

Diagnosing Food and Chemical Susceptibility

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Abstract: A spectrum of noninfectious disease processes that affect smooth muscle, mucous membranes, and collagen in the respiratory, gastrointestinal, genitourinary, and vascular systems are manifested clinically in a variety of symptoms that are often mistaken for hypochondriasis but actually are due to reactions to foods and chemicals found in the patients home and work environments. Careful clinical histories should alert the physician, who can confirm suspicions by eliminating the potentially offending agents and challenging the patient with them under controlled circumstances.

Food and chemical susceptibility has been poorly understood until recent developments in the fields of environmental sciences, immunology, and vascular diseases. The development of the environmental control unit has facilitated more precise control of individual challenge tests and the accurate diagnosis of disease-producing incitants. The science of immunology helps physicians correlate changes in the body's homeostatic mechanisms after the controlled introduction of environmental incitants. Also, better understanding of pathophysiology of smooth muscle to environmental incitants has occurred, particularly in the cardiovascular system.

Signs and Symptoms

The signs and symptoms of patients affected by environmental incitants can be myriad and wide-ranging. Frequently, patients symptoms are confused with hypochondriasis because they have such a wide variation. However, attention to details of the symptoms of involved systems allows the clinician to perceive that any one or all parts of the smooth muscle system, as well as responses in the mucosa and collagen system, can be involved. Most of the inflammatory diseases of unknown etiology affect smooth muscle, mucosa, or the musculoskeletal system, so it is easy to see how symptoms can be widespread.

Examples of environmentally triggered disease involving the respiratory system are multiple. Symptoms and signs can result from odor sensitivities (cigarette smoke, hair spray, or pesticide), and include post-nasal drip, hoarseness, cough, or wheezing, resulting in sinusitis, laryngitis, bronchitis, and asthma.

If the gastrointestinal system is involved, the patient might develop bad breath or eructations, abdominal pain, bloating, constipation, or diarrhea. Nonreflux esophagitis, gastritis, ileitis, or colitis may also occur. When the genitourinary system is involved, complaints include urinary frequency and urgency, back pain or vaginal discharge that might result in a diagnosis of nonspecific cystitis (often requiring urethral dilatation), and vaginitis or back pain secondary to broad ligament swelling.

In the vascular system symptoms often will be vague if the small arterioles, venules, and capillaries are involved. Such complaints as fatigue, vascular and tension type headache, nosebleed, hemoptysis, spontaneous bruising, petechiae, peripheral and periorbital edema, cyanosis, Raynaud phenomena, and adult acne may occur. These can result from a type of small vessel vasculitis. If the veins, larger arteries, or heart are involved, recurrent phlebitis, Raynauds disease, collagen-type vascular diseases, arthritis, and a variety of idiopathic cardiac arrhythmias may occur without an atherosclerotic basis.

If all four of these systems are involved, a confusing set of symptoms could develop. The simplest way to diagnose a patient with environmentally triggered disease is to take a meticulous history relating to the respiratory, gastrointestinal, genitourinary, and vascular systems.

Other Clinical Characteristics

Drug sensitivity often occurs. Usually one or more drugs bother the patients and often five or more different drugs cannot be tolerated. The patient is often odor sensitive and can detect the presence of natural gas when others cannot. Normal gas leakage in a home is approximately 10%, but the average person does not perceive this. Often perfumes will produce nausea and vomiting, and the use of aerosols or air fresheners often make the patient ill. Chemically susceptible patients may not be able to tolerate fabric stores because of the toxic fumes emanating from the fabrics, and they are frequently intolerant of synthetic clothing and bedding.

Anesthesia is often a problem, and many people with chemical sensitivity have complications after surgery. Some even want to leave the hospital in order to have a more benign post-operative course. Women often find that they become worse after each pregnancy. This occurs for unknown reasons.

