BIOTERRORIST AGENTS

WATCH FOR THESE SYMPTOMS

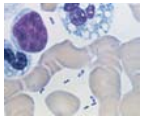
Disease	Signs & Symptoms	Incubation Time (Range)	Person-to-Person Transmission	Isolation	Diagnosis	Postexposure Prophylaxis for Adults	Treatment for Adults
Anthrax *Bacillus anthracis* A. Inhalation 	Flu-like symptoms (fever, fatigue, muscle aches, dyspnea, nonproductive cough, headache), chest pain; possible 1-2 day improvement then rapid respiratory failure and shock. Meningitis may develop.	1 to 6 days (up to 6 wks)	None	Standard Precautions	Chest x-ray evidence of widening mediastinum; obtain sputum and blood culture. Sensitivity and specificity of nasal swabs unknown - do not rely on for diagnosis.	Prophylaxis for 60 days: Ciprofloxacin* 500 mg PO q 12h Or Doxycycline 100 mg PO q 12h Alternative (if strain susceptible and above contraindicated): Amoxicillin 500 mg PO q 8h **In vitro* studies suggest that Levofloxacin 500 mg PO q 24h Or Gatifloxacin 400 mg PO q 24h Or Moxifloxacin 400 mg PO q 24h could be substituted	Inhalation anthrax Combined IV/PO therapy for 60d Ciprofloxacin 500 mg q 12h Or Doxycycline 100 mg q 12h, AND 1 or 2 additional drugs (vancomycin, rifampin, imipenem clindamycin, chloramphenicol, clarithromycin, and if susceptible penicillin or ampicillin
B. Cutaneous 	Intense itching followed by painless papular lesions, then vesicular lesions, developing into eschar surrounded by edema.	1 to 12 days	Direct contact with skin lesions may result in cutane-ous infection.	Contact Precautions	Peripheral blood smear may demonstrate gram positive bacilli on unspun smear with sepsis.		Cutaneous anthrax Ciprofloxacin 500 mg PO q 12h Or Doxycycline 100 mg PO 12h
C. Gastrointestinal (GI) 	Abdominal pain, nausea and vomiting, severe diarrhea, GI bleeding, and fever.	1 to 7 days	None	Standard Precautions	Culture blood and stool.	Recommendations same for pregnant women and immunocompromised persons	Recommendations same for pregnant women and immunocompromised persons
Botulism botulinum toxin 	Afebrile, excess mucus in throat, dysphagia, dry mouth and throat, dizziness, then difficulty moving eyes, mild pupillary dilation and nystagmus, intermittent ptosis, indistinct speech, unsteady gait, extreme symmetric descending weakness, flaccid paralysis; generally normal mental status.	Inhalation: 12-80 hours Foodborne: 12-72 hours (2-8 days)	None	Standard Precautions	Laboratory tests available from CDC or Public Health Dept; obtain serum, stool, gastric aspirate and suspect foods prior to administering antitoxin. Differential diagnosis includes polio, Guillain Barre, myasthenia, tick paralysis, CVA, meningococcal meningitis.	Pentavalent toxoid (types A, B, C, D, E) 0.5 ml SQ may be available as investigational product from USAMRIID.	Botulism antitoxins from public health authorities. Supportive care and ventilatory support. Avoid clindamycin and aminoglycosides.
Pneumonic Plague *Yersinia pestis* 	High fever, cough, hemoptysis, chest pain, nausea and vomiting, headache. Advanced disease: purpuric skin lesions, copious watery or purulent sputum production; respiratory failure in 1 to 6 days.	2-3 days (2-6 days)	Yes, droplet aerosols	Droplet Precautions until 48 hrs of effective antibiotic therapy	A presumptive diagnosis may be made by Gram, Wayson or Wright stain of lymph node aspirates, sputum, or cerebrospinal fluid with gram negative bacilli with bipolar (safety pin) staining.	Doxycycline 100 mg PO q 12h Or Ciprofloxacin 500 mg PO q 12h	Streptomycin 1 gm IM q 12h; Or Gentamicin 2 mg/kg, then 1.0 to 1.7 mg/kg IV q 8h Alternatives: Doxycycline 200 mg PO load, then 100 PO mg q 12h Or Ciprofloxacin 400 mg IV q 12h
Smallpox variola virus 	Prodromal period: malaise, fever, rigors, vomiting, headache, and backache. After 2-4 days, skin lesions appear and progress uniformly from macules to papules to vesicles and pustules, mostly on face, neck, palms, soles, and subsequently progress to trunk.	12-14 days (7-17 days)	Yes, airborne droplet nuclei or direct contact with skin lesions or secretions until all scabs separate and fall off (3 to 4 weeks)	Airborne (includes N95 mask) and Contact Precautions	Swab culture of vesicular fluid or scab, send to BL-4 laboratory. All lesions similar in appearance and develop synchronously as opposed to chickenpox. Electron microscopy can differentiate *variola virus* from varicella.	Early vaccine critical (in less than 4 days). Call CDC for vaccinia. Vaccinia immune globulin in special cases - call USAMRIID 301-619-2833.	Supportive care. Previous vaccination against smallpox does not confer lifelong immunity. Potential role for Cidofovir.

