Z oonotic Bacterial infection

DEPARTMENT MICROBIOLOGY
F K U S U

Zoonosis

- Agents:bacteria, viruses, fungus, protozoa, helminth, prion
- Animals: domestic, wild
- Vectors: inanimate, arhtropoda
- Human: behavior, occupation, activity

Bacterial Zoonosis

- Leptospirosis
- Brucellosis
- Typhus & spotted fever
- Plague & Yersiniosis
- Anthrax
- Tularemia
- Psitacosis & Ornithosis
- Sallmonellosis
- Melioidosis
- Cat Scrath disease & Bartonellosis
- Rat bite fever
- Dog bite fever
- Campylobacteriosis
- Aeromonas infection
- Erysipeloid
- Listeriosis

Routes of Transmission

- Oral: food/ drink (infected, contamination)
- Skin & mucosal invasion:

  contact (direct/indirect)

  bite (infected animal/vector)

  wound contamination
- Respiratory : aerosol, contaminated objects

Animal

- Domestic:

  Pets: dog, cat, bird. Fish, turtle, lizard, snake

  Cattles: meat& meat suppliers, wool & hide product

  Pest: Rat, mouse, lizard

- Wild

  Relate to human activities/accident/environment:

  hunting, tracking, farming, eating habbit, invading wild environyment, mining, occupation, recreation.

Bacterial infection

- Aerobic gram positive Rods

  - Spore forming : Anthrax (*Bacillus anthraxis)*

  -Non spore forming :

  Erysipeloid (*Erysipelothrix rhusiopathuae)*

  Listeriosis (*Listeria monocytogenes)*

  Mycobacterial infection (*M. bovis, M. chelonei)*

Anthrax

- Agents: *Bacillus anthraxis*
- Animal: Cattles, other herbivores
- Vector (inanimate): dust, food, wool, hide, bone, dung
- Route: respiratory: pulmonary anthrax
  oral : intestinal anthrax
  skin (direct contact): cutaneus anthrax
- Occupation: (farmer, veterinarian, abattoir worker, butcher, industry workers (wool-sortes'disease)
- Biological Warfare Weapon

Bacillus anthraxis

- Aerobic gram positive
- Spore forming bacilli
- Encapsulated (in infected tissue/culture in blood)
- Non-motile, non-haemolytic
- Toxigenic: protective Ag, Lethal factor,edema factor
- Genes code for toxin, capsule: plasmid
- Antibiotic: penicillin, gentamycin, cholramphenicol, ciprofloxacin, doxyciclin, streptomycin
- Desinfection: formalin, hypochlorite in 50% alcohol
- Ascoli Test: detect antigen of *B. anthracis* in animal products

Erysipeloid

- *Erysipelothrix rhusiopathuae*
- Animal: swine, turkey, duck, sheep, fish
- Vector: contaminated water, soil
- Route: skin (direct contact)/injury
- Occupation: veterinarian, abattoir worker, butcher, fish handler, food handler, farmer
- Vancomycin resistant (use betalactam, quinolone, clindamycin)

Listeriosis

- *Listeria monocytogenes*
- Animal: cattle, mice
- Vector: food, milk
- Perinatal inf, pregnacy, opportunistic
- Intracellular bacteria
- Culture cold enrichment

Mycobacterial Infections

- Agent: *Mycobacterium bovis, Mycobacterium avium*
- Animal: cattle, dog, cat, parrot, poultry, swine
- Vector: milk, droplet nuclei
- Route: respiratory: pulmonary tuberculosis, lymphadenitis, diseminated infection

  oral: GI infection, Chron disease
- Population at risk: AIDS, Immunocompromised host

Mycobacterium bovis

- *Mycobacterium tuberculosis* complex
- Attenuated *M. bovis* is used as BCG
- Tuberculosis like disease
- Bovine tuberculosis
- Niacin & Nitrate Test: negative
- Susceptibe to antituberculosis drugs

