



Cleaning Products - Risks at Home and Work

Case #1

A woman in her 30s who worked at a supermarket, developed wheezing, cough, chest tightness and shortness of breath two hours after she mopped up a drain cleaner which had been used in a sink drain and then spilled out onto the floor. She was hospitalized for three days and given steroids and albuterol. At the time of her interview one and a half years later she was still symptomatic and still used albuterol. She had never smoked cigarettes. She had a son with asthma and had a personal history of food allergies.

Case #2

A woman in her 50s who worked at a hotel as a housekeeper developed cough, wheezing and shortness of breath one year after beginning work at the hotel. Her symptoms developed when she used

window cleaner,

bathroom cleaner, or bleach. She was begun on a steroid inhaler, ipratropium bromide, and was given a nebulizer to use at home. Her asthma remained symptomatic and she visited the emergency room twice and was hospitalized once.

Three years later, she was reassigned to the kitchen as a cook. Her symptoms decreased after the reassignment although she continued to use albuterol. She smoked a half pack of cigarettes a day since her teens. There was no personal or family history of asthma.

Case #3

A woman in her 50s who worked as a teacher developed cough, wheezing, chest tightness, and shortness of breath six years after beginning work at a junior high. She was begun on theophylline, accolate and inhalers (names unknown). Her symptoms began two weeks after a new service contract to

clean the school was initiated. She went to the emergency room once for treatment. She continues to work at the school and to be symptomatic. She had quit smoking three years previous to her symptoms, after smoking one pack of cigarettes a day for 25 years. There was no personal or family history of allergies.

Cleaning agents are widely used in both the home and workplace. Acute high level exposures to cleaning compounds containing ammonia or bleach have caused chemical pneumonitis, pulmonary edema and the long term complication of reactive airways dysfunction syndrome (RADS) (Alberts et al 1996). Case number one illustrates a typical presentation. Similar lung pathology is caused if bleach and cleansers containing acid are mixed, producing chlorine gas, or if ammonia and bleach are mixed producing chloramine. Twenty-nine of the 56 case reports to SENSOR have RADS involving cleaning compounds.

What about the possibility of sensitization to cleaning products? Disinfectant cleaners may contain a documented occupational allergen such as: benzylkonium chloride, chloramine, chlorhexidine, formaldehyde or glutaraldehyde.

Cases have been reported where cleaners with disinfectants have been used to clean showers, saunas, a meat processing factory, kitchens, operating rooms, dairies and hospital floors. Although the reports typically have involved the individual doing the cleaning, individuals using the area after the cleaning have also developed sensitization and asthma (Burge et al, 1994; Kujala et al, 1995). Sixteen of the 56 case reports to SENSOR involving cleaning compounds have been for patients who work in a health care facility.

Aliphatic polyamides are commonly found in cleaning compounds. Members of this chemical group that have been associated with work-related asthma are ethylene diamine, diethylene triamine and triethylene tetramine (Ng et al, 1995). Similarly the ethanolamines, mono and triethanolamine, also found in cleaning solutions, have been associated with work-related asthma (Savonius et al, 1994).

In addition to potential respiratory allergies, cleaning agents may contain substances that cause contact dermatitis. A review of the 1250 different chemicals used in cleaning solutions in Denmark found that 41 (4%) were known causes of contact dermatitis (Flyvholm, 1993).

Cases 2 and 3 illustrate some of the difficulties of identifying the specific agent to which the patient may be reacting. Neither patient knew the names of the cleaning solutions. At the minimum, the product name and if possible, the manufacturer's name is needed to identify the specific chemicals that are in the cleaners to which the patient is exposed.

It is important to encourage the patient to obtain this information from the product label. A summary of the 56 reports involving patients exposed to cleaning compounds received by SENSOR is shown in Table I. Because of incomplete information on exposure, no particular chemical pattern can be identified. If you have patients with work-related asthma from exposure to cleaning solutions who you have not yet reported, we would be interested in receiving a call, FAX, or E-mail from you.

