



Aspergillosis in Poultry

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Abstract

Aspergillosis is a non-contagious respiratory disease caused by fungal species known as aspergillus affecting chickens, ducks, turkey and many other bird species. Mainly seen in 7-40 days old birds. *Aspergillus fumigatus* is the main cause of this disease. Infection occurs through inhalation of spores, typically from contaminated litter or other contaminations in hatchery. After inhalation spores mainly penetrate the respiratory system causing granulomas. Itraconazole is one of these drugs that can be used to treat the disease. Prevention is best method of controlling this disease as treatment is not effective. Adequate managerial practices such as sanitation, disinfection and ventilation must be adopted. Handling infected birds and animals, inhaling spores from infected feed and litter, poor sanitation and hygiene, and eating undercooked contaminated poultry are all ways for it to spread to humans.

Keywords: Aspergillosis; Respiratory; Inhalation; Spores; Disinfection; Ventilation

Introduction

Aspergillosis is a non-contagious mycotic disease that primarily affects the respiratory systems of chickens, turkeys, and, less frequently, ducklings, pigeons, geese, and a variety of other wild and pet birds. This disease occurs when the host's immune system is compromised or when the bird is exposed to an extremely high number of spores. The cold, high ammonia, and dusty environment all contribute to an increase in the occurrence and severity of infection. It is a common mismanagement issue in both commercial and backyard poultry operations [1]. Aspergillosis can be acute or chronic. Acute aspergillosis typically affects young birds, resulting in significant morbidity and mortality. The chronic form is sporadic, resulting in lower mortality, and affects older birds with weakened immune systems [2]. The main risk factors are poor sanitation, inadequate ventilation, and food contamination.

Etiology

Aspergillosis is caused by fungus *Aspergillus*. Major species which causes this disease in poultry are: *Aspergillus fumigatus*, *A.*

flavus niger, *A. glaucus* and *A. terreus*. *Aspergillus fumigatus* is the main cause of this disease. *Aspergillus* spp are ubiquitous in nature. These organisms are common soil saprophytes, occurring in decaying vegetative matter and feed grains. They grow on organic matter in warm (>25°C) humid environment including damaged egg in hatcheries and poor ventilation system [3].

Transmission

The developing embryo can become infected by inhaling conidia or spores from contaminated feed, faeces, soil, or contaminated eggs in ovum. During incubation, the fungus may break through the eggshell, infecting newly hatching chicks. An increase in body temperature also promotes rapid fungus development. Chronic stress, filthy environments, crowding, malnutrition, vitamin deficiencies, notably vitamin A deficiency, excessive use of certain drugs (corticosteroids), and respiratory irritants are other causes (disinfectant fumes and aerosol sprays). Aspergillosis can also affect sick or young or old birds, as well as healthy birds.

Pathogenesis

The inhalation of a large number of small, hydrophobic fungal spores (conidia) into the respiratory tract causes aspergillosis. After infective spores infiltrate the tracheal, nasal, bronchial, and air sac epithelium, they enter the respiratory tissue and reproduce by single division of tubular hyphae to form mycelia, where they initiate granulomas. The spores are then spread haematogenously to other tissues such as the brain, pericardium, bone marrow, kidney, and other soft tissues, where they cause lesions. In these tissues, an inflammatory response involving heterophils, lymphocytes, and giant cells is prominent [4].

Clinical Signs

Infected chicks exhibit dyspnea and open-mouthed breathing (gaspings) within the first three to five days due to airway blockage. If the bird survives, it might develop torticollis, grow dull and stunted, exhibit lethargy, lack of appetite, emaciation, and increased thirst. It might also acquire swollen or blind eyes (twisting of the neck to one side). Older birds may initially show subclinical symptoms before developing respiratory issues. Infected flocks have a biphasic pattern of mortality. In the first 1-3 weeks of life, acute respiratory illness may result in a 5-50% death rate. The chronic illnesses that cause up to 5% of the death rate in birds that do survive include pulmonary insufficiency, ascites, and brain fungal metastases. Mycotic keratitis, which manifests in hens as huge plaques from the medial canthus, has an ocular manifestation as well [5].

Lesions

Lungs and air sacs are the most common sites of granulomas, which are white plaques or caseous nodules 1- 15 mm in diameter. The necrotic centres of these granulomas contain branching, septate, and hyphae. Because of conidiophore pigmentation, older lesions may appear green to black. Exudates caused by Aspergillosis become lodged in the trachea or syrinx, causing respiratory difficulties. Granuloma formation was also observed in the brain and lungs of layer chickens [6].

Diagnosis

A history, clinical presentation, postmortem findings, haematology, biochemistry, serology, radiographic changes, endoscopy, and fungus culture are usually used to make a diagnosis. During postmortem examination, white caseous nodules in the lungs or air

sacs are visible. Diagnosis is based on the presence of branched, septate Aspergillus hyphae in the lesion, which can be seen during a microscopical examination of an impression smear of the lesion after the addition of 10% potassium hydroxide. Differential stains such as Periodic acid-Schiff (PAS), Bauer's, and Gridley's help to distinguish and identify hyphae and mycelia.

Treatment

Aspergillosis treatment is ineffective because the drug used does not reach the fungus, which is walled off by the bird's inflammatory response and thus isolated from the bloodstream. When the infection in the tissue is extensive and only systemic drugs are used, the prognosis for this disease is poor. Treatment involves the use of one or more systemic antifungal agent. Itraconazole, ketoconazole, clotrimazole, miconazole, fluconazole, and Amphotericin B are some of the most commonly used medications. Itraconazole is one of these drugs that can be used to treat the disease [7].

Zoonotic Importance

Aspergillosis is a zoonotic pathogen. It is spread to humans through handling infected birds and animals, inhaling spores from infected feed and litter, poor sanitation and hygiene, and eating undercooked contaminated poultry [8]. Most aspergillus mycotoxins are not broken down by cooking temperature, and there is no safe way to salvage moulded grain or food. It is spread through inhalation or ingestion. Aspergillosis develops in patients who are disabled by chronic diseases such as diabetes, cancer, tuberculosis, and immune system disease, as well as in people who have been on antibiotics, antimetabolites, and corticosteroids for an extended period of time.

Conclusion

Aspergillus is a common environmental contaminant that causes respiratory disease in chickens, humans, and wild birds. Aspergillosis is a common condition caused by mismanagement issues in both commercial and backyard poultry. There is no effective treatment or vaccination for this disease on the market. As a result, the factors responsible for its predisposition must be properly controlled, which include

- Hatchery sanitation entails fumigating the hatchery with formaldehyde and cleaning and disinfecting the hatchery equipment and air ducts.

- Effective management with dry, high-quality litter.
- Avoid feed that is mouldy or dusty.
- Remove infected birds from the flock.

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