Johne's Disease

A PowerPage Presented By

Johne's disease primarily affects ruminants such as cattle, sheep, goats, and deer. Mycobacterium avium subspecies paratuberculosis is the bacterium responsible for the disease. It is most commonly observed in dairy cattle and results in substantial morbidity and ultimately mortality. The bacteria has been implicated but not proven to be a potential cause for Crohn's disease in humans. Lastly, Johne's disease results in substantial financial loss to the dairyman. It has been estimated that as much as 22% of dairy herds and 7.8% of beef herds in the United States are affected. This PowerPage reviews and highlights key features of the disease as well as clinical signs and prevention recommendations.

Key Points

- Causative agent is **Mycobacterium avium subspecies paratuberculosis**
- Transmitted by ingestion of **contaminated feces or milk**
- **Diarrhea and weight loss**
- **Ileum** most severely affected
- **Dairy cows** most affected
- No economical/effective treatment

Overview and Pathophysiology

Animals affected

- Ruminants susceptible
  - Cattle, sheep, antelope, deer, elk, bison
  - Llamas and alpacas may also be infected

Source of infection

- Can only multiply in macrophages
- Infection results as a result of exposure to an infected animal
  - Milk from infected female
  - Ingestion of contaminated feces
  - Manure contaminated water
- Animals **less than 6 months** of age are more susceptible

Lesions

- **Ileum** is most severely affected
- Lymph nodes draining the ileum also affected
- Results in **pronounced inflammation** (mainly macrophages and lymphocytes)
- **Acid fast** bacterium may be visualized in advanced cases
- Gross lesions
  - As disease progresses ileum becomes **severely thickened**
  - Regional **lymph nodes** also enlarged

Clinical Signs

- **Diarrhea**
- **Rapid weight loss ("waste away")**
  - Despite normal appetite
  - Although weight loss is considered rapid, signs are typically not identified until animals are adults

Diagnosis

- Several different tests available
  - Typically have high specificity but low sensitivity
  - Therefore recommended to perform two or more different types of tests to try and increase sensitivity
- Tests that isolate agent
  - Culture
    - Slow-growing- takes at least 8-16 weeks
    - More sensitive and specific than antibody tests
    - 100% Specific (no false positives)
  - PCR
    - Approximately 3 days to get results
- Tests for antibodies in serum
  - Complement fixation
    - Not as popular anymore
  - Agar-gel immunodiffusion (AGID)
    - High specificity
    - Low sensitivity
  - Enzyme-linked immunosorbent assay (ELISA)
    - More sensitive than other two and high specificity
- Tests for cell-mediated immune response
  - Bovigam
    - Measures gamma interferon released from WBCs

Control and Prevention

Treatment

- None
  - Chances of curing are low, cost of antibiotics high, economically not feasible
  - Meat would likely not be suitable for human consumption as a result of antibiotics used

Prevention of new infection

- Prevent exposure
- Do not allow calves to drink infected milk
  - Use colostrum and milk from Johne's test-negative animals only
- Farm sanitation and manure management
  - Thoroughly clean facilities and use a tuberculocidal disinfectant
- Focus on not exposing the young as they are more susceptible

Elimination from herd

- Remove infected animals from herd
  - Cull

Prevention

- Test animals before introducing them into the herd
- Purchase from "test-negative" herds
- Participate in "Herd Status Program" which is designed to help limit spread of Johne's disease and to protect animal buyers
    - National Paratuberculosis Certification Program
- It is illegal for animals that test positive to be moved interstate unless it is for slaughter

References and Links

www.johnes.org
http://www.aphis.usda.gov/publications/animal_health/content/printable_version/faq_johnes_cattle3-06.pdf
http://www.vetmed.ucdavis.edu/vetext/INF-DA/INF-DA_JOHNESDISEASE.HTML
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