

Clinical features of multiple chemical sensitivity

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Multiple chemical sensitivity (MCS) could be called a phenomenon rather than an illness. No single widely accepted test of physiological function can be shown to correlate with the symptoms presented by the patients. In addition to allergy and asthma, patient history can include various "illnesses", and the "diagnosis" is often made by the patient, usually alone or with the help of clinical ecologists. This paper reports the experiences from a department of occupational medicine. More than 80% of the patients were women and solvent exposure was the most common cause of chemical intolerance reported by the patients. Many patients also reported psychosocial stressors. The patients also showed mood disorders with irritability, anxiety, sleep disturbances and depression, often with thoughts centered around different organ symptoms. The symptomatology of MCS is still nonspecific and in no way diagnostic of a specific illness or a medically acceptable syndrome. It may indicate many other conditions, both organic disease and psychopathology.

Key terms chemical intolerance, ecological illness, environmental illness, food intolerance.

Multiple chemical sensitivity (MCS) as a part of environmental or ecological illness is a controversial and not medically accepted "diagnosis" used mainly by clinical ecologists. The belief that environmental chemicals are the cause of immunologic impairment affecting multiple organs has spread from the United States and Canada to Europe during the past decade. The patients are often unable to work or even live in an urban environment. The medical profession has problems in understanding this phenomenon, which does not fulfill the criteria of a recognized disease. A psychosomatic reaction to environmental exposure is, at present, the most popular explanation. The study of epidemics in relation to groups of persons exposed to a common pollutant (pesticides, remodeling of buildings) has indicated that more than psychology might be implicated (1).

Definitions

The main problem regarding definitions is that the manifestations of MCS and ecological illness differ widely.

The following definition of ecological illness appears in the journal *Clinical Ecology*, cited from the American College of Physicians (2): "Ecologic illness is a polysymptomatic, multisystem chronic disorder manifested by adverse reactions to environmental excitants, as they are modified by individual susceptibility in terms of specific adaptations. The excitants are present in air, water, drugs, and our habitat."

Originally the condition was called environmental illness, and it primarily included food intolerance. Later on, chemical intolerance was added, and chemical intolerance or chemical hypersensitivity are now common manifestations. Many different definitions have been presented after each new workshop. MCS might be called a phenomenon rather than an illness (3).

In occupational medicine I prefer to use the definition suggested by Cullen (4): "MCS is an acquired disorder, characterized by recurrent symptoms, referable to multiple organ systems, occurring in response to demonstrable exposure to many chemically unrelated compounds at doses far below those established in general population to cause harmful effect. No single widely accepted test of physiologic function can be shown to correlate with symptoms".

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However, the clinical ecologists and many communities have adopted the name MCS as more or less synonymous to environmental illness, and some confusion exists regarding the content of the name. The preceding definition is used for research purposes to define a more homogeneous population. There are several other names for conditions with some common manifestations, as well as suggested synonyms for MCS. A suggested neutral descriptive term is multiorgan dysesthesia (5).

Several diagnoses are interpreted by the clinical ecologists to be part of MCS, not independent illnesses, for instance hypoglycemia and hypothyroidism.

History

The "diagnosis" is often given to us by the patients, who usually alone or with the help of clinical ecologists, after careful searching, have identified the "cause" in the environment. In addition to allergy and asthma, their history may include more than one of the "illnesses" in the following list: (i) environmental somatization syndrome, (ii) multiorgan dysesthesia, (iii) psychoorganic brain syndrome, (iv) chronic fatigue syndrome, (v) environmental illness, (vi) 20th century disease, (vii) candida syndrome, (viii) amalgamism, (ix) sick-building syndrome and (x) electrical hypersensitivity disorder. Commonly it also includes an additional diagnosis of food intolerance, candida hypersensitivity, hypoglycemia, or hypometabolism.

Symptoms

The symptoms are common and nonspecific. They are typically recurrent on exposure and clear away when exposure is avoided. They are impossible to verify by accepted medical tests, but are "confirmed" by immunologic and provocation tests by clinical ecologists. Symptoms of the central nervous system are often added to irritation of the mucous membranes of the eyes, upper and lower airways (asthma), pain in the muscles and joints, and disturbances of the gastrointestinal and genitourinary system. The symptoms are attributed to a well specified external exposure situation as well as to "food intolerance". The symptoms associated with MCS are listed as follows: (i) central nervous system symptoms mimicking organic brain damage: headache, acute tiredness out of proportion to time and exposure, difficulties in short-term memory and concentration, dizziness and nausea, odor hypersensitivity; (ii) mood changes with irritability, anxiety and depressive reactions and somati-

zation; (iii) irritation of mucous membranes: rhinitis, hoarseness, dry cough, feeling of pressure when breathing and report of asthma as symptoms associated with airway irritants, usually odorous products (solvents, perfumes, cigarette smoke, etc) or particles; (iv) skin symptoms: transient urticaria, often periorbital swelling, and dry, red, irritated skin, usually on the face; (v) rheumatoid symptoms: diffuse muscular stiffness and pain, neuropathy, rheumatoid arthralgias; and (vi) gastrointestinal symptoms (bloating, diarrhea), renal pain and gynecological disturbances attributed to food allergy or intolerance or candida infections.

