The Role of the Brain and Mast Cells in MCS

by Gunnar Heuser, MD, PhD, FACP

Multiple Chemical Sensitivity (MCS) was first described in the 1980s, yet it has remained controversial. The resistance to the concept of MCS has come from scientists who pointed out the lack of solid scientific diagnostic tests. It has also come from the industry which has trouble accepting the proposition that their products make a great number of people sick.

My personal experience (I have evaluated several thousands of chemically injured patients) has convinced me that MCS is based on a physiological and not on a psychological mechanism. This is why I have been interested in finding evidence for MCS. In this paper, I will present a mast cell hypothesis, and an office approach to objective testing for MCS.

Mast Cell Disorder and MCS

Patients with mastocytosis can be exquisitely sensitive to even small amounts of chemicals. When mast cells discharge histamines and other compounds, patients often develop flushing and a metallic taste in their mouth.

A few years ago I decided to test some of my patients for mast cell disease. Some of these patients with MCS actually turned out to have mastocytosis. Other patients were found to have a mast cell disorder.

All diagnoses were made on the basis of skin biopsies done in an area which on inspection and palpation, showed no evidence of abnormality. It was also made on the basis of an elevated tryptase (an enzyme produced by mast cells) level. If mast cells were present in excess and/or if tryptase levels were elevated we would make a diagnosis of mast cell disease or disorder, if the clinical picture was also consistent with that diagnosis. In a few patients we also used a bone marrow biopsy to assist in the diagnosis.

Mastocytosis is considered to be a very rare disease. Yet, I have accumulated more than 20 patients with that diagnosis in a matter of two to three years... We also hope to work with the Mastocytosis Society(1) in further developing diagnostic approaches to the overlapping syndromes of matocytosis and MCS.

At this time the diagnosis of MCS is considered justified only in the absence of diseases such as mastocytosis and porphyria(2). This exclusion will require that all patients with MCS be tested for mast cell disorder and porphyrinopathy. I believe that this indeed should be done.

In summary I postulate that chemical injury can trigger a mast cell disorder which in turn can cause MCS. This concept was recently published(3).

Limbic Hypermetabolism and MCS

Patients with MCS often show emotional instability during their reactions to small amounts of chemicals. This has been likened to the epileptogenic effects of kindling which is particularly effective in the limbic system of the brain... We started doing PET brain scans on some of our patients with MCS and found that the limbic, hypothalamic and brain stem areas are hypermetabolic (in terms of their radioactive glucose uptakes) and therefore hyperactive (almost as seen during focal seizure activity).

Since the limbic system contributes emotional reactions and interpretations to sensory input, and since patients with amygdaloid (the amygdala is part of the limbic system) seizures can develop panic and

related attacks during an amygdaloid seizure, our data appear to explain the emotional instability during a reaction to chemicals.

The previously mentioned structures also serve memory and cognitive as well as neuroendocrine and autonomic nervous system functions, all of which can be deranged in a person with MCS.

In summary, I have shown that patients with MCS can develop hyperactivity in deep structures of the brain and that this may explain their emotional instability which therefore develops on a physiological rather than psychological basis.

It should be mentioned at this time that patients who are impaired and/or disabled from chemical injury and resultant MCS often become depressed. This depression would obviously be a natural reaction to their impairment and/or disability and therefore be a secondary depression.

Our findings were first published in 1999(4) and will soon be published(5) in proceedings of a meeting on Chemical Intolerance. In this volume, kindling and related mechanisms are also discussed...In summary, I have shown approaches to MCS which in my opinion are promising and will help to further define the mechanisms underlying the development of MCS.

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