Weekly

November 16, 2001 / 50(45);1014-**6**

Notice to Readers: Update: Interim Recommendations for Antimicrobial Prophylaxis for Children and Breastfeeding Mothers and Treatment of Children with Anthrax

Ciprofloxacin or doxycycline is recommended for antimicrobial prophylaxis and treatment of adults and chil*dren with Bacillus* anthracis infection associated with the recent bioterrorist attacks in the United States. Amoxicillin is an option for antimicrobial prophylaxis for children and pregnant women and to complete treatment of cutaneous dis*ease when B*. anthracis is susceptible to penicillin, as is the case in the recent *att*acks (1--3). Use of ciprofloxacin or doxycycline might be associated with adverse effects in *chi*ldren (4,5), and liquid formulations of these drugs are not widely available. This notice provides further information about prophylaxis and treatment of children and breastfeeding mothers, including the use of amoxicillin.

Ciprofloxacin, doxycycline, and penicillin G procaine have been effective as antimicrobial prophylaxis for in*halational B*. anthracis infection in nonhuman primates and are approved for this use in humans by the Food and Drug Administrat*ion* (FDA) (5,6). Amoxicillin has not been studied in animal models and is not approved by FDA for the prophylaxis or treatment of anthrax. Other data ind*icate that B*. anthracis strains produce a cephalosporinase and suggest that the strains contain an inducible beta-lactamase that might decrease the effectiveness of penicillins, especially when a large number of organisms i*s* present (2). In addition, penicillin achieves low intracellular concentrations that might be detrimental to its ability to kill germinating spores in macrophages.

Because of these concerns, penicillins (including amoxicillin) are not recommended for initial treatment of anthrax, but are likely to be effective for antimicrobial prophylaxis following *exposure to* B. anthracis, a setting where relatively few organisms are expected to be present. Therefore, amoxicillin* may be used for the 60-day antimicrobial prophylaxis in infants and children when the isolate involved in the exposure is determined to be susceptible to penicillin. *Isolates of* B. anthracis implicated in the recent bioterrorist attacks are susceptible to ciprofloxacin, doxycycline, and *p*enicillin (2).

Initial treatment of infants and children with inhalational or systemic (including gastrointestinal or oropharyngeal) anthrax should consist of intravenous ciprofloxacin† or doxycyline§, plus one or two additional antimicrobial¶ agents. If meningitis is suspected, ciprofloxacin might be more effective than doxycycline because of better central nervous system *p*enetration (2). Experience with fluoroquinolones other than ciprofloxacin in children is limited.

Ciprofloxacin or doxycycline should be the initial treatment of localized cutaneous anthrax in infants and children. Intravenous therapy with multiple antimicrobial agents is recommended for cutaneous anthrax with systemic involvement, extensive edema, or lesions on the *h*ead or neck (2). Whether infants and young children are at increased risk for systemic dissemination of cutaneous infection is not known; a 7-month-old patient infected during the recent bioterrorism

attacks developed systemic illness after onset of cutaneous anthrax (7). For young children (e.g. aged <2 years), initial therapy of cutaneous anthrax should be intravenous, and combination therapy with additional antimicrobials should be considered.

After clinical improvement following intravenous treatment for inhalational or cutaneous anthrax, oral therapy with one or two antimicrobial agents (including either ciprofloxacin or doxycycline) may be used to complete the first 14--21 days of treatment for inhalational anthrax or the first 7--10 days for uncomplicated cutaneous anthrax. The optimal oral treatment regimen is unknown; some adults with inhalational anthrax as a result of the recent bioterrorist attacks are receiving ciprofloxacin and rifampin. For both inhalational and cutaneous anthrax in the setting of this bioterrorist attack, antimicrobial therapy should be continued for 60 days because of the likelihood of exposure *to aerosolized* B. anthracis and the need to protect against persistent spores that might germinate in the respiratory tract. Because of potential adverse effects of prolonged use of ciprofloxacin or doxycycline in children, amoxicillin is an option for completion of the remaining 60 days of therapy for persons infected in these bioterrorist attacks.

Because of its known safety for infants, amoxicillin is an option for antimicrobial prophylaxis in breastfeeding *mothers w*hen B. anthracis is known to be penicillin-susceptible and no contraindication to maternal amoxicillin use is indicated. The American Academy of Pediatrics also considers ciprofloxacin and tetracyclines (which include doxycycline) to be usually compatible with breastfeeding because the amount of either drug absorbed by infants is small, but little is known about the safety of long-term use (8). Mothers concerned about the use of ciprofloxacin or doxycycline for antimicrobial prophylaxis should consider expressing and then discarding breast milk so that breastfeeding can be resumed when antimicrobial prophylaxis is completed. Decisions about antimicrobial choice and continuation of breastfeeding should be made by the mother and her and the infant's health-care providers. Consideration should be given to antimicrobial efficacy, safety for the infant, and the benefits of breastfeeding.

Health-care providers prescribing antimicrobial drugs for the prophylaxis or treatment of anthrax should be aware of their adverse effects and consult with an infectious disease specialist as needed. Additional information about recognition, prophylaxis, and treatment of anthrax infection is available at <http://**www.bt.cdc.**gov>.

References

CDC. Update: investigation of anthrax associated with intentional exposure and interim public health guidelines, October 2001. MMWR 2001;50:889--93.

CDC. Update: investigation of bioterrorism-related anthrax and interim guidelines for exposure management and antimicrobial therapy, October 2001. MMWR 2001;50:909--19.

CDC. Updated recommendations for antimicrobial prophylaxis among asymptomatic pregnant women after exposure *to Bacillus an*thracis. MMWR 2001;50:960.

Bayer Corporation. Ciprofloxacin®. In: Physicians desk reference. Montvale, New Jersey: Medical Economics Company, 2000:678--83.

Food and Drug Administration. Prescription drug products; Doxycycline and Penicillin G Procaine administration for inhalational anthrax (post-exposure). Federal Register 2001;66:55679.

Friedlander AM, Welkos SL, Pitt MLM, et al. Postexposure prophylaxis against experimental inhalation anthrax. J Infect Dis 1993;167:1239--43.

Roche KJ, Chang MW, Lazarus H. Cutaneous anthrax infection: images in clinical medicine. N Engl J Med 2001. Available at <http://www.nejm.org>. Accessed November 6, 2001.

American Academy of Pediatrics Committee on Drugs. The transfer of drugs and other chemicals into human milk. Pediatrics. 2001;108:776--89.

* The recommended dose of amoxicillin is 80 mg/kg/day orally divided every 8 hours (maximum 500 mg/dose).

† The recommended dose of ciprofloxacin is 10 mg/kg/dose every 12 hours intravenously (maximum 400 mg/dose) or 15 mg/kg/dose every 12 hours orally (maximum 500 mg/dose).

§ The recommended dose of doxycycline is 2.2 mg/kg/dose every 12 hours intravenously or orally (maximum 100 mg/dose).

¶ Options for additional drugs, based on in vitro sensitivity testing of isolates in the recent attacks, include rifampin, vancomycin, penicillin, ampicillin, chloramphenicol, imipenem, clindamycin, and clarithromycin (2).

Morbidity and Mortality Weekly Report
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and Human Services

This page last reviewed 11/16/2001