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Avian colibacillosis: Management control, treatment and prevention

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Abstract

Escherichia coli (*E. coli*) is a typical bacterium that naturally exists in the gastrointestinal tract of birds and, consequently, in their surroundings. However, it can result in the clinical illness of colibacillosis, which is one of the most prevalent and serious diseases in poultry. Avian Pathogenic Escherichia Coli (APEC) is the name given to *E. coli* strains with the potential to cause clinical illness. Avian colibacillosis is a significant bacterial disease in broiler (meat-producing) and layer (egg-producing) poultry that is associated with significant economic losses to the poultry industry due to its association with various disease conditions, either as a primary pathogen or as a secondary pathogen. APEC can cause systemic to localized lesions in poultry birds, including pericarditis, perihepatitis, air sacculitis, salpingitis, yolk sac infection, omphalitis, granulomas, swollen head syndrome, synovitis, cellulitis, ascites, and chronic respiratory disease. One of these disorders is *E. coli* septicemia, which is characterized by bacteriaemia and *E. coli* colonization of the organs. Currently, between 150 and 200 serotypes or serogroups have been used to classify E. coli strains in O:H: K. Despite being the most frequent bacterial infection affecting poultry, only a few APEC serogroups, including O1, O2, and O78, have been prevalent and more pathogenic. The treatment and prevention of colibacillosis have traditionally been accomplished by the use of various kinds of antibiotics Antibiotic overuse allows bacteria to develop novel antimicrobial resistance mechanisms. Colibacillosis prevention is primarily a question of adequate sanitation and hygiene and vaccination.

1. INTRODUCTION

The organism is found all over the world and is a natural inhabitant of the gastrointestinal tracts of animals and birds at a concentration of 10^6 per gram, while poultry house dust can contain up to 10^5-10^6 / gm (Vegad, 2015). APECs enter the body by faecal dust inhalation, producing air vasculitis and pneumonia in the respiratory system. Bacteria then translocate into the blood, causing colisepticaemia and other extraintestinal diseases (Ewers, 2009). Egg infection can occur during laying or in the oviduct. This frequently ends in the death of the embryo and the early chick. APEC infection of skin lacerations causes cellulitis

1.1 Etiology

Avian pathogenic *E. coli* is a non-spore-forming gram-negative bacillus. Serotypes are frequently identified using somatic (O) and capsular (K) antigens. In poultry, serotypes with the somatic antigens O1, O2, and O78 are usually related to illness. *E.coli* is a non-acid-fast, gram-negative, uniform-staining bacillus that grows aerobically and anaerobically and can vary in size and shape. Many strains possess motility as well as peritrichous flagella. They can ferment carbohydrates like glucose and lactose, however, some strains cannot because they are oxidase-negative and indole-positive.

1.2 Distribution

Colibacillosis is found all over the world. A variety of poultry, wild birds, and mammals are affected. Infections in chickens are usually caused by poor sanitation in the hatchery and/or poor environmental conditions in the barn, or they develop after the birds have been infected with another main agent or immunosuppressive illness.

1.3 Susceptibility of the agent

E. coli is inactivated after 30 minutes at 60 °C. Desiccation has an effect on the organism. Cleaning and drying surfaces kill bacteria. However, heat treatment can also inactivate *E. coli* in moist litter, especially in the presence of free ammonia.

1.4 Pathogenesis

E. coli is found in the intestinal systems of birds and animals and is widely dispersed into the environment through faeces. *E. coli* may colonize and cause disease if exposed to susceptible birds (immunocompromised) or damaged tissues.

1.5 clinical signs

Airsacculitis causes respiratory distress; omphalitis causes weakened young birds with distended abdomens; synovitis causes lameness and frequent dehydration; chronic salpingitis causes upright position and cessation of egg production; acute septicemia causes sudden death of well-fleshed animals; cellulitis causes dimpling and yellowing of the skin; and enteritis causes diarrhoea (*E. coli* enteritis).

1.6 Necropsy findings

Air sacs are thickened and caseous exudate is present in airsacculitis, omphalitis, deposition of yellowish caseous exudate in subcutaneous tissue in cellulitis; accumulation of fibrinous material around the heart (fibrinous pericarditis), liver (fibrinous hepatitis), peritonitis, salpingitis. *E. coli* enteritis is similar to unspecific bacterial enteritis in that it frequently causes congestion, oedema, cellular sloughing, mucus, and excess liquid in the lumen.

Diagnosis

Clinical signs, isolation and identification of the *E. coli* organism of the typical colibacillosis lesions**,** serotyping and Molecular detection.

Treatment

Effectively treated using antibiotics such as tetracyclines, sulfas, ampicillin, and streptomycin. Early treatment is recommended, with a follow-up that takes antibiotic sensitivity testing taking the specific isolate into account. The antibiotic treatment becomes less effective as the organism becomes encapsulated or sequestered in caseous exudate; consequently, chronic phases of infection have a lesser likelihood of being properly treated.

Prevention

Increase the number of measures in place to clean and disinfect viable eggs from breeder flocks. Avoid laying floor eggs. Improve the hatchery's sanitation. Biosecurity and immunization can help reduce the danger of primary infections in chicken flocks. Reduced ammonia and dust levels in barns may help lessen the environmental insult required for *E. coli* to gain access into a flock.

Vaccination

- Poulvac *E. coli* 078 (by Zoetis)-commercial modified live vaccine
- Autogenous inactivated (killed)

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