots of research and consulted several specialists. Ideas and tests were pursued,

Dr. Eberle, a family physician, is medical director of Hospice of Petaluma.

but nothing definitive was discovered. Could it simply be that, after two years of improvement and stability, the CO poisoning was now entering a second stage of decline? Or was something new developing, in particular something that worsened whenever I went to Hospice of Petaluma, my workplace of many years?

An important shift in my thinking occurred when I developed severe confusion and headache during monthly meetings held at our sister program, Memorial Hospice, which had just moved into a newly remodeled building. I wondered: Is it the carpet degassing that others have complained about? Or is it the wireless broadcaster on the ceiling of the meeting room? The latter got me thinking about the wireless system at our Petaluma office, which had been installed nine months earlier—around the time I had begun getting worse.

My suspicions aroused, I decided to do a "scientific trial." At home I had a router with both wireless and wired options. I sat with eyes closed a few feet from the router and, at an unknown time, a friend turned on the silent wireless function. About 10 minutes into the trial, I started having a piercing headache: sharp and pointy going up the middle of my brain just left of midline. My friend confirmed that he had turned on the router less than a minute before I had become symptomatic. Might this be the answer?

A few hours of Internet research produced a diagnosis—electromagnetic hypersensitivity (EHS)—along with information about what to do, most

of which focused on avoiding and/or shielding myself from radiowave exposure. But clearing the environment of electromagnetic fields is no easy task. With a newly-bought radiowave meter in hand, I began mapping out my world and soon discovered how ubiquitous this technology is: wireless routers and computers; cellphones and cell towers; cordless phones and microwave ovens; smart meters and smart keys. I recently heard a physician speaker estimate that the current density of radiowaves, per cubic inch of air, is now several million times greater than it was 10 years ago.

For months after the self-diagnosis, I worked closely with an experienced consultant, meticulously testing my environment, keeping a detailed journal about exposures and symptoms, and completing an array of shielding and rewiring projects. As I write now, a year has passed and, as a result of all that I've learned and done, I feel great most of the time—the best I have felt since before the CO poisoning.

That said, I remain vulnerable to any surprise electromagnetic exposure. I call it "getting zapped." When that happens, an all-too-familiar pattern unfolds. Within an hour, my brain feels unnaturally activated, like a shot of mental caffeine. An hour or two later, a headache starts and mental function slows, followed by a night of poor sleep. The next day I awaken feeling mentally washed out. It takes me 24 hours to feel okay and 48–72 hours to return to normal. According to a leading theory about EHS, my CO poisoning may have caused blood-brain barrier damage, meaning that voltage-gated ion chan-

nels are now triggered by radiowaves, prompting unwanted chemical leakage into the brain.

With 60–80 exposures in the last year, I have, in effect, repeated my original experiment over and over. Cause and effect are beyond question to me now, as it would be if a person with a suspected drug allergy took that drug many times and repeatedly developed the same rash. Using a radiowave meter to closely monitor peak exposures, I have learned that my threshold for risk with an exposure is at or above 0.001 microwatts per square centimeter ($\mu\text{W}/\text{cm}^2$). Current American standards, however, claim we are safe at radiowave levels up to 100 $\mu\text{W}/\text{cm}^2$ —100,000 times higher than my danger threshold.

Seems I'm a classic canary in a coalmine. That's why I write.

History of EHS

"Radiowave sickness" was first named and described in 1932, with most of the early cases being discovered in military personnel. The advent of the

personal computer in the 1980s led to a growing number of cases, mostly due to low-frequency electromagnetic fields. The subsequent increase in cellphones and other wireless technologies was followed by a rise in radiowave-related cases. In 2005 the World Health Organization (WHO) coined the term "electromagnetic hypersensitivity" to encompass symptoms caused by any electromagnetic field (EMF), independent of frequency.

Not coincidentally, WHO recognition of the syndrome came three years after their director general, Dr. Gro Harlem Brundtland—a physician and former prime minister of Norway—revealed that she had severe EHS. Her disclosure likely enhanced Europe's role as a world leader in both EHS research and public policy.

While debate about the validity of an EHS diagnosis still exists in Europe, various organizations there have taken forward-thinking steps to address a rising concern. In 2007, the European Environmental Agency

called for a reduction in acceptable levels of radiowave exposure, with several countries adopting the revised limits. In 2009, the European Union parliament voted to recognize EHS as a disability, again with some countries following this lead. In 2011, the WHO's International Agency for Research on Cancer classified radiofrequency EMFs as possibly carcinogenic for humans. And in 2011, the Parliamentary Assembly of the Council of Europe adopted a report on EMF dangers recommending that "all reasonable measures" be taken to reduce EMF exposures, especially cellphone use by young people, given their vulnerability to getting brain tumors.