The development of the hypersensitivity reactions is explained by the theories of clinical ecology as a sequence of events, quite parallel to allergic diseases. This sequence of events, proposed by clinical ecologists, is as follows:

1. Sensitization-induction: acute high or recurrent low levels of exposure.
2. Trigger-response: the same chain of symptoms elicited with a new exposure to the same or related compound.
3. Adaptation: the connection of the symptoms to specific chemicals masked during regular exposure (valid for both inhalation and food).
4. Unmasking: the offending agent identified by keeping the patient away from it for a period of more than about 4 days, after which the patient will respond to a provocation test resulting in the same chain of symptoms as previously experienced.

The agent causing the symptoms is identified or "confirmed" by provocation tests with different dilutions of environmental pollutants in addition to known allergens. The symptoms make it very difficult for the patient to function normally in the environment where the "cause" is identified. Identification of a relevant exposure to evaluate the toxicologic risk and to establish a probable dose-response is central in occupational medicine, but impossible when chemical hypersensitivity is being dealt with. The following aspects should be borne in mind in the identification of exposure: (i) the initial exposure can often be identified; (ii) the exposure can be massive, acute, with a strong smell and recognized as dangerous; (iii) the exposure may be identified in retrospect as the result of long-term low-level exposure; and (iv) the borders between traditional occupational illnesses and MCS are often indistinct, but the level of exposure is usually very low in MCS.

The exposure interpreted to be the primary cause of MCS is often described and related to a distinct episode with symptoms perceived as intoxication caused by formaldehyde, solvents, disinfectants, automobile exhaust fumes, or insecticides used indoors. More diffuse exposures for longer periods are also important, like living in polluted environments, near waste deposits or near high-voltage power lines. The patients have experi-

enced some period with symptoms of unidentified cause before the "triggering factor" is identified. Much effort is spent in collecting proof to support the assumption. In contrast to occupational medicine, no dose-response relationship exists, and the dose (eg, odor) that initiates the symptoms is minimal in respect to the toxicologic effect. Acute overexposure may initiate behavioral sensitization (6). Some combinations of exposures are as follows: (i) single exposure reaction (single chemical, eg, formaldehyde, dihydrogensulfide, chlorine, biocides), (ii) multiple chemicals (solvents, inorganic, air pollution), (iii) physical factors and multiple chemicals (electromagnetic fields, light, heat, etc, and the sick-building syndrome), (iv) multiple chemicals and foods or food additives and candida ("multiallergy", "universal reactant"), and hypersensitivity to foods and food additives mainly or only.

Chemical intolerance in combination with food intolerance is excluded from the MCS criteria by Cullen (4). The patients often have additional chemical sensitivities to the inhalation of chemically unrelated odorous compounds (reactions to smell).

Diagnostic tests

In contrast to traditional allergy diagnostics, none of the tests claimed to be diagnostic in MCS or ecological illness are accepted by the medical profession as scientifically documented. In addition to standard immunologic tests (IgA, IgM, IgE, IgG or IgG4), immunologic tests for sensitization against environmental pollutants or tests on subclasses of mononuclear white blood cells (lymphocytes) are used. The interpretation of the results is controversial, and the results vary widely (2, 7).

The provocation-neutralization test (J Miller) is central in the diagnostics; diluted chemicals are injected until a flare reaction or recurrence of symptoms occurs, the following injection of the next lower dose abolishes the reaction, if the test is positive. Positive results in provocation-neutralization tests are regarded by the medical profession as probably the results of pure chance or coincidence (2, 8).

Summary of my own experience

In my practice as a specialist in occupational medicine, MCS patients are referred to our clinic because they often claim workers' compensation or wish to be transferred to another job. Usually there has been some identifiable exposure related to their occupation.

As in most other reports, more than 80% of our patients with MCS in the wider sense are women. Some of them are young women with solvent-related jobs (painters, printing industry workers) who wish to be retrained for a new job where solvent exposure can be avoided. The patients seem well educated, with good intellectual resources, and they have functioned well until the actual event that caused the illness.

Solvent exposure is the most common cause of chemical intolerance in occupational medical practice. Most of the patients referred to us have a long history of occupational solvent exposure prior to the development of their intolerance symptoms. Subsequent chemical intolerance with memory problems is interpreted as solvent-induced encephalopathy. These patients are mainly men. They are hypersensitive to smell, often have multiple diffuse organ symptoms, but usually do not claim to have food intolerance.