References

1. Alberts WM, Do Pico GA. Reactive Airways Dysfunction Syndrome. *Chest* 1996; 109:1618-1626.
 2. Burge PS, Richardson MN. Occupational Asthma Due to Indirect Exposure to Lauryl Dimethyl Benzyl Ammonium Chloride Used in a Floor Cleaner. *Thorax* 1994; 49:842-843.
 3. Flyvholm MA. Contact Allergens in Registered Cleaning Agents for Industrial and Household Use. *British Journal of Industrial Medicine* 1993; 50:1043-1050.
 4. Kujala VM, Reijula KE, Ruotsalainen EM, Heckkinen. Occupational Asthma Due to Chloramine-T Solution. *Respiratory Medicine* 1995; 89:693-695.
 5. NG TP, Lee HS, Malik MA, Chee CBE, Cheong Ta, Wang YT. Asthma in Chemical Workers Exposed to Aliphatic Polyamines. *Occupational Medicine* 1995; 45:45-48.
 6. Savonius B, Keskinen H, Tuppurainen M, Kanerua L. Occupational Asthma Caused by Ethanolamines. *Allergy* 1994; 49:877-88
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Table 1. Reports of Patients with Work-Related Asthma from Exposure to Cleaning Solutions

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Location	Total Pts.	Occupations (#pts.)	Suspected Substances	Asthma Type*			
Health Care	16	Dietary Aide; Housekeeper (6); Lab Tech (2); Laundry Aide; Nurse; Nurse Assistant; Paramedic; Patient Caretaker; Secretary; Social Worker	Bleach	R			
			Carpet Cleaner	S			
			Carrascent Odor Eliminator*, Citrus Oil	S			
			Cleaning Products	S, R, S			
			Floor Cleaner	S			
			Hydrochloric Acid	S			
			Lime-A-Way*	S			
			Mixed Acid & Bleach	R			
			Mixed Bleach & Ammonia	R			
			Mixed Cleaning Agents	R, S			
			Mixed Lime-A-Way*, Comet* and Bleach	R			
			Top Gun*	A			
			The Works*	R			
			Restaurant	9	Bus Boy; Dishwasher (3); Cashier; Cook (2); Janitor; Server	Mixed Bleach & Acid	R, R
						Mixed Bleach & Ammonia	R
						Mixed Bleach & Chlorine	R
Mixed Bleach, Delimer & Lime-A-Way*	R, R, R						
Mixed Lime-A-Way* & Cleaner	A						
Muriatic Acid	A						
Hotel	5	Housekeeper (5)	All Purpose Cleaner	A			
			Bleach	R			
			Mixed Bleach & Ammonia	R			
			Tilex* & Lime Remover	A			
			Window & Bathroom Cleaner, and Bleach	S			
Retail	5	Cake Decorator; Cashier; Clerk; Janitor; Manager	Ammonia, Carburetor Cleaner Cleaner	R			
			Drain Cleaner	R			
			Muriatic Acid	R			
			Zep Pride*	S			
			School	5	Cafeteria Aide; Custodian (3); Teacher	Bleach & Solvents	S
Cleaning Product	S						
Lime-Off*	R						
Micro-Quat*, Oven Cleaner, & Lime-A-Way*	S						
Mixed Bleach & Cleaner	R						
Manufacturing Facilities	4	Janitor (4)	Cleaning Solution	S			
			Floor Cleaner	S			
			Mixed Bleach & Ceramic Cleaner	R			
			Triple O*	A			
Offices	4	Bank Loan Processor; Telephone Operator; Cook @ Police Dept.; Janitor	Cleaning Compounds	S			
			Cleaning Solution for Vomit, Carpet Cleaner	R			
			Mixed Bleach & Soap	R			
			Pine-Sol*	S			
Jail	2	Laundry Worker; Teach Custodial Maintenance	Ammonia, Bleach Disinfectants	S			
			Rugbee Foam Shampoo*	S			
Miscellaneous	6	Camp Counselor; City Hockey Rink Maintenance; Country Club Janitor; Janitor @ Military Base; Health Club Attendant; Truck Driver	Bug Spray, Carpet Fresh*	R			
			Mixed Soap & Acid	R			
			Plastic Cleaner	S			
			Sulfuric Acid	R			
			Tilex*	R			
			TimeSaver*	S			

*A = Aggravation of Pre-existing Asthma; R = RADS; S = Possible Sensitization.

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