In parallel with the above public policy measures, a unified medical response has also developed in several European countries; two examples are worth highlighting. In 2008, Swiss Doctors for the Environment (www.aefu.ch) created a physician working group, "Electromagnetic Fields and Health," which serves as the coordinating and consulting center for a nationwide network of physicians caring for people with EMF health issues. Then in 2012, the Austrian Medical Association published detailed guidelines for diagnosing and treating EMF-related health problems.¹

The United States has lagged far behind Europe in addressing EMF exposure, both in general understanding and in public health response. Current American guidelines for safe exposure are decades old and are based on studies measuring the intensity of radiowave radiation needed to heat body tissue, analogous to using a microwave to cook food. Many studies have since demonstrated that nonthermal effects from EMF exposure can occur at much lower levels. Leading researchers have advocated that American public health guidelines be based on nonthermal effects, describing the recent evolution in understanding EMF exposure as a shift in scientific paradigm.

In 2013, the American Academy of Environmental Medicine sent a letter

Possible symptoms of EHS

Auditory: earaches, tinnitus

Cardiovascular: dysrhythmias

Dermatologic: rashes, facial flushing

Musculoskeletal: weakness, spasms

Neurological: headaches, poor concentration, sleep problems, fatigue

Ophthalmic: dry or itching eyes, impaired vision

Psychological: irritability, anxiety, depression, panic attacks

Respiratory: cough, throat irritation

Possible precursors of EHS

Physical trauma to brain or spinal cord

Electro-trauma: electric shock, lightning strike, acute or chronic electrical exposures

Chemical trauma: CO poisoning, exposure to toxic chemicals, metal implants

Biological sensitivities or allergies

Impaired immune function: people with autoimmune diseases, the elderly, infants

EHS websites

bioinitiative.org

The full 1,479-page report summarizing research into the health effects of EMF.

electromagneticman.co.uk

UK site includes videos of people with EHS.

electrosense.com

European site with information about making homes and offices safe.

emfcenter.com

Website of a Sonoma County electromagnetic field consultant.

emfsafetynetwork.org

Sonoma County advocacy group with links to other sites.

lessemf.com

Online store for meters, shielding material and related products.

magdahavas.com

Dr. Havas is a leading researcher in the health effects of electromagnetic fields.

weepinitiative.org

Canadian website with pamphlet "Living with electro-hypersensitivity: a survival guide."

to the Federal Communications Commission urging a marked reduction in EMF exposure limits, more in line with some countries in Europe.² Here's an excerpt from that letter:

It became clear to AAEM physicians that by the mid-1990s patients were experiencing adverse health reactions and disease as a result of exposure to electromagnetic fields. In the last five years, with the advent of wireless devices, there has been an exponential increase in the number of patients with radiofrequency-induced disease and hypersensitivity.

Numerous peer-reviewed, published studies correlate EMF exposure with a wide range of health conditions and diseases. These include neurological and neurodegenerative diseases—such as Parkinson's Disease, ALS, paresthesias, dizziness, headaches and sleep disruption—as well as cardiac, gastrointestinal and immune disease, cancer, developmental and reproductive disorders, and electromagnetic sensitivity.

Doubt and indifference still exist about the growing body of literature concerning EMF health effects. Are the peer-reviewed studies mentioned above of sufficient quality to give us a definitive answer about the dangers? An international panel of experts authored the BioInitiative 2012 Report, a 1,479-page review of over 1,800 studies, and concluded that sufficient quality research already exists and that new safeguards should be implemented.³ In contrast, the American approach is to insist that more research be done.

Our current public health policy runs contrary to "the precautionary principle," which states that if an action or policy has a suspected risk of causing harm to the public or the environment, and no clear scientific consensus exists, then the burden of proof falls on anyone initiating a potentially risky action or policy to demonstrate that harm is not being done. Laws of the European Union make the application of this principle a statutory requirement (though it's not always followed), while in the United States no equivalent limitation exists.

Several factors serve as obstacles to the U.S. taking this precautionary approach with radiowave technology: the potentially offensive agent is silent, invisible, and odorless; the technologies offered are ubiquitous and addictive; and the telecommunications industry is wealthy and powerful. Definitive future research will likely confirm or deny suspected dangers. In the meantime, we are conducting a large-scale, uncontrolled public health experiment that may have dire consequences for many people.

Guidelines for physicians

According to the American Academy of Environmental Medicine, the number of EHS cases is on the rise. As a physician, how might you help patients who come to you with EHS symptoms?

