

Chronic *Aspergillus fumigatus* Infection in a Ostrich (*Struthio camelus*)

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Abstract : An 8-month-old ostrich (*Struthio camelus*) which had shown lethargy died in 2-day clinical course. Gross necropsy revealed greenish gray mold grow on the wall of thickened air sacs and multiple tiny nodules on the liver. Microscopically, the granulomatous lesions of air sac membrane, lung, and liver contained numerous septate, branching fungal hyphae. The typical conidial heads of fungi were observed in inner membrane of inflammatory thickened air sacs. This case was a chronic and systemic mycotic air sacculitis and pneumonitis caused by *Aspergillus fumigatus* in a ostrich at a zoo.

Key words : ostrich, air sacculitis, *Aspergillus fumigatus*

Introduction

Despite a century of commercial production of ostrich there have been a little progress in scientific knowledge and research which deal with physiology, disease control, and management practices of this animal³.

Respiratory aspergillosis is common in commercial poultry⁴, and it also occurs in other avian species⁵. Aspergillosis in commercial poultry is encountered in two forms. Acute outbreaks may occur in which there are high morbidity, particularly in young birds. In adults, an occasional bird in a flock may become affected while others remain healthy⁴.

Aspergillosis in ostrich was reported by the beginning of the 20th century¹ with clinical signs of chronic respiratory tract disease which bring out weight loss, lethargy, and dyspnea⁶.

Aspergillus species are dimorphic fungi that are ubiquitous in our environment, growing as saprophytes in decaying organic material. They withstand a broad range of metabolic and temperature conditions, and their spores are able to become widely dispersed by air in large numbers⁷.

Case

An 8-month old ostrich housed in an outdoor pen in a zoo had shown lethargy and anorexia. The bird died on the next day of the finding of the clinical signs. Clinical examination by a veterinarian had revealed no respiratory distress in this bird.

The significant gross lesions of this emaciated bird was caseous thickened air sac membranes with typical white to green or black mold inside (Fig 1). The inflammatory thickened air sac membranes were attached to thoracic wall (Fig

2). The lung was hardened and foamy on its surface. The liver was hardened, entirely congested and multiple tiny nodules were found (Fig 3). There were no visible lesions on the other organs.



Fig 1. Air sac. White to green or black hyphae formed inside the caseous thickened air sac membrane.

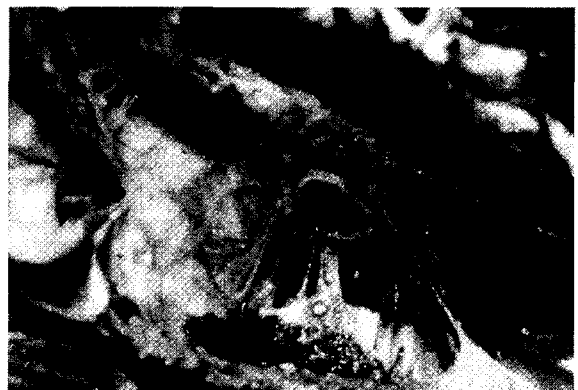


Fig 2. Air sac. Inflammatory thickened air sac membrane attached to thoracic wall.

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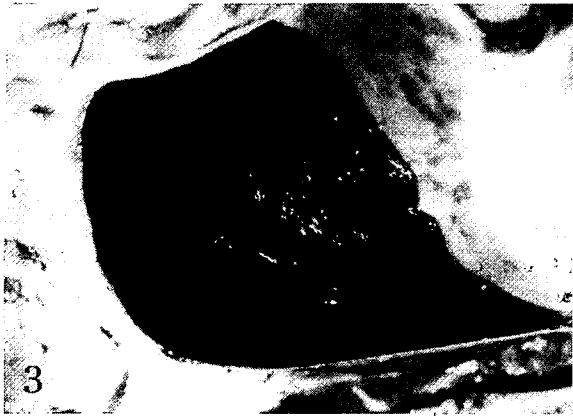


Fig 3. Liver. Multiple tiny nodules on the surface of the entirely congested liver.

