

Multiple Chemical Sensitivity (MCS) -- An Overview

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Background

No single accepted definition of MCS exists. Characteristics common to most definitions include: a.) MCS is an acquired disorder; b.) usually involves symptoms in multiple systems; c.) symptoms occur in response to demonstrable exposures to chemicals and environmental agents widely tolerated by the majority (Tables 1 - 3).

Although there is much disagreement over causes, proper diagnosis, and appropriate treatments, most in the scientific and medical communities now agree that MCS is a real phenomenon. Whether its basis is in the physiological or psychological realm is disputed. Some scientists accept the hypothesis of "sick building syndrome (SBS)" but reject that of MCS. The World Health Organization has estimated that 30% of new or remodeled office buildings show signs of SBS and that 10-30% of the occupants are affected¹. MCS is also theorized to be related to disorders related to Agent Orange and Persian Gulf service².

Most patients respond initially to only one exposure, but their sensitivities usually spread over time³. Exposure to the same substance may result in different symptoms in different individuals (Table 4). New symptoms frequently emerge during deadaptation and reexposure⁴. Severe cases (those requiring virtual imprisonment of the affected party in an attempt to avoid exposures) comprise "perhaps 1 to 2%...of people who believe they have this illness." Patients usually identify the onset of their sensitivities to either a.) a single overwhelming exposure, as with a chemical spill or a direct spray, or b.) chronic, medium-level exposure to a new agent, such as moving into a new house with significant emissions of volatile organic compounds or beginning a new job in a building with poor ventilation³.

Mechanism

Several theories for the mechanism of MCS exist. One current theory involves the limbic system, which is located very close to

the olfactory bulb and is the focal point where immune, nervous, and endocrine systems interact⁴. This theory involves the phenomenon of "kindling," wherein a small insult would more readily trigger nerve cell firing in areas of the brain that had been kindled previously. The limbic system is rich in AChE, possibly to protect against overstimulation. The potential detrimental effect of OPs on the limbic system is thus obvious, and, in fact, Ashford and Miller note that some of the most severe and debilitating exposures for MCS patients have been to OPs. Also interesting is the fact that the limbic system is also sensitive to conscious thought processes.

An alternative theory proposes that the immune system of MCS patients is somehow damaged⁴. The immune system interacts in a complex manner with the endocrine and nervous systems. MCS does not seem to be IgE-mediated. Some studies have identified differences in non-IgE components of the immune systems of MCS patients.

Others have proposed psychiatric disorders as the cause of MCS^{3,4,5,6}. Psychological problems tend to occur more frequently in MCS patients than in non-affected individuals. However, whether such problems are cause or effect is disputed.

Other mechanisms have been proposed as well. Biochemical (defective enzyme detoxification systems) and vascular causes have also been proposed⁴. Some researchers have found nasal/pharyngeal abnormalities in MCS patients and have proposed that this may somehow cause MCS^{7,8}.

Diagnosis

No definitive diagnostic test exists for this condition. Most clinicians take complete

medical histories of MCS patients, but the degree of attention to environmental exposures, food-related symptoms, and psychological factors varies tremendously. Traditional allergists and clinical ecologists differ in their perceptions of the usefulness of provocation-neutralization, used as a diagnostic and treatment tool in classic allergy cases. (A small dose is injected or administered sublingually to provoke a response. Subsequently, dilutions of the provoking substance are administered until a dilution is found that turns off the symptoms -- the neutralizing dose.)

The use of environmentally controlled units for diagnosis is desirable but not very feasible. The patient must live in a specially constructed and filtered unit for weeks. A fast of 4 to 7 days is usually imposed, after which the patient is sequentially exposed to various foods and chemicals to determine which ones cause a response. Some clinicians believe patients must be deadadapted in this manner before true reactions can be determined. Also, the units enable the presentation of possible agents one at a time.

Treatment

Therapies differ widely. Allergists tend to recommend avoidance of suspect foods and chemicals as well as drugs such as antihistamines and steroids. If allergists cannot provide relief for their patients, they often refer them to psychiatrists³. Clinical ecologists are more likely to rely solely on avoidance of suspect foods and chemicals and employ a rotating elimination diet. In addition, some clinical ecologists recommend special saunas and vitamin therapy to eliminate chemicals stored in body fat. Clinical ecologists are more likely to refer patients to psychiatrists to help them cope with the stresses of suffering from MCS, rather than for diagnosis and treatment³.

