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Popular Article

Understanding and Managing Avian Colibacillosis

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Avian colibacillosis is an infectious disease in poultry caused by *Escherichia coli* (*E. coli*), a gram-negative, non-acid-fast, non-spore-forming bacteria. While *E. coli* is commonly found in the intestinal tracts of birds, it can become pathogenic under certain conditions. Colibacillosis is a leading cause of illness and death in poultry across all age groups, resulting in significant economic losses for the poultry industry. The disease is characterized by reduced productivity, increased mortality rates, higher veterinary costs and economic loss of poultry farmer. *E. coli* can act as either a primary pathogen or a secondary invader, particularly in birds debilitated by other diseases or stressors. Common predisposing factors include viral infections (e.g., infectious bursal disease, Newcastle disease, infectious bronchitis), mycoplasmosis, coccidiosis, nutritional deficiencies, poor husbandry practices, and stressors like overcrowding. The disease manifests in various forms, including yolk sac infections, omphalitis (navel and yolk sac infection), respiratory tract infections, swollen head syndrome, septicemia, polyserositis (inflammation of serous membranes), coligranuloma (granulomatous infection), enteritis (intestinal inflammation), cellulitis (skin infection), and salpingitis (oviduct inflammation). These diverse clinical presentations make it challenging for diagnosis and control. *E. coli* thrives in both aerobic and anaerobic environments, allowing it to spread rapidly in poor management condition. Effective prevention and control require maintaining proper hygiene, improving biosecurity, avoid overcrowding, ensuring adequate nutrition, and managing predisposing diseases.

Transmission

E. coli is primarily transmitted to poultry through ingestion, inhalation, and secondary contamination of eggs, particularly in incubators. The most common route of transmission is the ingestion of contaminated feed and water. Fecal contamination of drinking water is a significant source of infection, as is dust in poultry houses, which can carry *E. coli* from fecal matter or infected materials. Contaminated well water can also introduce pathogenic *E. coli* strains into flocks, especially if water sources are not adequately protected. Eggs can become contaminated during incubation, leading to infections in newly hatched chicks. Direct contact with infected birds, especially in overcrowded or stressful conditions, further facilitates transmission. Additionally, inadequate biosecurity measures, such as contaminated footwear, equipment, visitors, vehicles, can introduce *E. coli* into poultry facilities.

Clinical Signs

The clinical signs of *E. coli* infection in poultry vary depending on the strain, the bird's age, and the affected organ systems. The disease can present as localized or systemic infections, with symptoms including:

1. Respiratory Signs: Labored breathing, nasal discharge, swollen head syndrome.
2. Digestive Signs: Diarrhea, enteritis.
3. General Signs: Lethargy, weakness, reduced appetite, decreased egg production.
4. Systemic Infections: Septicemia, polyserositis, peritonitis.
5. Localized Infections: Omphalitis, coligranuloma, cellulitis, salpingitis.

The severity of these signs depends on factors such as the *E. coli* strain, environmental stress, and concurrent infections. Early diagnosis and treatment are crucial to minimize the economic losses.

Diagnosis

Diagnosis of *E. coli* infections in poultry involves a combination of clinical evaluation, laboratory testing, and post-mortem examination. Clinical signs such as respiratory distress, diarrhea, and lethargy may raise suspicion, but these are nonspecific and overlap with other diseases. Post-mortem examination (necropsy) can reveal characteristic lesions, including air sacculitis, peritonitis, swollen head syndrome, polyserositis, and coligranulomas in organs like the liver, lungs, and kidneys. Definitive diagnosis requires isolation of bacteriological culture where *E. coli* is isolated from tissues such as the liver, heart, lungs, or blood. Biochemical tests confirm the identification, and serotyping can determine the specific strain. Polymerase chain reaction (PCR) is a sensitive tool for detecting *E. coli* DNA and identifying virulence factors. Antibiotic sensitivity testing is essential to guide treatment, particularly in cases of antibiotic resistance. Histopathological examination of affected tissues can

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confirm inflammation, granulomas, or necrosis. Serological tests like ELISA or Western blot may detect antibodies, indicating recent or ongoing infections.

Treatment

Treatment of *E. coli* infections depends on the disease's severity, the age of bird, and the clinical presentation. Antibiotics are commonly used, with the choice guided by sensitivity testing to ensure effectiveness. Commonly used antibiotics include enrofloxacin, tetracyclines, chloramphenicol, sulfonamides, and amoxicillin. Supportive care is critical, including fluid therapy to address dehydration and nutritional support to counteract reduced feed intake. Anti-inflammatory drugs like NSAIDs may be used to alleviate pain and inflammation. Managing stress factors, such as overcrowding and poor ventilation, is also important. Probiotics and prebiotics can help restore intestinal flora and improve resistance to infections.

Prevention and Control

Preventing and controlling E. coli infections in poultry requires a multifaceted approach:

1. **Biosecurity Measures**: Restrict access to poultry facilities. Regularly disinfect equipment, egg trays, and incubators. Use foot baths and hand sanitization for workers and visitors.
2. **Environmental Management:** Properly dispose of faeces and dead birds. Clean and disinfect housing regularly. Control dust and ensure adequate ventilation.
3. **Water and Feed Management:** Provide clean, fresh water and feed. Regularly test water sources for E. coli.
4. **Stress Management**: Avoid overcrowding and maintain proper temperature and humidity.
5. **Health Management:** Vaccinate against prevalent *E. coli* strains. Control co-infections like Newcastle disease and coccidiosis. Monitor flock health regularly.
6. **Antibiotic Stewardship**: Use antibiotics judiciously and based on sensitivity testing. Monitor antibiotic resistance patterns.
7. **Hatchery Practices**: Ensure egg sanitation and proper incubation conditions. Source chicks from reputable hatcheries.
8. **Monitoring and Surveillance**: Conduct regular health checks and bacteriological testing.
9. **Quarantine and Culling**: Quarantine new birds and cull heavily infected individuals if necessary.
10. **Training and Education:** Educate farmers and workers on biosecurity and disease management.

By implementing these strategies, poultry producers can reduce the incidence of *E. coli* infections and minimize economic losses.

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Conclusion

Avian colibacillosis poses a significant threat to poultry health and productivity, requiring prompt diagnosis and effective treatment to mitigate losses. Prevention through robust biosecurity, proper management practices, and vaccination is essential to control the spread of *E. coli* infections. By addressing predisposing factors and maintaining a clean, stress-free environment, poultry producers can significantly reduce the impact of this disease on their flocks.

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