

MYCOPLASMA INFECTIONS

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Etiology

- *M.gallisepticum* (MG)
- *M.synoviae* (MS)
- *M.meleagridis* (MM)
- *M.iowae* (MI)

Role of *Mycoplasma* species in respiratory system Infections

Mycoplasma + *E. coli*

Mycoplasma + Adenovirus

Mycoplasma + Reovirus

Mycoplasma + *Avibacterium paragallinarum*

IBV + *E. coli*

NDV + *E. coli*

NDV (vaccine) + **Mycoplasma + *E. coli***

AmPV + *E. coli*

Etiology

- Gram negative, usually in coccoid form but pleomorphic structures can be seen
- Does not have a cell wall
- Requires complex media for growth
- Embryonated chicken eggs can also be used for the culture of the bacteria
- Egg-like colony form are seen on media
- *Mycoplasma gallisepticum* lyses horse erythrocytes while hem agglutinating turkey/chicken erythrocytes

Resistance to Environmental and Chemical conditions

- Disinfectants are effective
- Resistant to antibiotics which affects the structure of the cell wall
- Sensitive to environmental conditions
- Long life in exudate and cold
- Can survive for 1-3 days in chicken feces
- The life time decreases when the temperature increases
- Can survive in egg yolk for 6-18 weeks.
- Survive 6 days at room temperature in allantoic fluid
- ECE infected with *M.gallisepticum*, be inactivate in 11-14 hours at 45.6°C
- If liquid cultures are lyophilized at -30°C for 2-4 years, stays alive for a long time

Pathogenicity

- Turkeys are more susceptible to MG infection than chickens
- Live F strain, very pathogenic for turkeys than chickens
- *M.gallisepticum* infection is often caused by environmental and complicated by other microorganisms, the pathogenicity can be differ
- When MG-containing exudates or liquid cultures inoculated into embryonated chicken egg yolk, embryos dyes in 5-7 days

Epidemiology-1

- Chickens and turkeys naturally susceptible to MG infection
- Can be isolated from other poultry such as pheasant, quail, goose, duck and parrot
- The disease is more serious in the winter months
- Direct transmission: contact with infected carriers
- Indirect transmission: with infected lint, dust, streams and contaminated equipment
- Clinical symptoms usually develop slowly and the disease lasts a long time

Epidemiology-2

- 4 stages in lateral transmission of chickens
 - Latent phase
 - 5-10% infection in population
 - 90-95% infection in population
 - The entire population is infected
- Vertical transmission with eggs
- It is also transmitted by artificial insemination

Clinical Signs

- Incubation period
 - Usually 4 weeks in natural conditions, but many additional clinical symptoms plays a role, therefore unexplained
 - 6-10 days in turkeys for 6-21 days in experimental conditions
- When the clinical findings are not complicated, occur lightly before hatching
- In young animals, although they are serologically positive, no clinical signs may occur

The Importance of Clinical and Necropsy Findings in Infection

- Severe to mild upper respiratory tract symptoms
- Mortality levels can reach from 1% to 5-10%
- Air sac inflammation is quite important in necropsy findings. The involvement of other agents change the situation
- Increase in discarded carcass rate in broiler flocks (>1%)

Economic importance of Mycoplasma infection

- Increase in death rate
- Additional treatment costs
- High discard rate
- Decrease in egg production
- Deterioration in egg shell quality
- Decrease in hatching efficiency

Calculation of economical loss

- **Broiler**
 - 5-10% live weight loss
 - 1% additional mortality
- **Layers**
 - 10-15 eggs/chicken
 - 3-5% additional mortality-discard
- **Breeding**
 - Additionally >3% decrease in hatching efficiency

Diagnosis

- **Direct Diagnosis (Isolation, PCR)**
 - Trachea, air sac, lung, sinus contents
 - Swab samples taken from the trachea, esophagus, cleft palate and cloaca
 - Semen from roosters and eggs follicles from chickens
 - If in incubation period, dead chicks under the shell and chicks that broke but did not hatch
- **Indirect Diagnosis (Serology)**
 - Blood serum

Diagnosis of *M. gallisepticum* (ELISA)

Diagnosis of *M. gallisepticum* (PCR)

Differential Diagnosis

- In chickens
 - IBV, NDV, APV infections
 - Infectious coryza and fowl cholera
 - It should also be differentiated from *M.synoviae* infections
- In turkeys
 - Pasteurella infections, chlamydiosis, cryptosporidiosis, MS infections and Vitamin A deficiency should be differentiated

Mycoplasma Control Program

- Breeders being negative for mycoplasma
- Biosecurity
- Treatment
- Vaccination

Treatment

- Treatment of breeding flocks (except MG)
- Treatment of layers and broiler flocks

Antibiotics Used for Mycoplasma Infection

- Macrolides (tylosin, erythromycin, aivlosin, spiramycin, kitasamycin)
- Tetracyclines (chlortetracycline, oxyteracycline, doxycycline)
- Tiamulin
- Quinolones (enrofloxacin, danofloxacin, norfloxacin, imequil)
- Tilmicosin
- Lincosamides (linkomycin, kanamycin)
- Aminoglycosides (streptomycin, spectinomycin, gentamicin, neomycin)

Mycoplasma Vaccines

- Inactive vaccines
- **Live vaccines**
 - F, **6/85**, **ts-11**
 - K5054
 - MS-H
- Recombinant vaccines

Result

- Mycoplasma Control program must be generated for poultry businesses. For this purpose;
- Periodic monitoring of breeding flocks
- Biosecurity
- Treatment procedures in infected flocks
- Prevention of losses due to mycoplasma