

NECROTIC ENTERITIS

***Clostridium perfringens* type C-** have different toxins and enzymes that cause different lesions and symptoms

The disease was first reported in England in 1961. Later, many countries with intensive poultry production also reported outbreaks.

The disease develops as a result of an overgrowth of *C.perfringens* in the poultry intestine and the subsequent production of toxins, which leads to the formation of necrotic lesions

Mortality is generally around 5–15%.

Animals often die suddenly without showing clinical signs, or they may exhibit depression, loss of appetite, and bloody diarrhea, leading to increased flock mortality.

In untreated acute outbreaks, mortality may reach 10% or more in broilers.

Clinical signs may sometimes be confused with a mild course of coccidiosis. Symptoms tend to be more severe in turkeys.

Affected birds may cluster together (aggregate), show diarrhea, and produce abnormal vocalizations.

Typically, the necrotic lesions are confined to the small intestine. The lesions are most commonly observed in the ileum and jejunum.

The small intestine is usually thin, fragile, and distended with gas.

Fibrinonecrotic enteritis with a diffuse **pseudomembrane** in the ileum and jejunum is the main pathological finding. Bronze-orange pseudomembranes are typically noticeable on the intestinal surface.

The mucosa of the ileum becomes markedly thickened due to deep, bloody, velvety-like areas of necrosis.

In some cases, the lesions in the lower parts of the ileum may be quite dry in appearance

Diagnosis

Clinical findings are often **insufficient for an accurate diagnosis**.

Necropsy findings and a **detailed anamnesis** (including investigation of predisposing factors) are very important.

The disease is often **confused with coccidiosis**.

Treatment

Severe clinical outbreaks often respond well to specific **antibiotic therapy**.

Protection

Prevention of **subclinical coccidiosis** is one of the most important strategies for controlling the disease

Ornithobacterium rhinotracheale
Infection (ORT)

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- **Ornithobacterium rhinotracheale (ORT)** is an infectious disease agent that causes respiratory disorders, growth retardation, mortality, and production losses in chickens and turkeys.
 - Losses associated with the disease increase in the presence of concurrent viral or bacterial infections, inadequate ventilation, high stocking density, and poor hygiene
 - The disease was first reported in **1981**, and since then, *Ornithobacterium rhinotracheale* has been isolated from respiratory tract infections in chicken and turkey flocks in many countries.

Etiology

- The agent of the disease is *Ornithobacterium rhinotracheale*.
- It is a **Gram-negative, pleomorphic, cocco-bacillary, non-motile, and non-spore-forming bacterium**.
- It is **facultative anaerobic**.
- Blood agar, chocolate agar, or tryptose agar are used for **primary isolation**.
- Biochemical tests are performed after primary isolation, and **serological tests** are also used for identification of the agent.

Serotyping

Ornithobacterium rhinotracheale strains have been divided into different serotypes based on their heat-extract antigens.

Agglutination, agar gel precipitation, and ELISA tests are used for serotyping. Electrophoretic methods and molecular techniques such as **PCR and RAPD** are also used for typing isolates

To date, **18 serotypes (A–R)** have been identified using these serotyping methods, with **serotypes A, B, D, and E** being the most common.

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Resistance

O. rhinotracheale strains are highly sensitive to commercially available disinfectants.

It is not very resistant to environmental conditions.

The agent can survive for 1 day at 37 °C, 6 days at 22 °C, 40 days at 4 °C, and at least 150 days at -12 °C.

Epidemiology

Ornithobacterium rhinotracheale infections are seen in chickens and turkeys worldwide. The agent has also been isolated from other bird species such as **guinea fowl, pheasants, pigeons, partridges, quails, ducks, camels, and geese.**

All ages of chickens and turkeys are susceptible to infection.

Transmission occurs **horizontally**, both directly and indirectly.

Direct contact with infected birds is considered the **most effective route of transmission.**

Vertical transmission is **still controversial.** The isolation of the agent from **ovaries, hatching eggs, and embryos or chicks that died in the shell** supports the possibility that the agent may be transmitted vertically.

Wild and non-domestic birds also play an important role in transmission

Clinical signs

- The incubation period of the disease is **2–4 days**.
- The clinical findings of the disease are **highly variable**, mainly because *O. rhinotracheale* infection is rarely seen alone and is often complicated by other bacterial and viral pathogens.
- Clinical signs are **exacerbated by secondary infections**, particularly under conditions of **poor ventilation** and **high ammonia levels** within the flock.
High stocking density and poor hygiene also **worsen clinical signs**.
- The disease is more common in **broiler flocks aged 3–6 weeks**. It is also frequently observed in **breeder and commercial layer flocks**, especially during the **laying period** and at **peak production**.
- In broiler flocks, **loss of appetite, reduced daily weight gain, decreased feed intake, nasal discharge, facial edema, and mortality ranging from 1–10%** may be observed.
Under adverse environmental conditions and in the presence of secondary infections, **mortality may reach up to 20%**.
- In breeder flocks, **a decrease in egg production, deterioration in eggshell quality, and 1–2% mortality** accompanied by mild respiratory signs are commonly seen.
- In some cases, the increase in mortality due to the disease may be minimal, around **0.2–0.5%**.