Table 1. Reported MCS symptom triggers from indoors sources⁴

gas stoves	deodorizers
combustion products from gas- or oil-fired furnaces and space heaters, water heaters, and central air conditioning systems	disinfectants (especially those containing phenolics)
sponge rubber bedding, padding, and upholstery	mothballs
plastics (especially pliable odorous plastics such as shower curtains)	cedar closets
insecticides	fabrics in clothing, bedding, and window coverings (especially synthetics or coated fabrics)
perfumes	particleboard (formaldehyde)
paints and decorating materials	gasoline vapors from attached garages
fireplaces	carpeting and carpet padding
newsprint and other printed materials	"odors" of virtually any description, especially petrochemical odors but also "natural" odors from cedar or pine terpenes or cooking foods
cleaning agents	

Table 2. Reported MCS symptom triggers from food sources⁴

pesticide residues	sweeteners
can linings (the golden-brown linings of cans may contain a phenolic resin)	preservatives
sulfur treatment	ripening procedures (such as ethylene gas)
artificial colors	protective waxes
	packaging materials (especially plastics)

Table 3. Other reported triggers of MCS⁴

water source contaminants: leachates from plastics or rubbers; chemical contaminants; (symptoms frequently occur while bathing or showering in addition to ingestion exposure)	ointments
drugs: (especially aspirin, barbiturates, and sulfonamides); diluents, coloring agents, excipients (substances used to bind the active ingredients into a pill), flavorings, coatings, preservatives	lotions
cosmetics: scented soaps, shampoos, hand lotions, personal hygiene products, perfumes and colognes, deodorants, hair sprays and dyes, bath salts and oils	laxatives
medical devices and substances: prostheses, implants, local anesthetics, plasticizers leaching from IV tubes or oxygen lines, lubricating jelly, alcohol, dio-contrast dyes, latex devices or components of devices ⁹ , acrylic dentures	synthetic vitamins
mineral oils	adhesive tape
petroleum jelly	mouthwash
	denture adhesives
	electric blankets (the plastic wire coatings off-gas when heated)
	waterbeds
	mattresses treated with flame retardants
	felt-tip pens
	odorous books, magazines, and newsprint
	polishes, cleaners, and bleaches
	chlorinated swimming pools
	cigarette smoke
	clothing-related triggers: synthetic textiles, permanent press finishes (especially during ironing), dry-cleaning residues, detergents and fabric softeners

Table 4. Reported MCS symptoms⁴

CNS: headache (from mild to migraine), dizziness, fainting, depression, mood swings, hallucinations, hyperactivity, irritability, anxiety, fatigue, apathy, confusion, memory loss, insomnia, drowsiness, blackouts, slowed reaction time

ears, nose, and throat: erythema, tinnitus, earache, hearing loss, hyperacusis (abnormal sensitivity to sound), itching, sneezing, obstruction of nasal passages, nasal discharge, postnasal drip, sinus discomfort, stuffy feeling, sore throat, dysphagia (difficulty swallowing), choking, hoarseness, salivation, mucus, bad or metallic taste

skin: itching (generalized or local), sweating, rash, flushing, erythema, hives, pallor

musculoskeletal system: muscle tightness, stiffness, aches, pain in joints or muscles, swelling

eyes: irritation, itching or burning, lacrimation, blurred vision, loss of acuity, perception of spots or flashes, increased darkness, photophobia, diplopia (double vision), dyslexia

gastrointestinal system: nausea, gas, belching, vomiting, pressure, abdominal pain, cramps, diarrhea, hunger, thirst, hyperacidity, gall bladder symptoms

genitourinary system: frequency in voiding, urgency, pressure, dysuria (painful or difficult urination), genital itch, vaginal discharge, yeast infection

lungs, heart, blood vessels: reduced air flow, shortness of breath, chest tightness, chest pain, hyperventilation, tachycardia, palpitations, spontaneous bruising and petechiae, cold sensitivity

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