Indoor moulds and human health

Epidemiology

Stachybotrys atra (also called S. chartarum and S. alternans) is a dark-coloured fungus that grows well on damp materials that have a high cellulose concentration, such as straw, grass, sawdust and lumber. Its toxin can produce skin and mucous membrane irritation, lymphocytic depletion and hemorrhagic syndrome in farm animals. The question of whether it also produces hemorrhagic effects in humans was raised in 1994 when a cluster of 8 cases involving infants in Cleveland who developed idiopathic pulmonary hemosiderosis was noted. Preliminary results of a case-control study indicated that hemorrhage was associated with major household water damage during the 6 months before illness and increased levels of measurable household fungi, including the mould Stachybotrys (odds ratio 1.6, 95% confidence interval 1.0–30.8).1

Despite the researchers’ caution that further study was needed to determine causality, the alarming suggestion that exposure to this fungus might be fatal led to the rapid closure and cleanup of contaminated buildings, including portable classrooms in Ontario.4 It now appears that the health risks posed by Stachybotrys may not be as hazardous as initially perceived. In March 2000 the Centers for Disease Control and Prevention (CDC) in Atlanta released the results of 2 separate reviews of the Cleveland investigation.1 The reviewers concluded that the association between cases of pulmonary hemorrhage in infants in Cleveland and household water damage or exposure to S. atra was not adequately substantiated by scientific evidence. The cause of acute idiopathic pulmonary hemorrhage is unresolved; the CDC recommends further surveillance and improved assessment of environmental exposure to moulds and fungi.

These shortcomings demonstrate the methodologic difficulties involved in assessing the health effects of indoor moulds. Fungi and actinomycetes cause a variety of illnesses because of their direct infection of human tissue. These conditions are well known. The indirect non-specific illnesses caused by these organisms are less clear and more difficult to demonstrate. Possible pathologic mechanisms for the indirect (noninfectious) causes include immune-mediated (hypo-sensitivity pneumonitis), toxic (mucosal irritation) and carcinogenic (aflatoxin) mechanisms. An expert panel has recently reviewed the evidence supporting causal relationships between certain fungi and a variety of these types of health effects.6 People with diabetes, immunosuppression or atopy are apparently susceptible populations, as well as infants.

Clinical management

In this case an indirect effect (pulmonary hemosiderosis) was suspected to have been caused by S. atra. What should a physician do when confronted with a case of hemoptysis in a child with no known source of bleeding? Idio-pathic pulmonary hemosiderosis is similar to Goodpasture’s syndrome. It is characterized by bouts of clinical or subclinical pulmonary hemorrhage, but without the renal involvement typical of Goodpasture’s. Children are mainly affected; most have iron-deficiency anemia and during bleeding episodes may have fever, hyperbilirubinemia and reticulocytosis.7 To facilitate diagnosis and reporting, the CDC is developing a standard case definition. In the interim, such cases might be reported directly to the CDC and its assistance sought regarding further investigations.

Recognizing patients in the office whose nonspecific respiratory and systemic symptoms might be related to indoor mould exposure can be challenging. Knowing which populations are at risk and knowing how to take an environmental exposure history can be helpful.

Prevention

The best way to prevent mould growth is to keep all material in homes as clean and dry as possible using adequate ventilation. Surfaces where moisture collects frequently can be cleaned with a baking soda solution one day and vinegar the next to keep moulds at bay. In areas where flooding has occurred, prompt cleaning of walls with water mixed with chlorine bleach, diluted 4 parts water to 1 part bleach, can prevent mould growth.8

Further information is available from the Canadian Mortgage and Housing Corporation. It offers a wide range of housing-related information, including clean-up procedures for mould in houses (800 668-2642; www.cmhc-schl.gc.ca). In addition, the College of Family Physicians of Ontario has developed an Environment and Health Peer Presenter Program (www.cfpc.ca/ocfp/cme/ehcpeer.html). — Erica Weir, CMAJ

References