BRUCELLOSIS

Epidemiology

- Worldwide zoonosis
- Only 17 countries declared brucellosis free1986
- Six species
  1. B.abortus - mainly cattle
  2. B.melitensis - sheeps & goats
  3. B.suis - pigs
  4. B. canis - dogs
  5. B. ovis - sheep (not human pathogen)
  6. B. neotomae - desert wood rat (not human pathogen)
- B. melitensis -- most common worldwide

Brucella-Diagnosis

- grow slowly
- most enriched blood agars
- microscopic and colonial morphology
- positive oxidase and urease reactions
- *B. abortus* and *B. melitensis, B. abortus,* and *B. suis* will react with antisera prepared against *B. abortus* or *B. melitensis*

Bacteriology

- Gm - ve cocci, coccobacilli, bacilli.
- Strict aerobic, nonmotile, nonspore forming.
- B. ovis, B. abortus --CO_2 supplementation.
- Grow in regular media -- prolonged incubation > 4 weeks.

Bacteriology

- Surface lipopolysccharide cell wall
  - determine virulence.
  - smooth LPS : B. melitensis,suis,abortus
  - Non-smooth LPS B.canis, ovis.
  - the basis for agglutination test.

Transmission

- Zoonosis affecting domestic animals.
- Concentrated in milk, urine, genital organs.

ROUTES OF TRANSMISSION

- Oral : unpasteurised milk & products raw milk or meet.
- Respiratory: lab workers.
- Skin: accidental penetration or abrasion
  - at risk farmers & veterinarians.
- Other routes:

Conjunctival, Blood transfusion, Transplacental, ? person to person.

Pathogenesis

Entry to the body

Macrophage activation

Polymorph migration & Phagocytosis

Intracelluar multiplication

Lymphatics

RES organs

Blood

Any organ

Pathogenesis

- Cell mediated immunity also activated with granuloma formation (mainly with B. abortus)
- Humoral antibody response of little importance
- Main way of body control of the infection is through committed T-lymphocytes producing lymphokines (γ-Interferon) which activate macrophage killing
- Pyogenic infection more with B. melitensis and B. suis

Diagnosis

Laboratory

- WBC (N) or . monocytosis
- Blood cultures
  - slow growth = 4 weeks
  - new automated system BATEC identifies he organism 4-8 days
  - more recent (BACT/ALERT) - 2.8 days

PCR

Diagnosis

- Serology
  - Main laboratory method of diagnosis
  - Serum agglutination test - most widely used
    - measures agglutination for IgG, IgM, IgA
    - 2ME - break sulf-hydrile bonds in IgM polymer - no agglutination
    - which level is diagnostic ??
      - 1 : 160 - non endemic area
      - 1 : 320 - endemic area
    - SAT - false negative
      - Prozone
      - Blocking antibodies
  - Other tests: coombs, ELISA, CFT, FTA

Prevention

- Control of disease in domestic animals
  - immunization using B. abortus strain 19 and B. melitensis strain Rev 1
- Routine pasteurization of milk
- In labs strict biosafety precautions

Treatment

Drugs against Brucella

- Tetracyclines
- Aminoglycosides
  - *Streptomycin since 1947*
  - *Gentamicin*
  - *Netilmicin*
- Rifampicin
- Quinolones - ciprofloxacin
- 3rd generation cephalosporins

Treatment

Drugs against Brucella

- Treatment for uncomplicated Brucellosis
  - Stremptomycin + Doxycycline for 6 weeks
  - ? TMP/SMX + Doxycycline for 6 weeks
  - WHO recommendation 1986
  - Rifampicin + Doxycycline for 6 weeks
- Treatment of complicated Brucellosis
  - Endocarditis, meningitis
  - No uniform agreement
  - Usually 3 antibrucella drugs for 3 months


Thank you