Patients may say that they are not sensitive to foods, but careful histories indicate they are intolerant to one or two foods that they strictly avoid. They will often admit to feeling sluggish after eating and frequently will develop bloating that lasts for one to two hours. Sometimes, patients are even intolerant to water. The chemically sensitive patient also may be weather sensitive. On inclement, overcast days, when the pollution is being held in, symptoms worsen. When a cold front blows in, these patients often develop

recurrent sore throats and upper respiratory infections. They are plagued by recurrent infections all winter, complaining of flu-like symptoms month after month. Cold susceptibility is a frequent complaint. They become much worse in the winter and sometimes cannot tolerate foods that give them no problem in the summer. They usually wear sweaters and several layers of clothes. Even in the summer they wear clothes to protect them from air conditioning.

Weakness is a prime complaint in chemically susceptible patients. Patients are unable to complete a days work and may develop severe weakness for no apparent reason. They become apathetic and listless, are often worked up for hypothyroidism and adrenal insufficiency, and may be told that they have borderline hypothyroidism. They are sometimes misdiagnosed as having myasthenia gravis.

Laboratory Data

Patients with food and chemical susceptibility often have depressed white blood cell counts below $4,000/\text{mm}^3$. Once malignancy and acute viral infections have been ruled out, a chronically low white blood count should cause suspicion of food and chemical susceptibility.

A second parameter that is easily accessible to the clinician is the total eosinophil count. In over 300 patients with this problem studied at Brookhaven Environmental Unit, 90% had total eosinophil counts below $50/\text{mm}^3$; 10 above $400/\text{mm}^3$. It is well known that some environmentally triggered asthmatics have elevated eosinophils, but it appears that many more patients with environmentally triggered disease will present with few eosinophils in the peripheral blood smear. It has become quite clear that a stay in the Environmental Unit, away from incitants, allows the eosinophils to return to normal. When an incitant challenge is done under these controlled conditions, the eosinophil count will become depressed paralleling the patients symptoms. Because steroids will alter these relationships, the physician must be sure the patient is not taking them while evaluation is being done.

IgG should also be studied in patients suspected of having food and chemical sensitivity; often this will be in the range from 90 mg/dl to 750 mg/dl (normal is 800 mg/dl to 1800 mg/dl). Once returned to normal, it will often become depressed after incitant challenge.

Total complement (CH_{50} and CH_{100}) as well as C_3 and C_4 should be done. Frequently, total complement will be low in these patients, ranging from 20% to 80% of normal. Many patients with environmentally triggered disease will have marginally low complements, 60% to 80% of normal. Often the C_3 complement will be low, staying around 50 to 70 mg/dl while C_4 may be elevated above its 20 to 40 mg/dl range.

T-lymphocyte estimations are still not readily available, except in immunology centers, T-lymphocytes often are depressed below 1,000 by the sheep blood cell E Rosette method, and it is apparently significant when values are found in this range or below. In the most severely affected patients, B-lymphocytes are also low.

Occasionally, patients will present with normal laboratory tests but still react severely to challenges. In this group of patients there probably exists direct mediator triggering of symptoms, with kinin and prostoglandin being examples.

Case Reports

Case One

A 33-year-old woman presented with a history of tonsillitis in childhood, eventually resulting in a tonsillectomy. At age 15, abdominal pain, bloating, and mild intermittent diarrhea occurred, which was erroneously diagnosed as nervous or irritable bowel. At age 17, recurrent posterior headaches occurred that were diagnosed as tension headaches. They seemed to follow exposure to the odor of egg and cooking. At age 23, thrombophlebitis occurred and was thought due to birth control pills. During a pregnancy at 26 she had severe vomiting and was tired and listless for months after delivery. Also, she was treated for recurrent hemorrhoids that began at childbirth and persisted. At age 30, she had an increase in postnasal drip and frequent episodes of sinusitis. She also noticed that she had become supersensitive to the odor of cigarette smoke, perfume, and pesticide. Even a transient exposure would make her nauseous, cough, and feel very tense and jittery. At age 32, she developed recurrent cystitis and was treated with frequent urethral dilatations. At age 33, she became incapacitated by fatigue and weakness and noticed that all foods gave her bloating and sluggishness. She also experienced peripheral cyanosis and swelling after shopping. She began to develop spontaneous bruising and petechiae and her teenage acne was reactivated. Symptomatic treatment with Benadryl⁷, codeine, and Valium⁷ caused adverse effects.