Mycobacterium avium

- MAC (*Mycobacterium avium complex)*
- Bacillus, scotochromogen
- Important disease in poultry and swine
- The most common NTM infection in man
- Lymphadenitis in children
- Pulmonary disease
- Disseminated in AIDS
- Resistant to Antituberculosis (use Clarythromycin + Erythromycin)

Bacterial infection

Gram negative rods:

1. ENTEROBACTERIACEAE

Plaque & Yersiniosis: *Yersinia pestis &* Other Yersinia

-Salmonellosis : non typhoidal *Samonella*

-Diarrhea/ Food poisoning : ETEC, EHEC

2. Non fermenter:

Melioidosis : *Burkholderia pseudomallei*

Glander's Disease: *Burkholderia mallei*

Other gram negative rods

- Fastidious: *Brucellosis*

  Brucella abortus (Cattle)

  B. mellitensis (Goat)

  B. suis (pig)

  B. canis (dog)

  Tularemia

  Francisella tularensis
- Dog/cat bite wound inf: *Pasteurella multocida*
- Fresh-water bacteria: *Aeromonas hydrophhila, A. sobriae*

  Fish Haermorrhagic Disease

Plague

- Agent: *Yersinia pestis*
- Animal : domestic: rat or wild animal
- Vector: rat, flea/aerosol
- Route: flea bite → lymph node → blood stream → respiratory
- Population at risk: endemic, ports, invading forest
- Pathognomonic:bulbonic, septicemic, pneumonic plague
- Diagnosis :smear stain: bacilli, gram negative
- Virulent factors: V antigens, serum resist

Yersiniosis

- Agent: *Yersinia enterocolitica, Y. pseuotuberculosis*
- Animal: dog, pig, and various domestic animal/wild animal
- Vector: food, milk
- Route: oral (invade M cell at the Peyer Patch)
- Population at Risk: children > adult
- Pathognomonic: mesenteirc lymphadenitis, reactive polyarthritis

Melioidois

- Agent: *Burkholderia pseudomallei*
- Animal: farm animal, cattles
- Vector : water/aerosol
- Route: skin/respiratory
- Population at risk: endemis, farmers
- Diagnosis: smear stain, gram negative
- Serorogy

Bacterial Infection

- Spirochete& spiral Bacteria
  - Leptospirosis : *Leptopira interogans*
  - Lyme disease : *Borrelia burgdorferi*
  - Rat-bite fever : *Spirillum minor*
  - Campylobacter : *Campyloacter jejuni*

Leptospirosis

- Agent: *Leptospira interrogans*
- Animal: mammal: wild, domestic, pet, pest
- Vector: urine: environment, water,plant
- Route: contact: abraded skin, mucous membrane
- Population at risk: activities relate to animal,water, farm
- Diagnosis: dark-field microscope, silver stain, serology, culture,serology

Lyme disease

- *Borrelia burgorferi*
- Animal: deer, mice (dog, human)
- Vector: *Ixodes tick*
- Pathognomonic:
  1. Erythema migrans (80%)
  2. Flu like, Neuro, Heart damage
  3. chronic arthritis, CNS
- Diagnosis: Clindamycin, serology, PCR
- Th: Doxyciclin, Amoxycillin, Erythomycin

Bacterial Infection

- Rickettsial Infections
- Scrub typhus: *Rickettsia tsutsugamushi*
- Murine typus : *Rickettsia tyhi*
- Q fever : *Coxiella burnetti*
- Spotted fever*: Rickettsia rickettsii*
- Rickettsial pox: *Ricketsia akari*
- Cat scratch disease: *Bartonella henselae*

Bacterial infection

- Chlamydial infection
  - Psittacosis & ornithosis: *Chlamydia psittacosi* (from birds by aerosol transmisson)
  - Pneumonia & atheroclerosis: *C. pneumonia*
  - Life cycle: intracellular development

  Lab diagnostic:
  - Culture: Mc Coy cell
  - Serology.


THANK YOU