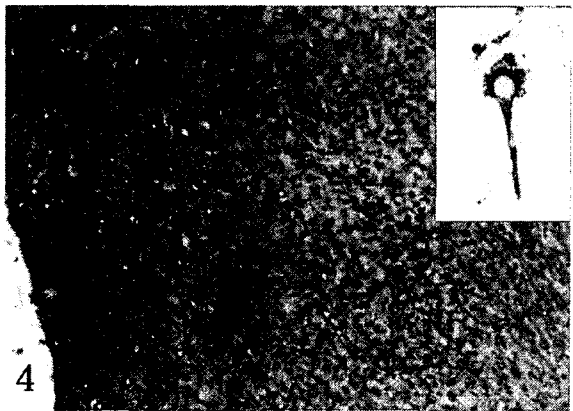


Fig 4. Air sac membrane. Necrotizing lesions with branching fungal hyphae breaking out into the lumen. PAS, $\times 400$. Inset: Fruit head of *A. fumigatus*. PAS, $\times 500$.

For histopathologic examination, samples were taken from air sac, lungs, liver, kidneys, stomach, and intestine, fixed with 10% neutral buffered formalin, and embedded in paraffin. Tissue sections were stained with hematoxylin and eosin (HE) and Periodic Acid-Schiff (PAS).

The wall of air sacs were significantly thickened with necrotizing lesions and mass of fungi which contained numerous thin, regular-diameter septate, branching fungal hyphae (Fig 4). The organisms broke out into air sac lumen and several conidial heads were observed. Typical 'fruit head' of *Aspergillus* with flask-shape vesicle, uniserial sterigmata were found (Fig 4, inset). Nearby the granulomas lesions heterophils, macrophages, significant giant cells, lymphocytes, and some fibrous tissues were found. Multifocal granulomatous necrotizing lesion and severe congestion were found in the liver and the lung. Severe congestion was also observed in the kidney.

For mycotic examination, samples showing gross lesions

were cultured on Sabrouaud dextrose agar (Difco, Detroit, USA). Colony spreaded rapidly over the surface. The color of this initially white mold became velvety and tinged bluish green, which was consistent with *Aspergillus fumigatus*.

Discussion

Aspergillosis is the most common mycosis in the avian species, and *A. fumigatus* is the most frequently isolated agent². Birds are routinely exposed to this ubiquitous fungus and only rarely does it become pathogenic. *Aspergillus* spp. usually cause disease only under conditions of stress, immuno-suppression, prolonged treatment with antimicrobials, or massive exposure to the organism⁶.

Clinical signs of aspergillosis include weight loss, lethargy, and dyspnea, and it is usually difficult to differentiate aspergillosis from other chronic respiratory tract diseases⁶. In this case, however, typical clinical signs of respiratory disease were not observed. Instead, the bird had shown acute progress of disease. Postmortem and histological examination revealed multifocal caseous necrosis admixed with mass of fungal elements and granulomatous lesion throughout the air sacs and liver, which shows that this case is a chronic mycotic inflammation. Definitive diagnosis was made on the basis of cultural and histological results. In the zoo situation, diagnosis may indicate the need for changes in environmental conditions to prevent the disease in the flock.

Conclusions

An 8-month-old ostrich (*Struthio camelus*) had shown lethargy, anorexia, and subsequently died in 2-days clinical course. Caseous thickened air sac membrane with typical mold was significant and multiple tiny nodules were observed on the liver. Microscopically multifocal necrosis were found in the lung and liver, whereas congestion in the liver and kidney. This was a case of chronic mycotic air sacculitis and pneumonitis in a ostrich caused with *Aspergillus fumigatus*.

Acknowledgments

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타조에서 *Aspergillus fumigatus* 만성 감염증

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요 약 : 혼수상태를 보인 8개월령 타조가 증상 발현 이틀 후 폐사되었다. 부검시 육안상으로 두꺼워진 기낭벽에는 녹색의 곰팡이가, 간에는 다발성의 작은 결절들이 관찰되었다. 현미경상으로 기낭막, 폐, 간의 육아종성 병소는 많은 격벽을 가지며 가지를 뺀 곰팡이성 균사를 함유하고 있었다. 곰팡이의 전형적인 포자머리는 감염된 두꺼워진 기낭 내막에서 관찰되었다. 이 증례는 *Aspergillus fumigatus*에 의해 만성적 전신적인 사상균성 기낭염과 폐렴을 보인 동물원 타조에 대한 보고이다.

Key words : 타조, 기낭염, *Aspergillus fumigatus*