An alert family doctor suspected food and chemical susceptibility and asked the patient to avoid the four most frequently eaten foods in her diet—coffee, beef, eggs, and wheat. After four days of avoidance, she drank only coffee for a couple of hours and became violently ill with headache, fatigue, and nasal symptoms. After eating wheat the next day, diarrhea and urinary complaints worsened. The following day she ate eggs and developed a phlebitis-like syndrome, became extremely weak and fatigued, and could not function for several hours. She also noticed that each time she was around her gas cook stove she would start coughing, develop tightness in the chest, become nauseous, and her nose would run. Biopsy of a petechia showed lymphocytic infiltrate around the vessel.

Laboratory data showed zero total peripheral eosinophils, WBC 3,000, IgG 600 mg/dl, IgE 150, total complement 60%, and T lymphocytes 700. She was admitted to the Environmental Unit and all signs and symptoms cleared after five days of total food abstinence. She found that her city drinking water triggered fatigue and rhinorrhea and that chlorine, formaldehyde, and fumes from polyester clothes did the same. In all, nine foods triggered her symptoms.

Since returning home, the patient has removed all gas appliances, drinks only spring water, and maintains a rotary diversified diet, never eating the same foods more than one time in four days. Only washable natural fiber clothes are worn in order to avoid the formaldehyde. For the last three years, the patient has been totally asymptomatic, without medication, leading a vigorous life. Laboratory tests have returned to normal, except the total complement remained 80% of normal.

This case is typical of the patient with environmentally triggered disease who rather frequently presents to a physician's office. A 20-year history of symptoms was overlooked, probably because they were so commonplace and because several physicians called many of the complaints functional or felt that cause could not be determined. Data is becoming available that many people with recurrent tonsillitis at any age develop other problems related to environmental triggering even though their throat infections are cleared after tonsillectomy. Frequently, these problems are in other smooth muscle systems of the body resulting in inflammatory diseases such as phlebitis, cystitis, colitis, or bronchitis. Perhaps if the early signs had been recognized, this patient would not have developed such a widespread and chronic problem. Other patients present with more life-threatening complications.

Case Two

A 30-year-old woman presented with an area of gangrene on the right index finger, recurrent headaches and obesity. Pain was excruciating and vasodilators were ineffective. The patient had Raynaud syndrome for many years. Her past history was significant in that her father and grandmother died around age 40 from inflammatory vascular disease. Laboratory data showed WBC 3,500 total hemolytic complement (CH_{50}) 70%, total eosinophil count zero, and T lymphocytes 800 (E Rosettes). The patient was taken off all foods and medications after admission to the Environmental Unit. With ten days the gangrene and pain disappeared. Ten different foods, including beef, corn, wheat, and milk; six synthetic chemicals, including formaldehyde, phenol, alcohol, and gas; and several inhaled molds triggered the arterial spasm. The patient has worked every day for the past two years without vasodilators. There has been no recurrence of the disease, although if the patient becomes chemically overloaded, her finger turns blue.

Patients often can be helped by establishing simple cause and effect as was done in this woman. As a general rule, it is the substances to which the patients are exposed on a daily basis that are the offending agents, and the major offender often will be obvious in the uncomplicated patient if potential causes are methodically examined in the patient's home and personal environment. When the physician suspects certain agents, the patient can do withdrawal and challenge tests at home until the offenders are clearly defined. If the practitioner finds a few triggering agents and the patient does not improve, further workup will be needed by an individual specializing in this area of treatment.

Avoidance of environmental incitants is by far the best treatment for environmentally triggered disease, but this may be impossible because of employment and financial situations. When this is the case, the total body load often can be lowered by removing all offending agents possible and creating one room at home as an oasis. The general reduction in incitant load seems to decrease the overall sensitivity to many substances and often will allow a person to continue to work at a job that formerly would have been intolerable because the major offenders could not be removed in the workplace. If the offending substances are natural, often hyposensitization and neutralization by injection can be accomplished. Neutralization of symptoms of food reactions often is quite successful by injecting small doses of the aggravating food subcutaneously every three or four days. Neutralization of odors can often be accomplished in a similar manner.