I turn again to Europe for information and guidance. I have been in regular contact with two members of the aforementioned Swiss Doctors for the Environment, both to receive consultation about my own health situation and to garner general advice for physicians caring for patients with EHS. The following recommendations combine advice received from these experts, a review of the Austrian Medical Association guidelines, and my own experience.

Take the patient's symptoms seriously. Some people with suspected EHS will have a confirmable diagnosis; some will have other environmental issues; some will have a psychiatric or psychosomatic illness; and some will have a combination of the above. Regardless of which category a patient falls into, a physician's support is vitally important.

Take a full history and physical. Diagnose and treat other disorders where possible, while also taking a detailed environmental history that explores not only electromagnetic issues, but also chemical sensitivities, carbon monoxide, air pollution and mold. See the Austrian Medical Association guidelines for an outline of a full workup.¹

Have the patient keep a detailed

symptom diary. Learning about one's environment, including testing the effects of any interventions made, can be a long and convoluted process. Consider the patient's journal to be a foundational record for this journey of discovery. A few lines can be written each day under the headings of Date, Possible Exposures, Daytime Symptoms, Sleep, and Morning Symptoms.

Help the patient design exposure experiments to confirm or deny a suspected cause. Blinded exposure to a wireless router turned on and off by another person, for example, can help define sensitivity to radiowave technology.

Advise the patient to take simple steps toward reducing EMF exposure. These may include using a landline phone whenever possible; using the speakerphone feature of a cell phone if it must be used; turning the cellphone off when not in use; changing Internet connectivity from wireless to wired; shielding smart meters, or having PG&E turn them off. Various patient websites offer detailed suggestions for reducing EMF exposure (see sidebar).

If indicated, encourage the patient to have EMF levels evaluated at home and/or work. Different people with EHS will have varying degrees of sensitivity to different kinds of electromagnetic fields. Testing should include meters suitable for measuring low-frequency electric fields and magnetic fields, high-frequency radiowaves, and medium-frequency "dirty electricity" (distortions of the usual sinusoidal AC electric current). Ideally, testing should be performed by a knowledgeable, well-equipped electrical consultant. As an alternative, meters costing \$100–\$200 can help begin the evaluation process. Some people with severe EHS are reactive to the meters themselves and are unable to use them.

Recommend a diagnostic camping trip. Careful journaling about symptoms before, during and after the trip may help clarify if an environmental sensitivity is present. The task of identifying the source—be it at home or work—will still remain.

Encourage a healthy lifestyle. This includes quality food and water, regular exercise, good sleep hygiene and spending time in nature on a near-daily basis.

Consider aerobic exercise with heavy sweating soon after a strong EMF exposure. Exercise can help mitigate symptoms from an exposure, though caution is advised if exercise is contraindicated for any reason (e.g., coronary artery disease, electrolyte disorders, neuromuscular diseases).

Encourage cultivation of the relaxation response. Excess brain stimulation—with attendant anxiety, agitation and insomnia—can be major problem for EHS patients. Cultivating deep relaxation with meditation, yoga, massage, hot baths or other modalities can be healing.

Encourage avoiding excess blue light (e.g., from computers and televisions) during the two hours before sleep. If blue light is unavoidable, recommend blue-filter glasses. The blue portion of the light spectrum has been

shown to delay the onset of sleep more than other parts of visible light. Quality sleep is essential for healing any EMF-related brain injury.

Support the patient's exploration of complementary therapies. Functional medicine treatment and bodywork can be beneficial. In addition, therapies that resonate with a patient's own ideas about healing may play a role.

Refer for counseling as indicated. The experience of having one's environment feel unsafe can induce profound secondary psychological effects, even in people without previous mental health problems. Manifestations may include fear, panic, anxiety, shame, avoidance, helplessness, depression and insomnia—to name just a few. Do not dismiss the possibility of physical disease by overinterpreting these secondary psychological symptoms as mere paranoia, hypochondriasis or mental illness.

I close on a personal note. The crescendo of physical symptoms I experienced a year ago was overwhelming,

but almost as bad was the fear and shame I felt when speculating that other people might think I was crazy. The understanding and support I received from friends and colleagues, especially fellow physicians, was hugely important in surviving this dark and difficult time. If patients come to you suspecting they might have EHS, I offer this simple encouragement: Believe what they say. That alone will help immensely. ◇

Email: seberle@sbcglobal.net

References

1. EMF Working Group, "Guideline of the Austrian Medical Association for the diagnosis and treatment of EMF-related health problems and illnesses," Austrian Medical Association (2012). (Article available from author.)
2. American Academy of Environmental Medicine, "Letter to the FCC regarding radiofrequency exposure limits," www.aaemonline.org (2013).
3. BioInitiative Working Group, "BioInitiative 2012," www.bioinitiative.org (2012).