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SHEA News

THE SOCIETY FOR HEALTHCARE EPIDEMIOLOGY OF AMERICA

Clinical Anthrax: Primer for Physicians

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—Full text on SHEA's home page

Epidemiology

Occupation: Postal workers, mail room workers, media personnel, politicians and their associates, and microbiology laboratory personnel.

Geography: Exposure in time (within 7-14 days) and place with known clinical cases or locations where *Bacillus anthracis* contamination is identified.

Exposure: By direct contact or inhalation of aerosol from *Bacillus anthracis* spores in powder contents of envelope. One of 17 confirmed cases initially lacked a clear source, but cross-contamination in mail is now suspected.

Cutaneous Anthrax

Pathogenesis: Cutaneous contamination from direct contact.

Incubation period: Usually 1-7 days; up to 14 days.

Cutaneous lesion: Small papule progresses in 1-2 days to vesicle; then ulcer with black eschar over 3-7 days. Surrounding skin may show extensive cellulitis and brawny edema. Lesions usually involve exposed areas such as the face or arms. Systemic expression may include fever, headache, and regional nodes. The infant with cutaneous anthrax in New York City also had hemolytic anemia, thrombocytopenia, and hypotension requiring care in an ICU; however, most cases have been managed as outpatients.

Mortality: 20% without treatment; <1% with antibiotics.

Inhalation Anthrax

Pathogenesis: Inhalation; estimated criteria are particle size of ≤3-5 μ with an ID 50 inoculum size of 8,000-40,000 spores. Inhaled spores are transported to the mediastinal lymph nodes where they germinate, disseminate, and produce toxins that cause edema and cell death with arteritis and hemorrhage.

Incubation period: Usually 1-7 days; the cases in Sverdlovsk occurred at 2-43 (mean of 19.5) days post-release (Mendelson M, Guillemin J, Hugh-Jones M, Langmuir A, Popova I, Shelokov A, et al. The Sverdlovsk anthrax outbreak of 1979. *Science* 1994;266:1202).

Clinical features: The disease is described as biphasic, but the two stages may be a continuum. The prodrome is described as flu-like with malaise, fever, headache, nonproductive cough, substernal pain, myalgias, nausea, and abdominal pain. Unlike flu and other common respiratory infections, there is no coryza. The second phase is fulminant, consisting of severe dyspnea and shock; approximately 50% with advanced disease have meningitis with meningismus and compromised consciousness. In the 1979 Sverdlovsk epidemic of inhalation anthrax, the average duration of symptoms prior to admission was 4 days; average survival after hospitalization was 1 day.

Mortality: The quoted mortality is 80%-90%, but these data are possibly antiquated since they do not reflect the experience of care now available in ICUs and current antibiotics. Mortality in the current epidemic is 4/10 (40%).

Culture Recommendations

Specimens: *B anthracis* is usually easily cultured with routine media if specimens are obtained before antibiotic treatment or within 21 hours after antibiotics. Appropriate specimens are blood, swabs of cutaneous ulcers, vesicular fluid, pleural fluid, and CSF. Sputum may be cultured, but most patients do not have sputum production nor pneumonia.

When to Suspect Anthrax

Skin lesion or flu-like illness associated with exposure or in a person with a high-risk occupation (mail handlers) or geographic risk (building associations); skin lesion with the characteristic black eschar, especially if there is prominent surrounding cellulitis and edema; any patient with unexplained sepsis, respiration failure, or acute illness associated with large pleural effusions or wide mediastinum; sepsis with characteristic gram-positive bacilli in blood (buffy coat), pleural fluid, or CSF; unexplained death following acute febrile illness.

Treatment

In vitro sensitivity tests: Results of testing 11 strains indicate the same strain has been involved in all cases, according to DNA fingerprinting and in vitro sensitivity test results. The organism is sensitive in vitro to penicillin (see below), clindamycin, rifampin, chloramphenicol, imipenem, ciprofloxacin, and doxycycline. It is resistant to extended-spectrum cephalosporins.

Antibiotics: See Table 1 for the CDC's recommended regimen for cutaneous anthrax and Table 2 for the CDC's recommended regimen for inhalation anthrax.