Case Three

A 51-year-old woman presented with intractable cough that had persisted daily for five years. She had numerous hospitalizations, bronchoscopies and every available drug, but the cough persisted and she was miserable. Four foods triggered the cough, which ceased after four days of avoidance. She has not coughed significantly in two years and has led a vigorous life. This problem could have been solved years earlier had environmentally triggered disease been suspected. Medical costs could have been reduced. For examples of immune system changes during challenge and in environmental control.

Clinical Principles

When analyzing and considering whether environmentally triggered disease is a factor in a given patient's illness, the clinician must perceive several principles. First, medical technology is about 100 years behind environmental technology. Physicians are also hampered in diagnosing and treating diseases caused by noninfectious processes because of a lack of awareness. The environmentally contaminated circumstances present today are comparable to 100 years ago, before the germ theory of disease became well understood, when people rubbed manure into wounds or physicians did contaminated pelvic exams after an autopsy.

The public also is unaware of potential environmental triggering agents. Offending substances are readily found in homes, workplaces, and even hospitals in such abundance as to negate all treatment and hope for diagnosis and recovery. An individual with environmentally triggered disease may be sensitive to natural gas, but when exposed to it 24 hrs a day because it heats his home, water, and food, he may not perceive the cause and effect relationship. This may also be true in the individual sensitive to the chemicals in his water supply, who is exposed whenever he cooks, drinks, and bathes.

Total Body Load

The second principle that should be kept in mind is the concept of total body load, which tends to distort many of the body's homeostatic mechanisms. This is the sum of all incitants that the body has to handle in order to function, the total of the pollutants in air, water, and food. The load principle seems simple until one perceives the amount and scope of pollution that has crept into the environment. Most public water systems are overloaded with synthetic chemicals that increase the exposure to synthetics from 1,000 to 10,000 times. Unfortunately, public water supplies are rated safe only by bacterial content. Recent EPA studies of the 83 largest cities show all of the water supplies to be severely chemically contaminated. Apparently waters are now as polluted with chemicals as they were with bacteria 50 years ago, before chlorination. Ninety-four percent of the commercial food has pesticide in it, and it is estimated that the average individual ingests one gallon of food additives per year. The air in cities of 50,000 population or more has an outside air pollution gradient of 150 (on good days) to 2,000 to 4,000 on average to bad days. The most polluted place in the environment appears to be the average home. Homes being built air-tight will contain pollutant contaminants. They are full of high outgassing synthetics such as polyester, foam rubber in beds and chairs, and gas heat further complicates pollution. The summation of these facts plus a polluted work environment makes a massive increase in body load that the individual has to handle just to function daily. This often becomes too great in people with certain hereditary and acquired tendencies and results in individual susceptibility, allowing inflammatory diseases to occur.

Masking

The third principle is that of masking. A person comes into contact with a substance and perceives no harm because there is not an immediate reaction. This occurs if exposure is daily or more often. If the substance is avoided for four days, the reaction becomes unmasked. If after four days the suspected substance is taken, the patient will have an immediate and clearly definable reaction if it is harmful to him. In this way cause and effect is easy to establish. Food sensitivity often is missed because the individual is eating the offending food one or more times daily, causing symptoms to be masked. This masking principle is commonly understood in the individual who is addicted to drugs. This individual takes these whenever he has symptoms in order to feel better, but if they are omitted for four or five days and then reintroduced, he will have an acute reaction. People exposed to industrial fumes may not perceive the fumes as harmful except when they are away from them. Some painters and battery workers say that the substances they work around bother them after returning from vacation until they get used to the offending substances again. Once masked, they do well until they eventually develop inflammatory disease.

Bipolarity

Often the individual will have stimulatory reaction and perceive the substance not as harmful but as something that makes him feel good. However, after a period of time—minutes, months, or years—the body's defenses break down and he has harmful, disabling withdrawal symptoms. This is a well recognized principle in cigarette, narcotic, or alcohol addicts, but it is not as well known (though it is just as prevalent) in plastic workers, painters, food addicts, and any other individuals who constantly inhale or ingest a toxic substance.