Connecticut Epidemiologist

Volume 19, No. 3 **March 1999**

State of Connecticut, Department of Public Health
Norma Gyle, RN, MS, Acting Commissioner

Type A Botulism Intoxication Associated with Home-Prepared Mushrooms, Connecticut, 1998

On the evening of November 23, 1998, a physician at a Connecticut hospital contacted the epidemiologist on call at the Department of Public Health (DPH) to request assistance in obtaining botulism antitoxin. A 78-year-old man had been admitted to the hospital that evening with bilateral descending paralysis, ptosis, dry mouth, diplopia, weakness, nausea, and vomiting. Soon after admission, he required the assistance of a ventilator. The patient had a recent history of consumption of home-prepared wild mushrooms.

The Centers for Disease Control and Prevention (CDC) was notified and antitoxin was immediately released and shipped for administration to the patient. The patient had a prolonged recovery period involving physical therapy and placement in a long term care facility.

An environmental investigation by the local health department revealed that the mushrooms involved had been picked from a lawn 2 months earlier. At that time, the mushrooms were fried in olive oil with garlic, placed in canning jars and covered with lids, and stored in the basement. No further cooking or canning was done. The patient consumed the mushrooms unheated directly from a jar on November 20 and 21 during lunch. The amount consumed is unknown.

Subsequent blood and stool specimens as well as a sample of the home-prepared mushroom product were shipped to the CDC and examined for *Clostridium botulinum* toxin. Mouse toxicity assay revealed the presence of botulinum toxin type A in stool; serum samples were negative for toxin.

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Laboratory analysis of the home-prepared mushroom product also revealed the presence of *C. botulinum* toxin type A.

Editorial Note: This is the first Connecticut case of adult botulism since 1982. From 1986-1997, an average of 26 cases of foodborne botulism were reported annually in the United States. Foodborne botulism is a paralytic illness caused by the ingestion of botulinum toxin, which is produced by the spore-forming anaerobic bacterium *C. botulinum*. Although *C. botulinum* spores are heat resistant, the toxin is destroyed by heating to 176°F/80°C. Proper processing and retort pressure cooking of foods at temperatures > 212°F/100°C for 10 minutes will destroy *C. botulinum* spores.

Environmental conditions that promote the production of botulinum toxin in foods contaminated with *C. botulinum* spores include: the absence of oxygen (anaerobic conditions), a pH > 4.8, temperatures > 39°F/4°C, high moisture content, and lack of competing bacterial flora. The wild mushrooms and garlic in oil consumed by the patient were each a potential source of *C. botulinum* spores. The method used to produce the home-prepared wild mushrooms may have failed to destroy *C. botulinum* spores and may also have provided environmental conditions conducive to spore growth promotion. The oil covering and lack of refrigeration may have

provided anaerobic growth conditions. Outbreaks of botulism have been caused by covering vegetables (including garlic) with oil or grease (1).

After eating the prepared mushrooms a second time, the patient discarded the uneaten remainder of the jar. These were retrieved from an outside compost heap and tested positive for *C. botulinum* toxin type A. There may have been a bad taste that caused the patient to discard the mushroom product. *Clostridium botulinum* may cause container lids to bulge and the contents to have "off-odors". A conspicuous spoiled taste has previously been reported in a commercially prepared roasted eggplant in oil contaminated with type B botulinum (2). Commercial cans or home-prepared products with bulging lids should not be opened, and foods with off odors should not be eaten or "taste tested" (3). Taste and other sensory evaluations cannot be relied upon to determine the presence of foodborne toxin in a food item.

Persons who prepare any vegetables in oil at home for storage or consumption should be aware that this practice may be hazardous, especially if such foods are allowed to remain above refrigerator temperature (> 39°F/4°C). The Food and Drug Administration (FDA) requires the addition of antimicrobial growth inhibitors or acidifying agents to prevent the growth of botulinum spores in commercially prepared foods in oil. Questions about safe food preparation methods to avoid the growth of pathogenic microorganisms can be directed to the Connecticut DPH Food Protection Program at (860) 509-7297.

Because cases of foodborne botulism result from ingestion of contaminated food that may still be available to cause illness in others, a single case of foodborne botulism represents a public health emergency that might indicate a large outbreak. Therefore, clinicians who suspect botulism should report the case immediately to both the local and state health departments.

Botulism antitoxin for patients with symptoms of botulism intoxication is available from the CDC through the DPH. Any health care provider in Connecticut requesting botulism antitoxin or laboratory examination of specimens for confirmation of botulism should first contact the DPH, Epidemiology Program at (860)509-7994. After hours, the epidemiologist on call may be reached at (860)509-8000.

