Electrohypersensitivity – a moving target from VDT to WiFi

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Already in the 1980s VDT related skin rashes were reported, UK, Norway, Sweden. (VDT: static E field = screens, magnetic field from coils – pregnancy questions, etc)

From the 90s patients also started to complain about problem with other electrical equipment and the term ”electromagnetic hypersensitivity” was introduced since EMF was the only common factor.

Since the 90s many people experienced symptoms while using mobile phones.
WHO 2004

EHS* is characterized by a variety of non-specific symptoms, which afflicted individuals attribute to exposure to EMF. The symptoms most commonly experienced include dermatological symptoms as well as neurasthenic and vegetative symptoms. The collection of symptoms is not part of any recognized syndrome.

*Other terms: electrohypersensitivity, electro-sensitivity, electrical sensitivity, and electrical allergy.

Internet search for EHS

A cellphone to your ear is like a gun to your head.
The handicap federation in Sweden
Symptoms

Skin:
- burning sensations
- stinging
- itching

General symptoms:
- fatigue
- general discomfort
- headaches

Autonomic nervous system:
- palpitations
- respiratory distress
- sleep disturbances

Cognition:
- concentration problems
- memory loss
What causes the symptoms?

Video display screens
Office machines
Electric equipment
Fluorescent tubes
Power lines
Mobile phones
Base stations
Heterogeneous group!

- Large variation in symptoms
- The same sources give different symptoms
- One/a few/many sources give symptoms
- Varying severity of handicap
- The progression differs: (better/worse/no change)
- Different results of measures

No uniform picture!
Research ?

- Epidemiology (environment, ind. factors)
- Medical examinations (case reports)
- Follow-up studies of measures and treatment
- Provocation studies
Why provocation studies?

Causal connection between agents and biological response

How to measure the response?

Provocation with known factors known response
Neurophysiological effects of flickering light in patients with perceived electrical hypersensitivity.

Neurophysiological study of patients with perceived "electrical hypersensitivity".

Provocation study of persons with perceived electrical hypersensitivity and controls using magnetic field exposure and recording of electrophysiological characteristics.

Holter ECG monitoring in patients with perceived electrical hypersensitivity.
Provoking factor – response

Basic condition

- Flickering light
- Sound

  EEG, CFF
  SSR, SSR latency,
  HR, HRV

External load

- Mental load
- Physical load
- Magnetic field
Flickering light sources
Amplitude modulation of light from various sources.
Stimuli

Study 1

- Flickering light

Study 2

- Flickering light
- Noise
- Mental load
- Physical load

Study 3

- Flickering light
- Noise
- Mental load
- Physical load
- Magnetic field
In summary

• Hyperreactivity to external factors
• Increased sympathetic activity
• Higher CFF
• Heterogeneous group
• No connection with magnetic field exposure
Test person with equipment for HRV and MF registration
Figure 1. 24-hour registration of heart rate (mean values for each hour) from EHS and controls. In bars the 95% confidence intervals are shown.
Figure 2. 24-hour registration of normalized HF (mean values for each hour) from EHS and controls. In bars the 95% confidence intervals are shown.
Conclusion of the HRV study

- a disturbance of the circadian rhythms of the autonomous regulation
- significantly less parasympathetic activity during sleep
Among EHS patients we found:

- Hyperreactivity to external factors
- Increased sympathetic activity
- Higher CFF
- Significantly less parasympathetic activity during sleep
Observed deviations in EHS

Higher HR

Higher diast. blood pressure
Divergent temp. increase left/right
Divergent pupill reaction

Higher amplitude in
Visual Evoked Potential
after light stimulus

references

Wang et al (1994)
Lyskov et al (2001)

Lyskov et al (2001)
Wennberg et al (1994)
Wang et al (1994)

Sandström et al (1997)
Lyskov et al (2001)

The EHS group reported more symptoms than the MP group, both EMF-related and EMF-nonrelated. The MP group reported a high prevalence of somatosensory symptoms, whereas the EHS group reported more neurasthenic symptoms.


The findings suggest an association between EHS and odor and noise intolerance.
MP related
- Warmth behind/around ear
- Tingling sensation

Electric equipment related
- Fatigue, headache, dizziness, concentration difficulties, cardiovascular symptoms

VDT related
- Skin symptoms: stinging, itching, burning, rosacea
Hyperreaktivity to external factors

Higher CFF

Unbalance in ANS

Heterogenous grupp

Clinically applicable
EHS: Previously known as Da Costas syndrome??

Symptoms of Da Costa's syndrome include fatigue upon exertion, shortness of breath, palpitations, sweating, and chest pain. Physical examination reveals no physical abnormalities causing the symptoms.[9]