

# **PARATUBERCULOSIS**

## **JOHNE'S DISEASE**

### **The Organism**

- *Mycobacterium avium* subspecies *paratuberculosis* (Map)
  - acid-fast Gram-positive bacterium
  - not contain endospores or capsules
  - Some species can be very difficult to culture
  - nonmotile bacteria
  - aerobic

### **Epidemiology**

- Occurs in cattle, sheep, and goats
- High prevalence of infection in cattle population and among herds
- Incidence of clinical disease in herds about 1 % annually
- Transmitted by fecal-oral route. Prenatal infection occurs
- Infection occurs soon after birth
- Long incubation period

### **Clinical Signs**

#### **Cattle**

- Chronic progressive intractable diarrhea
- emaciation in adult cattle extending over several weeks and months

#### **Sheep**

- Chronic wasting disease of adult sheep
- diarrhea not a distinct clinical finding. (Common cause of emaciation in ewes)

## **Stages paratuberculosis**

### **1. Silent infection**

- Calves, heifers, and young cattle up to 2 years of age.
- no clinical signs and no effects on body weight or body condition but may shed the organism.

### **2. Subclinical disease**

- Carrier adults
- no clinical signs but may be affected by other abnormalities such as mastitis or infertility

### **3. Clinical disease**

- Clinical signs do not appear before 2 years of age
- occur sporadically because of the slow rate of spread of the disease
- Gradual loss of body weight despite a normal appetite.
- Milk production declines and the temperature, heart rate, and respirations are within normal limits.
- thirst is excessive

### **4. Advanced clinical disease.**

- As the disease worsens, emaciation is the most obvious abnormality and is usually accompanied by intermandibular edema which has a tendency to disappear as diarrhea develops.
- The diarrhea is characterized by a fluid 'waterhose' or 'pipestream' passage of feces.
- The course of the disease varies from weeks to months but always terminates in severe dehydration, emaciation

## **Post Mortem Lesions**

- Lesions are associated lymph nodes.
- Typically, the intestinal wall is three or four times normal thickness, with a corrugated mucosa and prominent thickened serosal lymphatics.
- The ileocecal valve lesion varying from reddening of the lips of the valve in the early stages to edema with gross thickening and corrugation later.
- A granulomatous lymphangitis is often visible.

## **Clinical Diagnosis**

- Clinical sign
- P.M lesion

## **Differential Diagnosis**

### **Diarrhea in adult cattle**

- Intestinal parasitism (ostertagiasis)
- Salmonellosis
- Secondary copper deficiency

### **Emaciation in adult cattle**

- Chronic traumatic reticuloperitonitis
- Malnutrition
- Pyelonephritis
- Lymphosarcoma

### **Diarrhea and weight loss in sheep and goats**

- Gastrointestinal parasitism

## **Chronic weight loss in sheep and goats**

- Internal abscesses
- Caseous lymphadenitis
- Caprine arthritis-encephalitis
- Ovine progressive pneumonia
- Dental disease

## **Laboratory Diagnosis**

### **Bacteriology**

- distal ileum, colon, ileocecal lymph node (CULT (has special growth requirements),
- DIRECT SMEAR (acid-fast stains), PCR)

### **Histology**

- formalin-fixed samples of these tissues (PCR) .

## **Treatment**

The antimicrobials which have been used are summarized here:

- Streptomycin has most activity against the organism but treatment of affected cattle with daily doses of 50 mg/kg BW 1M causes only a transient improvement in clinical

## **Prevention and Control**

- Identify and eliminate clinical cases and subclinically infected animals
- Test herd serologically
- Identify and cull positive animals
- Improve management and hygiene to minimize spread of infection in herd with emphasis on avoiding infection of newborn calves
- Vaccination prevents clinical disease but not infection