

Work-Related Asthma from Exposure to *Cannabis sativa* (Marijuana and Hemp)

Marijuana is the most commonly used illicit drug in the United States. In 2013, 7.5%, 19.8 million people in the U.S., aged ≥ 12 years, reported using marijuana during the preceding month. Marijuana production has become an industry in states such as Colorado and Washington that have legalized marijuana's growth and sale. Marijuana, like many plant materials, is documented to cause allergies and asthma (1). Its illegal status in most states has reduced the likelihood of patients being forthcoming about its use. Studies of sensitization to marijuana found a prevalence of 14.6% among marijuana smokers and up to 18.3% among frequent or regular users (1). Marijuana is derived from the species of the genus *Cannabis*; *C. sativa*, *C. indica* and *C. ruderalis*. *Cannabis* is one of the 11 genera of the family *cannabaceae*. In addition to its use as a drug, hemp, which can be derived from *cannabis sativa* with a low delta-9-tetrahydrocannabinol (THC) content, is used as a fiber, health food, bird feed and fishing bait and in cosmetics. Hemp can also be derived from other plants such as sisal.

Sensitization, allergic rhinitis and asthma to hemp, *C. sativa* have been reported in the general population in India, Nebraska and Spain in areas where hemp grows (2-4) and sensitization to *C. sativa* is common in patients sensitized to tomatoes (5).

Occupational exposure has been documented to cause sensitization, allergic rhinitis and asthma.

There is one report of occupational asthma from *Cannabis sativa*. A 51 year old man in Spain developed rhinorrhea, chest tightness, dyspnea, cough and wheezing one year after he began to earn a living as a bird breeder (6). He fed the birds hemp seed. He had a history of asthma with sensitization to dust mites for which he received immunotherapy. He had 25% eosinophils in his sputum and an obstructive pattern on spirometry. He had positive skin prick and intra dermal skin tests and specific IgE to *Cannabis sativa*. Three controls were negative. The patient had negative skin reactions to mold and storage mites. He had a positive specific antigen challenge test to *cannabis sativa* with a 31% decrease in his FEV₁. Five asthmatic controls had negative antigen challenge tests to *C. sativa*.

Two forensic laboratory workers from Germany with exposure to hashish and marijuana were described (7). One 52 year old female technician had a four year history of nasal congestion, sneezing and eczema on days when she handled hashish or marijuana. She had worked in the lab for 21 years. The other, a 49 year old physician had an eight year history of nasal congestion, sneezing and "occasional mild asthma" while working with hashish or marijuana specimens. His symptoms had occurred after he began working in the lab eight years prior. Both had IgE antibodies to marijuana, the lab tech also had IgE antibodies to hashish. None of four non-atopic and two of eight atopic controls had IgE antibodies to marijuana and none of four non-atopic and one of eight atopic controls had IgE antibodies to hashish. No pulmonary function tests were reported.

A 27 year old Moroccan woman was reported to develop rhinoconjunctivitis over a two year period of working in a Spanish lab with *Cannabis sativa* pollen (8). She had positive IgE to *Cannabis sativa*.

A 29 year old female lab worker from England had urticarial after two years of work with *Cannabis* plants (9). She had a positive skin prick test to *Cannabis* plants, while four controls had negative skin tests. Contact dermatitis has been described in England in a 29 year old lab technician with exposure to *C. sativa* plants (10).

Byssinosis is traditionally associated with exposure to cotton dust in the textile mills. A typical pattern evolves with chest tightness and shortness of breath occurring Monday mornings, or the first shift back after a weekend. There is reversible impairment of FEV₁ on spirometry, which after years of exposure becomes irreversible obstruction, COPD. Etiologic agents in cotton dust ascribed to cause byssinosis have been a component of the bract or endotoxin in the cotton. Byssinosis has a slower onset than the typical immediate reaction to an allergen and has the characteristic Monday morning pattern with improvement during the rest of the week. In contrast, work-related asthma typically gets worse through the week.

Byssinosis has been reported: in a cross-sectional study of 106 workers in a spinning department processing *C. sativa* hemp in Yugoslavia, where 40.6% had byssinosis and 15.1% had chronic bronchitis (11); in a cross-sectional study of 76 British rope workers making rope from fiber, which was 35% flax and a 65% *C. sativa* hemp, where six (7.9%) had byssinosis (12); with a 77% prevalence of byssinosis (13) and progressive lung disease even after cessation of exposure in Spanish hemp workers (14); with a 47.8% -66.7% prevalence of byssinosis in 111 Yugoslavian *C. sativa* hemp workers (15) and progression of disease in 66 workers still exposed who were studied three years later (16). Additionally, 32 of 93 (34.4%) workers knitting nets from *C. sativa* hemp in India had positive skin tests to *C. sativa* and respiratory symptoms and had improvement of their symptoms with immunotherapy (17).

We are interested in hearing about patients suspected to be sensitized to marijuana or hemp from work-related exposure. Ken Rosenman, MD is available at 1 800-446-7805 to assist in patient diagnosis and management.

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Hydraulic Fracturing in Michigan

We have previously discussed in this newsletter the hazards from the use of silica in hydraulic fracturing for oil and gas (<http://www.oem.msu.edu/userfiles/file/News/v24n1.pdf>). Because of an overabundance of natural gas, natural gas prices are down and at least temporarily, drilling for new wells is down, thus reducing the likelihood of the occurrence of possible hazards associated with fracking.

A report from the University of Michigan Risk Science Center in September 2015 titled "What are the best environmental, economic, social and technological approaches for managing hydraulic fracturing in the State of Michigan" presents a review of all the environmental/health risks of hydraulic fracturing and controls to minimize these risks. The report presents various options without recommending a particular option (<http://graham.umich.edu/knowledge/ia/hydraulic-fracturing>).

Occupational Lead Standard

With the recognition of the problems of lead levels in the Flint drinking water there has been an increase in concern about lead exposure in Michigan and the United States. One consequence has been an increase in the number of blood lead tests performed not only among children but also among adults. Eighty percent of elevated blood leads in adults are from exposure to lead at work, where blood leads as high as 60µg/dl are allowed by OSHA. This standard dating from 1982 has not been revised to incorporate the subsequent research which shows adverse effects to both children and adults with blood leads at levels of 5µg/dl. In the absence of a known exposure to lead, 95% of blood lead levels in adults in the U.S. are below 3.8 µg/dL among men and below 2.8 µg/dL among women. A revised work place lead standard is needed to reduce adverse health effects in adults as well as in the children of these adults. The children are exposed to lead dust on the clothes and shoes when their parents return home after working in an industry that uses lead (Garcia BR, Rullá J, Maureen O'Neill, M, et al. Take-Home Lead Exposure Among Children with Relatives Employed at a Battery Recycling Facility — Puerto Rico, 2011. *MMWR* 2012; 61: 967-970). In Michigan, 34% of children who were tested for lead had a blood lead ≥ 10 µg/dL if one of their parents working with lead had an elevated blood lead level (<http://www.oem.msu.edu/userfiles/file/Annual%20Reports/Lead/2014ABLESReportRev.pdf>). This 34% prevalence of elevated blood lead levels in children is appreciably greater than the overall 3.5% of children in Michigan with blood lead levels ≥ 5 µ/dl.

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In this issue: v27n4 Work-Related Asthma from Exposure to *Cannabis Sativa* (Marijuana and Hemp)

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S Remember to report all cases of occupational disease!

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