TABLE 1
CDC's RECOMMENDED REGIMEN FOR CUTANEOUS ANTHRAX*

Patient Category	Recommendation
Adults†	Ciprofloxacin 500 mg po bid or doxycycline 100 mg po bid x 60 days‡
Children	Ciprofloxacin 10-15 mg/kg q 12 h (≤1 g/d) or doxycycline in the following dose regimens: 8 y and >45 kg: 100 mg po q 12 h >8 y and <45 kg or <8 y: 2.2 mg/kg q 12 h×60 days‡§

* *MMWR* October 26, 2001;50:909.
† Includes pregnant women and immunosuppressed patients.
‡ Patients with systemic involvement, extensive edema, or lesions on head or neck require IV therapy and combination therapy (see inhalation anthrax).
§ Amoxicillin 500 mg po tid (adults) or 80 mg/kg/d tid (children).
Note: Some authorities have expressed concern about a 60-day course of ciprofloxacin or doxycycline for pregnant women and children since both are contraindicated in pediatric patients and pregnancy. The recommendation is made based on perceived risk/benefit. However, it appears that an acceptable alternative would be to use amoxicillin (500 mg tid for adults) for the majority of the 60-day course once the patient has shown clinical improvement.

TABLE 2
CDC's RECOMMENDED REGIMEN FOR INHALATION ANTHRAX*

Patient Category	IV Therapy	Long-Term Therapy†
Adult‡	Ciprofloxacin 400 mg IV q12 h or doxycycline 100 mg IV q 12 h *plus* 1 or 2 other antibiotics§‖	Switch to po therapy when clinically appropriate; ciprofloxacin 500 mg bid or doxycycline 100 mg bid to complete 60 days‖
Children	Ciprofloxacin 10-15 mg IV q 12 h; doxycycline >8 y >45 kg: 100 mg IV q 12 h; 8 y <45 kg or <8 y: 2.2 mg/kg q 12 h *plus* 1 or 2 other antibiotics§‖	Switch to oral antibiotic when clinically appropriate; ciprofloxacin 10-15 mg/kg q 12 h or doxycycline (same dose regimen) to complete 60 days‖

* *MMWR* October 26, 2001;50:909.
† One drug may be used when patient has stabilized.
‡ Pregnant women and immunocompromised patients should receive the same therapy.
§ Other antibiotics that are active in vitro against the current strain: ampicillin, penicillin, clindamycin, clarithromycin, imipenem, vancomycin, rifampin, chloramphenicol.
‖ Consider steroids with severe edema or meningitis.
Note: Once patients have stabilized clinically, the IV treatment may be switched to oral, and monotherapy may be used to complete the 60-day course.

Brief items of interest to SHEA members may be sent to William R. Jarvis, MD, at wrj1@cdc.gov or to Keith Woeltje, MD, at kwoeltje@mail.mcg.edu for posting on the site of the Internet newsletter.

https://doi.org/10.1017/S0195941700072581 Published online by Cambridge University Press

Note: New Schedule!

12th Annual Scientific Meeting

Grand America Hotel • Salt Lake City
April 6 - 9, 2002

Opening Plenary Session — Saturday, April 6, 2002

"The Future Ain't What it Used to Be - Coordinating a Bioterrorism Response" — **5:00 pm - 7:00 pm**

- Exotic Weaponization Schemes
- Logistics of Operationalizing a Bioterrorism Plan
- Governmental Response to Bioterrorism

Opening Reception — **7:00 pm - 8:15 pm**

Workshops — Saturday, April 6, 2002

- Evidence Based Infection Control, *M. Loeb and C. Walker-Dilks*
- Media Relations: Communicating in Crisis, *J. Rodgers*
- Computer Database Support for Assessment and Control of Antibiotic Resistance, *M. Samore*
- JCAHO: New Safety Rules and Their Implementation, *T. Lundstrom*
- Bioterrorism-The Interface Between Public Health and Infection Control: Lessons Learned, *M. Leyton*

Plenary Sessions

PRION DISEASE: LESSONS FROM EUROPE

1. Update on the Biology and Epidemiology of Prion Diseases, *R. Will*
2. Sterilization-Disinfection, European Approach, *D. Pittet*
3. Sterilization/Disinfection for Prion Disease, US Perspective, *W. Rutula*
4. Safety of Blood Supply, *H. Budka*

IMPORTATION OF EXOTIC PATHOGENS: ARE YOU PREPARED?

