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Aspergillosis in Turkeys: A Review

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Abstract: *Aspergillosis is a disease of mammals and birds produced caused by the growth of the fungus Aspergillus in the tissues of the body. It is a major respiratory disease of poultry including turkeys. The disease is mostly caused by Aspergillus fumigatus but other species have also been incriminated in the disease. It can lead to significant economic losses particularly in turkey production. Aspergillosis in turkeys can be transmitted through the inhalation of infective spores of the causative organism; stress due to some management procedures such as debeaking and high stocking densities can predispose to the disease. The respiratory tract is the most frequent predilection site for the organism, respiratory signs thus ensue. Post mortem lesions are mostly granulomatous in nature in affected organs. Prevention of the disease which includes improved environmental hygiene and proper ventilation is advised because treatment of infected birds is almost non-effective.*

I. Introduction

Aspergillosis is an important respiratory disease in poultry [1]; it is worldwide in occurrence and probably affects all species of birds [2, 3]. It is an infectious, non contagious fungal disease of poultry [4]. Young birds tend to be more susceptible to the disease than adults [5]. The disease is caused mostly by *Aspergillus fumigatus* although *Aspergillus flavus*, *Aspergillus niger*, *Aspergillus nidulans* and *Aspergillus terreus* have also been incriminated in the disease [6]. *A. fumigatus* causes significant economic losses in turkey poults [5]; due mostly to low productivity, mortality, poor feed conversion, reduced growth rate and carcass condemnations at slaughter inspection. [6] observed that where the disease occurs late in the growing cycle in turkey production or in costly breeder toms, economic significance of aspergillosis is most readily apparent. Air sacculitis in aspergillosis also leads to carcass condemnation at slaughter inspection [7].

Although there is literature available on aspergillosis in birds generally, little literature is available regarding aspergillosis specifically in turkeys. Therefore, the aim of this study is to review the disease in turkeys.

II. Predisposing Factors/Transmission

Being opportunistic in nature, Aspergillus species cause disease in immunocompromised birds or in birds exposed to overwhelming numbers of spores [8]. Aspergillosis is transmitted to turkey poults during hatching through inhaling the large amount of spores in heavily contaminated hatching machines. Transmission in older turkeys could be through the inhalation of spore-laden dust from contaminated litter, feed or dusty range areas [2].

III. Clinical Signs

There is usually little bird to bird transmission. Usually, mortality is low but can reach 12% [9]. The disease occurs in different forms in turkeys: an acute aspergillosis which leads to severe outbreaks in young turkeys. Respiratory signs are seen in this form which include dyspnoea, gasping, coughing, cyanosis [10, 11]; nasal discharge [12] and inappetance are also often observed.

Chronic aspergillosis is mostly seen in turkeys 13-18 weeks of age [8] and manifests as ocular discharge (ocular form only), wasting [9], depression and dehydration. The encephalitic form (nervous system involvement) which is most common in turkeys manifests as ataxia, tremor, lateral recumbency, torticollis, seizures, convulsions, tremor, lameness and hind limb paresis [2, 11].

IV. Post Mortem Lesions

Gross lesions

The main sites of lesions are the airsacs and lungs although oesophagus, Proventriculus, gizzard, small intestines, liver, kidney, spleen, skin, trachea, peritoneum, brain, eye, muscles or heart may be involved [11, 12]. Large plagues have been expressed from the median canthus in turkeys in the ocular form [2].

The respiratory tract (air sacs and lungs) may be extensively involved before clinical signs become apparent. At post mortem, lesions may range from military (1mm in diameter) to larger granulomatous foci (< 2 cm) [13]. Necrotic areas (single or multiple) are visible on cut surfaces of the affected organs. In the lungs,

parenchyma is either consolidated or has focal granulomas of different sizes [13, 14]; in the air sacs, the nodules form cheesy caseous plaques when they coalesce and cover the thickened air sac membrane [10, 14].
[15] reported non ulcerative or mildly ulcerative keratitis in a turkey flock; circumscribed white to grayish areas have been observed in the cerebellum of turkeys by [16].

Histopathology

[14] reported the presence of necrotic centers in the granulomas. These necrotic centers were surrounded by macrophages, lymphocytes, plasma cells; large multi nucleated foreign body giant cells and an outer thick fibrous capsule. Branching and septate fungal hyphae are systematically observed within the lesions.

V. Diagnosis

Aspergillosis in turkeys should be suspected when debilitated birds with respiratory clinical signs do not respond to antibiotic treatment [6] and when the presence of environmental or immunosuppressive factors are revealed from detailed history taken. The disease can however be diagnosed by the isolation of the causative organism *A. fumigatus* by culture or by the detection of the organism during histopathological examination; a special fungus stain reveals granulomas containing mycelia [2]. Immunohistochemistry is also a tool to identify *A. fumigatus* in lesions [14].

VI. Treatment

Although several antifungal agents have been proposed to cure aspergillosis in poultry [4], treatment of the disease in poultry including turkeys is almost impossible [17] and has been considered useless.

VII. Prevention And Control

Improved environmental hygiene (including proper litter management, maintenance of dry, non dusty and clean feeders) and daily assessment of litter quality throughout the flock life time helps in the prevention of the disease by limiting fungal development [6]. Maximum sanitation procedures in hatcheries and proper ventilation tend to minimize aspergillosis outbreaks. Effects of stressors such as debeaking and high stocking densities should be minimized [10]. Routine spraying of the environment with anti fungal agents contribute to decreased fungal contamination of the environment [17].

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