AVIAN COLIBACILLOSIS

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Avian colibacillosis is an infectious disease caused by the bacteria Escherichia coli (E.coli). It is one of the leading causes of mortality and morbidity associated with economic losses in the industry throughout the world today (2). Avian colibacillosis can affect all avian species, at all ages and in all types of poultry production (broilers, breeders, layers, turkeys etc.). Economic losses can be due to decreased hatching rates, mortality, lowered production, carcass condemnation at processing and treatment costs.

Although E.coli is considered a normal inhabitant of the gut flora, it is capable of acquiring virulence factors to gain the ability of colonizing the internal organs, and producing avian colibacillosis. Virulence factors include the ability to resist phagocytosis (an important immune system mechanism used to remove pathogens and debris), utilization of highly efficient iron acquisition systems, production of colicin toxins, and adherence to respiratory epithelium (8). Strains capable of this are termed avian pathogenic E.coli (APEC). Multiple serotypes are associated with this disease but most commonly seen are serotypes O1, O2, and O78. The number of published APEC serotypes, however, is increasing. Colibacillosis can cause problems within a flock as either a primary or a secondary pathogen.

In birds, contrary to mammals, colibacillosis is usually a localized or systemic disease and not an enteric disease. It commonly causes yolk sac infection, omphalitis, airsacculitis, salpingitis, pericarditis, peritonitis, perihepatitis, arthritis, and septicemia. In broilers, colibacillosis involving the respiratory tract is the most commonly encountered disease at slaughter (2). It manifests mainly as a respiratory infection with peritonitis and pericarditis. The infection is considered airborne with the air sacs probably being an important port of entry.

In laying hens, E.coli infections commonly present as acute or subacute fibrinous salpingitis, oophoritis and peritonitis. These findings are often accompanied by lesions caused by cloacal cannibalism indicating that vent pecking is an important predisposing factor. Bacterial infections are generally more prevalent in laying hens in litter-based housing systems, including free-range birds, than in caged birds (4).

In young chicks, E. coli is a common isolate from birds displaying depression, septicemia, and variable mortality. The navel is often inflamed and swollen and abnormal yolk material with peritonitis may be seen on necropsy. Unabsorbed, infected yolk sacs often result in chicks with reduced weight gain.

Large numbers of E. coli are maintained in the poultry house environment through fecal contamination. Initial exposure to pathogenic E. coli may occur in the hatchery from infected or

contaminated eggs, but systemic infection usually requires predisposing environmental factors or infectious causes. Stress due to other infections, toxins, or nutritional deficiencies compromise the bird's immune system defenses allowing colibacillosis development. Colibacillosis often develops subsequent to infection with other agents such as infectious bursal disease, mycoplasmosis, coccidiosis, newcastle disease, infectious bronchitis, etc. or secondary to environmental stressors.

Prevention strategies include controlling predisposing infections that suppress the immune system and improving environmental factors through management of feed, water, temperature, litter, lighting, and ventilation. Optimal brooding conditions are fundamental in reducing the overall impact of colibacillosis. Additionally, birds need to be protected against pathogens that promote infections with APEC. This is possible by using Mycoplasma-free birds, implementing solid control programs for helminthiasis and coccidiosis, and protecting the birds against viral diseases such as IBD by using appropriate vaccinations. Additionally, biosecurity is essential in preventing disease introduction. Suitable housing infrastructure, the correct use of a transition zone (for changing clothes/shoes, and washing hands), and pest control (rodent feces can be source of pathogenic E. coli) are all imperative (7). Careful control of humidity, sanitation, and temperature in the incubator is important for prevention of E.coli in young chicks. Only clean eggs without cracks should be set.

The use of antibiotics to treat colibacillosis may be recommended in some cases in accordance with susceptibility testing. Resistance has been a problem with many drugs such as tetracycline, streptomycin, aminoglycosides and sulfa drugs (8). Resistance to fluoroquinolones was reported within several years of the approval of this class of drugs for use in poultry. There is concern that genes conferring resistance to extended-spectrum beta-lactams will emerge in avian pathogenic E. coli strains and reduce the efficacy of ceftiofur, which is currently used on a limited basis (7).

The great diversity among APEC strains makes successful vaccination difficult. There is, however, one commercially available APEC vaccine on the market. It is a modified-live, broad-spectrum vaccine that has been demonstrated to aid in the prevention of APEC related morbidity and mortality. It cannot, however, replace the need for solid management and environmental control efforts.

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