1. Viral Hemorrhagic Fever, *M. Loeb*
2. Rift Valley Fever, *Z. Memish*
3. Glanders, *A. Srinivasan*

PREVENTION OF ANTIBIOTIC RESISTANCE: NEW APPROACHES

1. Antibiotic Cycling: "It's Hard To Hit A Moving Target", *N. Fishman*
2. Decolonization Protocols, *L. Herwaldt*
3. Alternatives to Traditional Antibiotics: Probiotics and Antimicrobial Peptides, *M. Yeaman*

PATIENT SAFETY-NEW HORIZONS IN INFECTION CONTROL

1. The Science of Safety, *P. Pronovost*
2. Patient Safety: Translating Concern into Change, *B. James*
3. The Role of the Hospital Epidemiologist in Patient Safety and Improving Patient Care, *J. Gerberding*

Symposia

SURGERY AND PREVENTING ADVERSE EVENTS

1. The Changing Face of Surgical Site Infections: More Common, Different Microbial Etiology?, *R. Sherertz*
2. Metabolic Approaches to Prevention: Impact of Temperature, Oxygen Saturation, and Glucose Control, *J. Lee*
3. Systemic vs. Local Antimicrobials to Prevent Infections of Surgically Implanted Prostheses, *R. Darouiche*
4. Decolonizing Patients to Prevent Infections: The Mupirocin Story, *T. Perl*

UPDATE ON PEDIATRIC INFECTION CONTROL: NEW APPROACHES TO OLD PROBLEMS

1. PICU-Associated Infections: Getting to the Heart of the Matter, *N. Singh*
2. Computer-Based Decision Support Succeed Where Physicians Have Failed?, *W. C. Huskins*
3. Evidence-based Consensus Guidelines for Infection Control Practices among Patients with Cystic Fibrosis 2002: What?, Why?, and How?, *L. Saiman*

Symposia

PERSISTENT AND PERPLEXING PROBLEMS IN INFECTION CONTROL: WHAT IS YOUR OPINION?

1. Is routine air sampling for aspergillus worthwhile for improving patient safety in bone marrow transplant units?, *L. Dembry*
2. Is the scientific basis for wearing surgical masks in the operating room beyond question?, *R. Sherertz*
3. An Ethical Dilemma: When should an outbreak investigation become the public's right to know? *L. Herwaldt*
4. Annual influenza vaccination of healthcare personnel should be mandatory as a patient safety intervention?, *T. Lane*
5. Should surgeon-specific feedback of surgical site infections (SSI's) be a routine infection control and quality practice?, *C. Lerner*
6. Should potable water in all healthcare institutions be periodically cultured for Legionella and should routine culture or urinary antigen assay for Legionella be periodically performed on patients with nosocomial pneumonia?, *R. Besser*

PREVENTING ERRORS: NEW DIAGNOSTICS

1. New Techniques in Bacteriology, Including Rapid Detection of MEC, *T. Smith*
2. New Test in the Diagnosis of Viruses Important in Infection Control, *R. Thomson*
3. A Cost-Effectiveness Analysis of these Tests for Infection Prevention, *L. B. Reller*

INFORMATICS: AN INFECTION PREVENTION/PATIENT SAFETY TOOL

1. Where we'll be in the year 2012: An Overview, *R. Wurtz*
2. Where are we now?, *J. Overhage*
3. How to make the most of the CIS data you have, *S. Brossette*

Meet the Consultant Breakfasts

- Hand Hygiene, *J. Boyce and D. Pittet*
- Legionella-What Type of Surveillance Should be Done?, *R. Besser and L. Herwaldt*
- HICPAC Guidelines: What's New, *R. Weinstein and M. Pearson*
- Advanced Issues in Health Care Workers Exposed to Bloodborne Diseases, *K. Sepkowitz and D. Henderson*
- Endoscopy, *M. Favero and W. Rutala*
- Working Patient Safety into Your Infection Control Program, *G. Pugliese and T. Lundstrom*
- Outbreak Investigation and Control, *L. Dembry and W. Jarvis*
- Infections in Immuno-compromised Hosts, *K. Sepkowitz and G. Noskin*
- Sterilization/Disinfection, *M. Favero and W. Rutala*
- Immunizations in Healthcare Workers, *R. Wurtz and J. Siegel*
- Controversies in Isolation, *M. Rupp and T. Karchmer*
- Bioterrorism-Lessons from the Front Line, *M. Tapper and N. Singh*

For additional information regarding the SHEA Annual Meeting, please contact: www.shea-online.org

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https://doi.org/10.1017/S0195941700072581 Published online by Cambridge University Press