Photo Credits: Anthrax A and C - JAMA 1999;281:1737-8 ; Anthrax B - CDC; Botulism - JAMA 2001;285:1062 Copyrighted 2001 American Medical Association; Plague - JAMA 2000;283:2283; Smallpox - CDC

References:

- Arnon SS, Schechter R, Inglesby TV, et al. for the Working Group on Civilian Biodefense. Botulinum toxin as a biological weapon: medical and public health management. JAMA 2001;285:1059-1070.
- Centers for Disease Control and Prevention. Chemical/Biological Survival Cards for Civilians. 2000.
- Chin J, ed. Control of Communicable Diseases Manual. 17th edition. Washington, DC: American Public Health Association. 2000.
- Henderson DA, Inglesby TV, Bartlett JG, et al. for the Working Group on Civilian Biodefense. Smallpox as a biological weapon; medical and public health management. JAMA 1999;281:2127-2137.
- Inglesby TV, Henderson DA, Bartlett JG, et al. for the Working Group on Civilian Biodefense. Anthrax as a biological weapon: medical and public health management. JAMA 2002;287:2236-2252.
- Inglesby TV, Dennis DT, Henderson DA, et al. for the Working Group on Civilian Biodefense. Plague as a biological weapon: medical and public health management. JAMA 2000;283:2281-2290.
- U.S. Army Medical Research Institute of Infectious Diseases. USAMRIID's Medical Management of Biological Casualties Handbook. 4th ed. Fort Detrick, Frederick, Maryland. 2001.
- Update: Investigation of Bioterrorism-Related Anthrax and Interim Guidelines for Clinical Evaluation of Persons with Possible Anthrax. MMWR 2001;50:941-948.

NOTIFICATION PROCEDURES IN THE EVENT OF A BIOTERRORIST INCIDENT

1. **First call the Public Health Officer at your local health department; after hours contact local Health Director via 911.**
2. **If no answer at local health department, call the North Carolina Communicable Diseases Branch 919-733-3419.**
3. **If criminal activity is suspected, call your local law enforcement and the NC FBI 704-377-9200.**

FOR MORE INFORMATION ON BIOTERRORISM:

CDC - Centers for Disease Control and Prevention
www.bt.cdc.gov/

APIC - Association for Professionals in Infection Control & Epidemiology
www.apic.org/bioterror/

SPICE - North Carolina Statewide Program for Infection Control and Epidemiology
www.unc.edu/depts/spice/
919-966-3242

USAMRIID's Medical Management of Biological Casualties Handbook
www.usamriid.army.mil/education/bluebook.html

DECONTAMINATION FOR ALL OF THESE AGENTS

1. Place clothing from suspected victims in airtight impervious (e.g., plastic) bags and save for law authorities (e.g., FBI, SBI).
2. Use soap and water for washing victim.
3. For environmental disinfection for all of the above, use bleach (standard 6.0% - 6.15% sodium hypochlorite) in a 0.6% concentration (1 part bleach to 9 parts water). For botulism, plague and smallpox an alternative is to use an EPA-approved germicidal detergent.
4. For smallpox, all bedding and clothing must be autoclaved or laundered in hot water and bleach.
5. Healthcare worker should wear PPE (gowns, gloves and mask) during decontamination of anthrax, plague, and smallpox.

DETECTION OF OUTBREAKS

Epidemiologic Strategies

- A rapidly increasing disease incidence
- An unusual increase in the number of people seeking care, especially with fever, respiratory, or gastrointestinal symptoms
- An endemic disease rapidly emerging at an uncharacteristic time or in an unusual pattern
- Lower attack rate among persons who had been indoors
- Clusters of patients arriving from a single locale
- Large numbers of rapidly fatal cases
- Any patient presenting with a disease that is relatively uncommon and has bioterrorism potential

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