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Psyllium: Keeping this boon for patients from becoming a bane for providers

Precautions with this product are generally inadequate

Practice recommendations

- Don't pour psyllium powder into medicine cups: spoon it or combine it with a liquid (C).
- Use respiratory protection, such as a chemical hood or HEPA filter mask (C).

A 39-year-old female nurse with a history of moderate to severe asthma was preparing medications for patients at an extended care facility. While pouring a bulk psyllium product from a large container into a medicine cup, a clumped mass of the powder fell from the container, striking the counter, and raising a cloud of psyllium dust. On inhaling this dust, the nurse became dyspneic. She did not respond to a beta-agonist and suffered respiratory arrest within 5 minutes. Emergency Medical Services and staff at the receiving hospital were unable to resuscitate her. Time of death was 1 hour and 25 minutes after exposure to psyllium dust. Autopsy showed severe bronchospasm with mucus plugging, but no signs of foreign material in the airways. Anaphylaxis secondary to inhaled psyllium was the final diagnosis.

Risk is significant and underestimated

Thousands of health care workers, particularly nurses, are at risk for hypersensitivity responses to psyllium, including rhinitis, conjunctivitis, cough, wheeze, asthma

exacerbation, nausea, and anaphylaxis.¹⁻⁷ Exposure in the workplace usually results from inhalation of dust during the preparation of the product for patient use.

One review found that up to 73% of residents in extended care facilities receive psyllium products.⁸ Hospitalized and home care patients also receive psyllium. Nurses especially are constantly exposed, and many are sensitized.

Despite the significant number of persons at risk, awareness and precaution are inadequate. Personal communication reveals that no health care providers—nurses, physicians, medical directors—were aware of the degree of risk. There was no routine use of protective devices or precautions when working with psyllium products in the facilities reviewed.

Quality and safety of psyllium products vary

Psyllium is a well-known powdered fiber supplement derived from the seed husk of *Plantago ovata*.^{9,10} The supplement contains varying ratios of endosperm, seed embryo, and psyllium (a translucent hydrophilic colloid material).

The endosperm and seed embryo proteins are allergenic; the colloid is not.¹¹ Concentrations of each component vary according to the means of processing and the country of origin.⁹⁻¹¹

Independent review indicates that the concentration of non-psyllium allergenic components is inversely proportional to the cost of the commercial product. The product dispensed for the patient in our case was particularly heterogenous.

■ Those at particular risk

Multiple instances of anaphylaxis have been linked to psyllium since the initial description in 1941.¹² Ingestion of cereals containing psyllium is the most common cause of psyllium-related anaphylaxis.¹⁰ In a number of cases of anaphylaxis secondary to ingestion, the initial sensitization was related to psyllium dust inhalation.¹ Twenty cases of anaphylaxis to a psyllium-rich cereal were reviewed shortly after its introduction. Fourteen of those affected were nurses. It was concluded that these nurses were sensitized from job-related inhalation exposure.¹³

IgE sensitization to psyllium has been shown in as many as 12% of health care personnel. History of asthma or atopy in a health care worker, as in the patient presented, seems to make IgE sensitization to psyllium more likely and raises the risk for fatal anaphylaxis.²

One review of workers with documented IgE sensitivity to psyllium showed that 42% complained of symptoms of conjunctivitis, rhinitis, or exacerbation of asthma.³ In another study, 29% of subjects were shown to have significant bronchial hyper-responsiveness to psyllium dust.²

One 1987 investigation of health care workers in an extended care facility concluded that the response to inhaled psyllium in these employees could range from mild to disabling.⁵ In a similar study, a nurse who had experienced only mild symptoms previously required intubation for severe bronchospasm after only 1 minute of exposure to psyllium dust.³ As happened with the patient in our case, she was symptomatic (moderate to severe asthma) and exposed, which led to fatal anaphylaxis.

■ Urge precautions to limit risk

Package inserts for the most popular—but not all—brands of psyllium describe precautions for dispensing psyllium, particularly for those with asthma.

1. Don't pour the powder. Pouring the bulk form of the powder into medicine or beverage cups disperses significant amounts of dust. Yet this seems to be the most common manner of dispensing this medication. The standard set by the Occupational Safety and Health Administration (OSHA) limits the time-weighted average concentration for nuisance dust to 15 mg/m³. Dust concentration exhibited when psyllium powder is poured ranges from 4 to 28.5 mg/m³, with a mean concentration of 12.96 mg/m³. Given the frequency of inappropriate preparation, it is probable that OSHA recommended safe levels are frequently exceeded.³

Spoon the powder ... To limit the amount of aerosolized dust, the powder should only be *spooned* into cups. While this recommendation is in the package insert, most health care workers are unaware of the guideline.

... or pour solvent over powder. Even better, our experiments showed there was less dust produced if the solvent (water or orange juice) was poured slowly over the powder than if the powder was put into solvent.

... or immerse powder in liquid. Alternatively, a device such as a scoop with a lid could be used that would submerge the powder into solution and then release it, creating virtually no dust.

2. Ventilate properly ... Respiratory protection must be offered to the preparer and anyone else in the area. One maneuver to prevent exposure to psyllium dust would be to prepare the product in a chemical hood to ventilate dust away from the preparer.

... or use a mask. A simple mask, as is used to prevent the spread of communicable diseases, would offer some protection, though incomplete. The Material Safety

FAST TRACK

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Data Sheets for psyllium recommends that personnel wear powered purifying respirators with HEPA (high-efficiency particulate air) filters and Tyvek face seals while cleaning up a psyllium spill. In our query, however, these items were not readily available.

3. Substitute other preparations? A third alternative to prevent psyllium dust exposure would be to use other forms of psyllium, such as granules, capsules, or wafers. The drawback to this alternative, clearly, is greater cost. As already mentioned, the cost of a psyllium product is inversely proportional to the number of antigenic components.

4. Assess risk beforehand. A final means of preventing serious hypersensitivity reactions is to screen staff for their degree of risk: pre-employment screening as well during subsequent review of systems by a physician. Stratify risk based on such factors as history of allergies, atopy or asthma, and frequency of respiratory symptoms, particularly as may be related to work.

5. Consider cross-reactivity. For example, there is evidence that reactivity to psyllium may be seen in those with dust and grass allergies.¹⁵

Social history should focus on employment and exposure both at work and at home (eg, those who care for elderly relatives in the home). Smoking status is also important, as cigarette smoke increases the risk of bronchial hyper-responsiveness. Appropriate precautions and warnings could then be offered based on perceived risk.

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