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Rabies Prophylaxis - Update

In Connecticut, rabies postexposure prophylaxis (PEP) is administered to nearly 2000 people annually (1). Recommendations for the prevention of human rabies have been established by the Advisory Committee on Immunization Practices (ACIP) and were most recently revised in January, 1999 (2). Several recommendations regarding prophylaxis were changed including management of exposures to bats and domestic ferrets, administration of human rabies immune globulin (HRIG), and use of a new rabies vaccine in the United States (U.S.).

Since 1981, bat-associated rabies virus strains have caused 22 of the 25 cases of human rabies acquired in the U.S.. In most of these cases, possible exposures were not recognized and PEP was not administered. While touching the fur, feces, urine, or blood of a bat is not considered an exposure, contact that may have resulted in a bite is a potential exposure. Due to the relatively minor wound, bat bites are sometimes not easily seen. Therefore, unless the bat is available for testing, administration of PEP should be considered whenever there is a reasonable probability that an exposure occurred even if a bite, scratch or mucosal contamination was not demonstrated (2). For example, PEP is warranted if a person was in the same room

as a bat and unaware if direct contact occurred (e.g., a sleeping person, young child, or mentally disabled person).

The popularity of ferrets as pets and their frequent contact with people prompted researchers to determine the period of communicability of rabies virus in these animals. After challenge with the major endemic rabies strains in the U.S., ferrets shed the virus in their saliva for a maximum of 6 days before developing clinical signs of rabies. As with cats and dogs, a healthy ferret that bites a person may be confined and observed for signs of rabies in lieu of euthanasia and testing (2,3). The Connecticut Rabies Advisory Committee recommends quarantine for 14 days (4).

Rabies PEP consists of one dose of HRIG and five doses of vaccine given over 28 days. If anatomically possible, the ACIP now recommends that the entire dose of HRIG be infiltrated at the site of the potentially contaminated wound (2). Previously it was recommended that only half of the dose be infiltrated around the site of the exposure. Any remaining portion of the dose should be administered intramuscularly at a site distant from the site of vaccine administration. With the licensure of a purified chick embryo cell vaccine, three inactivated vaccines are now available in the U.S.. The new vaccine, RabAvert, manufactured by Chiron Corporation (800-244-7668), is given intramuscularly and can be used for pre- and postexposure prophylaxis (2).

The ACIP rabies prevention recommendations are available from the Centers for Disease Control and Prevention Web site at *www.cdc.gov*. Epidemiology Program staff are available to answer rabies-related questions from the public and assist physicians in evaluation of potential rabies exposures. For information please call (860) 509-7994 during regular working hours or (860) 509-8000 for assistance after hours.

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Candidemia Study

A statewide study of candidemia is a new addition to the Connecticut Emerging Infections Program (EIP). *Candida* has become an important pathogen in the late 1990's, yet our understanding of this emerging infection remains inadequate (1,2). Currently, *Candida* accounts for 10% to 15% of all hospital-acquired bloodstream infections and is the fourth most common cause of nosocomial bloodstream infection in the United States (3). The estimated case fatality rate for candidemia is between 46% and 75% (2). Recent studies have documented the emergence of *Candida* species resistant to fluconazole, the primary treatment for candidiasis (4,5). There are no reliable population-based estimates of resistance to fluconazole or risk factors for developing candidemia with fluconazole-resistant strains.

The study began on October 1, 1998 and will continue for a minimum of 2 years. Currently, 33 of the 34 acute care hospitals in Connecticut are participating voluntarily in this study. The goals are to conduct population-based, prospective surveillance for blood-borne *Candida* infection, to assess risk factors for the development of fluconazole resistance, and to assess the independent impact of fluconazole resistance on clinical outcome. Laboratory isolates are collected for antifungal resistance testing. Clinical information for each case is abstracted from medical records. Periodic summary reports will be sent to participating hospitals.

From October 1998 through January 1999, 77 cases of candidemia were reported by the participating hospitals. Of these the following species were identified, 38 (49%) *C. albicans,* 13 (17%) *C. parapsilosis*, 12 (16%) *C. glabrata*, 8 (10%) *C. tropicalis*, 1 (1%) *C. krusei*, 1 (1%) *C.*

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lusitaniae, and 4 (5%) other *Candida* species. Antifungal resistance testing has been completed on 65 (44%) of these isolates (Table 1). Of the 29 *C. albicans* isolates, 2 (7%) were resistant to fluconazole (MIC $\geq$ 8 mg/L).

Table 1. Fluconazole resistance by *Candida* species.

Species	No. Isolates tested	Fluconazole MIC $\geq$ 8 mg/L No. (%)
C. albicans	29	2 (7)
C. glabrata	11	6 (55)
C. parapsilosis	12	1 (8)
C. tropicalis	9	8 (89)
Other	4	0
Total	**65**	**17 (26)**

The project is being conducted by the Connecticut EIP and the West Haven Veterans Administration Hospital. Additional information on the Connecticut EIP Candidemia Study can be obtained by contacting Sharon Huie at 203-764-4366.

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