Occupationally exposed (but not necessarily only solvent-exposed) persons may have experienced moderate acute symptoms during their work. The time for the symptoms to clear may gradually have increased over the years of relatively high occupational exposure to solvents, disinfectants, pesticides, or other potentially toxic compounds (hydrogen sulfide, carbon monoxide). However, after sick leave, or loss of job for some reason, they are unable to tolerate even low exposure to solvents at work or at home (white spirit, gasoline, nail polish remover, perfumes, etc) without experiencing symptoms. They also report symptoms on exposure to poor indoor air quality, automobile exhaust fumes, and indoor combustion appliances, and their tolerance to ethanol and medication is extremely low.

When tested by neuropsychologists they can display impaired functioning with subnormal test results, much like that seen in solvent-induced encephalopathy. Toxicologically the findings cannot be explained.

It is common that a patient reports psychosocial stressors like family problems (primary or secondary to the MCS), divorce, loss of job, economic problems, or the like. These stressors may be of importance to the understanding of somatization phenomena, but the patients often state that the symptoms were present before these problems came up (but eventually became worse).

The perseverance of the belief that the symptoms reported by persons suffering from MCS are caused by external exposure is supported by the recurrence of symptoms at every related exposure. This belief of causality is even often confirmed by friends, clinical ecologists, and physicians. In addition, the observed positive effect with relief of symptoms when away from the exposure is taken as additional proof. This situation undermines any effort of the doctor to explore causes other than toxic organic ones.

Psychiatric or psychosomatic symptoms

Many of our patients have symptoms indicating mood disorders with irritability, anxiety, sleep disturbances, or depressive traits, often with thoughts centered around different organ symptoms (9). It is difficult for a nonpsychiatrist to identify somatization symptoms (10). The psychosomatic part is often interpreted as secondary to the illness, not as the cause. Antidepressive therapy alone is usually unsuccessful and often discontinued by the patient due to "hypersensitivity".

The hypothesis of the psychogenic origin of the MCS syndrome has been questioned by Davidoff & Fogarty (11) in their critical review of 10 articles on the topic. The patients usually turn down a suggestion to consult psychologists or a psychiatrist, and they do not appear to be patients with psychiatric problems and overt psychopathology. In addition the patients who have been referred to a psychiatrist in general practice usually come back with the diagnosis of no psychiatric illness. Those who have been evaluated by psychosomatically oriented psychologists often have the diagnosis of psychosomatic disorder, somatoform disorder, or even masked depression or anxiety disorders. Depression among solvent-exposed patients is usually interpreted by most of our neuropsychologists as a result of the exposure and as an incapacitating illness, rather than as a primary illness. However, psychiatric therapy seems to offer an alternative form of care (12).

Treatment

Clinical ecologists often recommend a total change of environment, in addition to "desensitization" and rotation diets. It may be problematic for patients to abandon their home and move to another building, sometimes far from the city, but often the patients themselves suggest this possibility on their own initiative.

The treatment prescribed by clinical ecologists includes both restrictive ("stone age") diets and self-desensitization over a long period. It seems that MCS patients can lead reasonable lives without incapacitating symptoms under these circumstances. The patients are certainly well taken care of for an indefinite time by the clinical ecologists, but it is unfortunate that we, as physicians, cannot confirm most of the diagnoses or diagnostic procedures used by them.

Medical treatment is not well tolerated. There is no basis for specific medication if no other illnesses are found (ie, hypothyroidism, depression). The use of psychopharmacological drugs, without psychotherapy,

seems to be unsuccessful, mainly due to low tolerance and many side effects.

However, most persons with MCS or other environment-related hypersensitivity appear to be incurable by medical doctors. They therefore rely on physicians practicing the theories of clinical ecologists that support their illness belief. The resistance against accepting a psychological explanation of the symptoms is massive, and neuroleptic medication in standard doses is usually not tolerated due to "hypersensitivity".

Concluding remarks

MCS and its equivalents must be regarded as phenomena rather than accepted medical illnesses. The symptomatology of MCS is still nonspecific and in no way diagnostic of a specific illness or a medically acceptable syndrome. It may indicate many other conditions associated with both organic disease and psychopathology.

The exposure-effect relationship to the specific agent seems to be indisputable when solvents or agents are considered that have a distinct smell, but there is no verifiable dose-response relationship. One problem is that the medical profession has been unable to verify the suggested exposures and causal relations proposed by the patient, and it discredits the careful diagnostics and treatment offered by clinical ecologists. The patients are then pushed further into the role of a person with an incurable disease ("the doctors can do nothing").

A psychological mechanism with a psychosomatic reaction as an explanation is usually not accepted by the patients. Without confidence in the physician, the patients spend their money on alternative treatment or isolation from the community. Whatever the explanation or mechanism, they suffer and need medical help. They must not be labeled as persons with an incurable disease, but instead treated by competent medical professionals with knowledge of internal medicine, toxicology, and, most important, psychosomatic medicine. More knowledge and research is needed on MCS and related phenomena. The psychosomatic explanation is, at best, only part of the solution.

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