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- In commercial layers, a decrease in productivity is observed along with deterioration in eggshell quality
 - Mortality remains at **1–10% on a weekly basis**. In these flocks, secondary factors can increase mortality
 - In turkeys, **young birds between 2 and 8 weeks of age may also be affected**, although the disease is most commonly seen in flocks over **14 weeks of age**.
 - In addition to upper respiratory tract findings, **sinusitis** is observed, and mortality may reach **1–20%**.
 - In breeding turkey flocks, **mild respiratory disorders** and a **decrease in egg production** are observed

Neucropsy

- The most obvious necropsy findings in both chickens and turkeys are **pneumonia and airsacculitis**.
- In cases of unilateral pneumonia, the presence of **foamy white exudate in the air sacs** (primarily in the abdominal air sacs) is considered characteristic.
- In chickens, **osteomyelitis and encephalitis** may be observed in some cases.
- In turkeys, **leg and extremity problems** may also occur.

Diagnosis

Materiel

- Air sacs, trachea, lung, and sinus contents taken from suspected animals are the most suitable materials for isolation.
- Isolation of the causative agent is important for the diagnosis of the disease. After culturing the samples on appropriate media (blood agar, chocolate agar), they are incubated for **48–72 h**.
- Colonies are identified based on their macroscopic and microscopic morphology, as well as their biochemical characteristics.
- The AGP technique can also be used for slide agglutination and serotype determination with specific antigens prepared from the colonies.
- Serological tests, especially **ELISA** and **agglutination**, can be used both for diagnosis and for serological monitoring of flocks.
- **IFA techniques** are also useful in diagnosis.
- **PCR** has also been widely used for the detection of the agent.

Treatment

Many antibacterial drugs are used in the treatment of *O. rhinotracheale* infection.

However, important difficulties are encountered in treatment because the agent is **more resistant to antibiotics** than many other bacteria or exhibits **higher MIC values**.

The antibiotic resistance of *O. rhinotracheale* strains varies **regionally** and **over time**.

Studies have shown that antibiotic resistance in strains isolated from the same region **increases in subsequent years**, depending on the frequency of antibiotic use.

For this reason, the most effective approach is to **determine the antimicrobial susceptibility** of the isolated strain and use the **appropriate antibiotic** based on these results

Control and Protection

It would be useful to evaluate the prevention and control measures of the disease depending on the management conditions.

Losses related to the disease increase, and control becomes more difficult in flocks where very old animals are kept and the disease is **endemic**.

Basically, the goal should be to maintain **strong biosecurity** within the flock.

Appropriate management practices should be implemented.

The introduction of microorganisms into the flocks should be prevented.

In recent years, studies on developing vaccines against *O. rhinotracheale* infection have increased. Vaccines are being tested for both broiler breeder and turkey flocks.

These vaccines are produced in different forms: **inactivated, live and recombinant**

After broiler breeders are vaccinated by inactivated vaccines, broiler chicks with maternal antibodies are protected against experimental *O. rhinotracheale* infection for up to **4 weeks**.

SPIROCHETOSIS

(Spirochetosis, Spirochaetose, Spirochétose)

- **Spirochetosis** is a disease characterized by **fever, cyanosis (bluish discoloration) of the head, prostration, and diarrhea.**
- The causative agent is ***Borrelia anserina.***
- Older birds often show **increased resistance** to the infection; however, the disease can be seen in **most poultry species.**
- In addition to ticks, **mosquitoes and mites** also play an important role in transmission.

PSEUDOTUBERCULOSIS

- It is a chronic infection characterized by nodular and caseous swellings in internal organs, or an acute infection in poultry.
- The causative agent of the disease is *Yersinia pseudotuberculosis*.
- *Y. pseudotuberculosis* is common in almost all domestic poultry species worldwide, as well as various wild birds, cage birds, and rodents.
- Although the agent has been reported in humans

ENTEROCOCCUS INFECTIONS

- It is found in the **normal intestinal flora of poultry**.
- It mostly causes **secondary infections**.
- The agents are commonly present in **poultry environments and in nature**.
- It causes **salpingitis, peritonitis, and mortality** in chickens.
- ***E. faecalis*** is the causative agent of **amyloid arthropathy** in poultry

ERYSIPELAS

- **Erysipelas** is an acute disease, mostly seen in **turkeys around 13 weeks of age**
- It is also seen in ducks, geese, quails, and chickens, usually with **low mortality**.
- It may cause **decreased egg production** in chickens and **high mortality** in pheasants.
- The infection also occurs in **domestic pigs and sheep**.
- It is important for public health. It can be transmitted through **skin wounds** during handling of contaminated carcasses, causing **skin rash and cellulitis (erysipeloid)** and, in some cases, **endocarditis** and **encephalitis** in humans.
- The agent of the disease is ***Erysipelothrix rhusiopathiae*** (It is the only pathogenic species that infects poultry)
- It is a **Gram-positive, non-motile, pleomorphic** bacterium.

ANTHRAX

- The agent of the disease is *Bacillus anthracis*
- It is a **Gram-positive, aerobic, spore-forming** bacterium.
- The agent causes infection primarily in mammals, but it can also infect poultry
- Chickens and turkeys are **highly resistant** to anthrax, whereas **ducks and pigeons are more susceptible**.

LISTERIOSIS

- Listeriosis is a bacterial disease seen especially in poultry living in warm regions.
- The agent of the disease is *Listeria monocytogenes*, a **Gram-positive, rod-shaped, and motile (at 22 °C)** bacterium.
- The disease occurs in **chickens, turkeys, geese, ducks, and canaries**, and birds of **all ages** are susceptible to infection.
- The main sources of infection are usually **contaminated feed, soil, water, or bedding materials**. Transmission occurs through the **nasal discharge and feces** of infected birds. **Egg transmission does not occur**.
- Clinical signs include **prostration, weakness, septicemia**, and in some cases **central nervous system symptoms**, such as torticollis and diarrhea.