Anthrax

Epidemiology

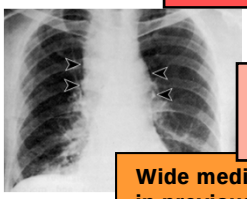
Source / Transmission
- Spores in soil, persist from years, no aerosolization, not a source for humans
- Sick animals: direct contact with lesions, meat consumption, spores on skin
- Weaponized spores: 10^9 to 10^{12} spores/g, inhalation
- Humans are NOT infectious, internal medistinum infection, no expelling bacilli, no secondary cases
- Laboratory exposure

Incubation 1-7 days (max 60 days)

INHALATION PHASE I
Fever, chills, headache, cough, dyspnea, chest pains, vomiting, abdominal pain
Duration: few days,
CXRay: No pneumonia

NOT communicable

INHALATION PHASE II
- **Onset abrupt, fever, dyspnea, diaphoresis, shock**
- **Massive lymphadenopathy**
- **Hemorrhagic mediastinitis**
- **Hemorrhagic meningitis 50%**
- **Fulminant, death before dx**
- **Mortality: 90% no tx**



Differential:
- Aortic dissection
- Pulm. embolism

Wide mediastinum in previously healthy with overwhelming ILI = anthrax

Bacillus anthracis
- Aerobic, gram-positive, spore-forming,
- nonmotile, non-hemolytic
- Large vegetative cell: 1-8 µm/1-1.5 µm, poor survival outside animal or human

Toxins:
- Hemorrhage
- Edema
- Necrosis

SKIN ANTHRAX

Through skin cut or abrasion onexposed skin area

Spore germinate in skin ⇨ toxin
- Local edema
- Macule ⇨ vesicle ⇨ pustule ⇨black eschar ⇨falls off, no scar
- Lymphangitis + painful lymphadenitis
- Some systemic symptoms
- Antibiotic does not influence local lesion BUT prevents systemic sx
- Mortality 0% with antibiotics, 20% without

GASTRO-INTESTINAL ANTHRAX

Ingestion of spores

Oral /pharyngeal ulcer ⇨ edema, lymphadenopathy, sepsis

Lesons in terminal ileum and cecum:
- nausea, vomiting
- acute abdomen
- Sepsis, massive ascites
- Mortality high

Diagnosis

- Gram stain of unspun blood , CSF: G+ boxcar
- Standard blood culture: 6-24 hrs

confirmation in 12 hrs:
1-Colonial morphology
2-Hemolysis and motility: NON motile, NON hemolytic
- Rapid identification by ELISA for protective antigen
- PCR

Differential bacteriology
- If not suspected peripheral lab will identify "Bacillus" and go no further
- Most "bacillus" = contamination or *B.cereus*
- Confirmation in specialized lab
- Sputum culture not useful: no pneumonia

Treatment, Prophylaxis

Oral Rx	Initial Rx	Optimal if suscep	Duration
Adult	Cipro 500mg po q12h	Amoxicillin 500mg po q8hr	60 days
Child >20kg	Cipro 10-15mg/kg	Amoxicillin 500mg po q8hr	60 days
Child <20kg	Cipro 10-15mg/kg	Amoxicillin 15mg/kg po q12h	60 days
Pregnant	Cipro 500mg po q12h	Amoxicillin 500mg po q8hr	60 days
Immunosuppressed	same as other adult		

- Early antibiotics are essential
- Most natural strains sensitive to penicillin, doxycycline
- Some weaponized strains engineered to resist penicillin and doxycycline

Control

Anyone w direct physical contact with anthrax should
- **Wash** exposed skin
- Remove then wash clothing with soap &water
- **Further decontamination** of directly exposed individuals **not indicated**
- Equipment /surfaces decontaminated with 5% hypochlorite (bleach) 30 mn / Steriplex ®
- Receive **postexposure antibiotic prophylaxis** until the substance is proved not to be anthrax

HCF: Standard Precautions

HUMAN VACCINE

US anthrax vaccine = inactivated cell-free product, filtrate of a nonencapsulated attenuated strain
principal antigen = protective antigen
licensed in 1970, Bioport Corp., Lansing, MI
6-dose series
all US military active- and reserve-duty personnel
1 small placebo-controlled human trial: efficacious against cutaneous anthrax
Population-wide vaccination not recommended
Postexposure vaccination following a biological attack with anthrax recommended with antibiotic administration to protect against residual retained spores, if vaccine were available