Colibacillosis in Chickens

Infections of E. coli in chickens, predisposing factors and treatments

Definition
Localized or systemic infections caused by *Escherichia coli* in diverse tissues and organs including omphalitis (picture 1), peritonitis, salpingitis, cellulitis, synovitis, coligranuloma, meningitis, and septicemia.

Introduction
This infection is one of the most common bacterial diseases affecting poultry, and thus it is associated with a large economic cost. In sharp contrast to mammals, it is generally accepted that, in poultry, a primary agent is needed to weaken the host’s defenses for *E. coli* to cause disease. Thus, viral infections that otherwise could go unnoticed can get contaminated with *E. coli*, generating a lingering disease often associated with elevated mortality.

Etiology
Avian pathogenic *E. coli*, is a gram-negative, non-spore-forming bacillus. Somatic (O) and capsular (K) antigens are often used to designate serotypes. Serotypes with the somatic antigens 1, 2, 35, and 78 are frequently associated with disease in poultry. Most of the strains are motile.

Susceptibility of the agent
*E. coli* is inactivated at 60 °C for 30 min. The organism is sensitive to desiccation. Washing and drying surfaces eliminates the bacteria. However, *E. coli* can also be inactivated in wet litter by heat treatment, especially in the presence of free ammonia. Reproduction of the bacteria is inhibited at pH < 4.5. Chlorine can be used to treat water. *E. coli* can acquire resistance against disinfectants when subjected to environmental pressure. The mechanisms for resistance are encoded in plasmids that can be shared between bacteria.

Occurrence
Colibacillosis has a worldwide presence. It affects all types of poultry, wild birds, and mammals. Infections in poultry are generally linked to suboptimal sanitation in the hatchery and/or poor environmental conditions in the barn, or it occurs after birds have been affected by another primary agent or immunosuppressive disease. Association with mycoplasma and the infectious bronchitis virus are common.

Pathogenesis
*E. coli* is present in the intestinal tracts of birds and mammals and is widely disseminated through fecal material into the environment. If susceptible birds (immunosuppressed) or damaged tissues get exposed, *E. coli* may colonize and cause disease.

Clinical manifestations
Vary according to the location of the infected tissue or nature of the compromised organs: respiratory distress in *airsacculitis* (picture 2); weakened young birds with distended abdomens in *omphalitis*; lameness and frequent dehydration in *synovitis*; upright position and cessation of egg production in chronic *salpingitis*; sudden death of well-fleshed animals in *acute septicemia*; dimpling and yellowing of the skin in *cellulitis*; and diarrhea in *enteritis* (*E. coli* enteritis is rare in poultry).
Necropsy findings

Variable depending on the infected tissue or compromised organs: air sacs are thickened and caseous exudate is present in airsacculitis; swollen navel and a congestive yolk sack with abnormal material in omphalitis (picture 3); swelling of joints and tendon sheets with accumulation of exudate inside the joints in synovitis; deposition of yellowish caseous exudate in subcutaneous tissue in cellulitis; accumulation of fibrinous material around the heart (pericarditis, picture 4), on the liver (perihepatitis, picture 5) and inside the abdominal cavity (peritonitis, picture 5); petechia and swollen organs can be detected in acute septicemia; distended oviduct with caseous exudate in salpingitis (which normally appears combined with peritonitis as salpingo-peritonitis, picture 6); and nodules along the mesentery, intestinal tract, and liver in coligranuloma. *E. coli* enteritis does not differ from unspecific bacterial enteritis, appearing often with congestion, edema, cellular sloughing, mucus and excess liquid in the lumen.
Diagnosis

Isolation of serotypes of *E. coli* associated with disease in poultry in the absence of other primary pathogens and their serological fingerprints. Diagnosis based on sole presence of *E. coli* is rarely accepted as a definitive diagnosis due to the well-documented ability of the organism to act as an opportunistic pathogen.

Relevant differential diagnosis

Mycoplasmosis, infectious bronchitis, laryngotracheitis, Newcastle. Refer to the enteritis section for details on differential diagnostics for enteritis.

Prevention

Strengthen measures to clean and disinfect fertile eggs from the breeder flocks. Avoid incubating floor eggs. Increase sanitation in the hatchery. Reduce the risk of primary pathogens using biosecurity and vaccination in poultry flocks. Reducing ammonia and dust levels in the barns may help reduce the environmental insult that *E. coli* commonly needs to gain access into a flock.
**Treatment**

Antibiotics such as tetracyclines, sulfas, ampicillin, and streptomycin have been successfully used to control some *E. coli*. Early treatment is advised, with a follow-up considering antibiotic sensibility testing using the specific isolate. As the organism gets encapsulated or sequestered into caseous exudate, the antibiotic treatment will be less effective; thus, chronic stages of infection have a lower chance of being successfully treated.

**References**


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