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Aspergillus Fumigatus Infection in Wild Goose

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흑기러기에 있어서 *Aspergillus fumigatus*에 의한 감염증

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요 약 : 제주도에 서식중인 흑기러기(Branta bernicla)가 식욕감퇴, 점진적인 수척, 호흡촉박 등을 나타내다 폐사하였다. 부검소견으로서는 폐 및 복부기낭에 다수의 위약한 흰색-황색 결절이, 병리조직학적검사 결과 괴사병소에 균사와 *Aspergillus*의 소포가 확인되었다. 배양결과 *Aspergillus fumigatus* 감염증으로 진단된 국내 최초의 보고로 생각된다.

Key words : wild goose (Branta bernicla), *Aspergillus fumigatus*

Introduction

Aspergillosis is a granulomatous necrotizing disease in most mammals and in poultry[2]. The disease was first recognized as an avian disease by Mayer and Emmert in 1815[1]. Since then, aspergilli infection have been described in various species of domestic animals and birds and in many wild species[2]. Among these animals, avian aspergillosis is common and effects economic damages especially in turkey and chicken, because acute outbreaks in young birds results in high morbidity and high mortality[2,6,7]. The infection also have been described in many species of wild birds including penguins, wild ducks, swans, gulls, Japanese quail and free-flying passerine birds[2-5]. This paper report the occurrence of aspergillosis in wild goose caused by *A. fumigatus*.

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Material and Methods

Three sea-gulls were conducted for the diagnosis of infrequent death at this laboratory. The main organs were fixed in 4% paraformaldehyde in phosphate buffer. Paraffin sections were prepared and stained with hematoxylin and eosin, and periodic acid schiff (PAS) for the histopathological examination.

Small portions of air sac tissues with lesions were cultured on Sabouraud dextrose agar at 25°C and 37°C. Following isolation of the findings, subcultures were made on potato dextrose agar (PDA) and Czapek-dox solution agar at 25°C and 37°C.

Results

Case history

Wild goose, which is raised in the confined en-

vironment in Cheju island, Korea, had worsen progressively with malnutrition. Fifteen-twenty-week-old wild goose from 400 died during 3 months. The clinical signs consisted in appetence, depression, sleepiness and gasping. Three sea-gulls were allowed for the diagnosis of infrequent death. Fungal infection was suspected in one case.

At necropsy, the heart, liver and gastrointestinal tract showed no necropsy abnormalities. Significant findings of fungal infection were found and the lesions were limited in the air sacs. On the inner surface of air sacs, whitish fragile nodules were present at multiple sites over the pulmonary and abdominal air sacs.

Histopathological findings

Histologically, thickened caseous lesions adherent to the air sacs (Fig. 1) were characterized by the fungal mycelia and inflammatory cells including eosinophils and mononuclear cells. Around the caseous necrotic lesions, foreign body giant cells were occasionally observed. Hyphae-like structures, which is branching, were seen easily around necrotic lesions as well as in the vicinity of air sac lumen, showing conidial head of Aspergillus (Fig. 1).

Mycological findings

Fig 1. Granulomatous inflammation of air sacs due to *Aspergillus fumigatus* infection. Conidial heads of Aspergillus are distinctively seen in the air sac lumen. H &E stain, ×240.

The fungus was isolated from the air sac culture and the characteristics of the isolate were as follows. The colony on potato dextrose agar (PDA) was fast-growing, reaching 3.3 cm in diameter by 4 days at 25°C. Initially the surface was floccose with erect aerial mycelium and was white, becoming velvety and bluish green with the production of conidia. At 37°C on PDA, the isolate showed more fast-growing

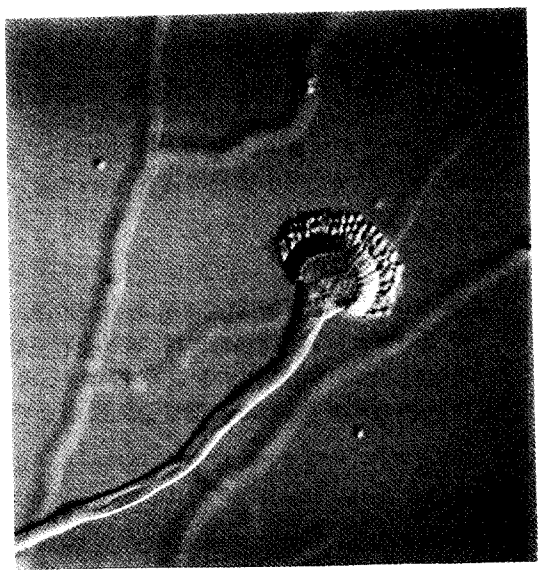

Fig 2. Conidial heads of *Aspergillus fumigatus* from 7-day PDA slide culture at 37°C.

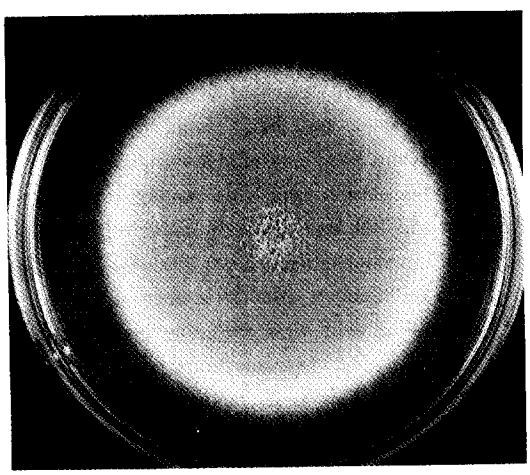

Fig 3. Giant colony of *Aspergillus fumigatus* from 4-day PDA giant culture at 37°C.

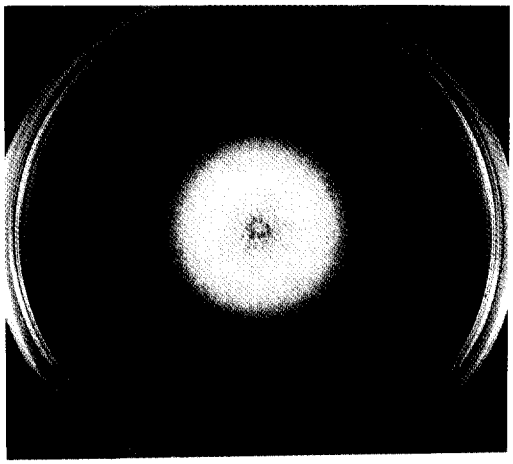

Fig 4. Giant colony of *Aspergillus fumigatus* from 4-day PDA giant culture at 25°C.

than that of at 25°C, reaching 6.5 cm in diameter by 4 days (Fig. 3 and 4). The reverse was colorless. The colony on Czapek-dox solution agar was similar to that on PDA, but the isolate grew more rapidly on PDA than on Czapek-dox solution agar. A slide culture on PDA revealed that conidiophore with flask-shaped vesicle was arisen from foot cell. The vesicle was produced a single series of phialides on the upper half only (Fig. 2). The conidia were green in mass, echinulate, globose to subglobose, and mostly 2.5 to 3 μm in diameter. These findings led to the identification of the organism responsible as *Aspergillus fumigatus*.

Discussion

Freeliving wild birds harbour *Aspergillus fumigatus* in their oral cavities and throats but the occurance of aspergillosis is rare[2]. The disease is usually considered to be associated with exposure to heavily contaminated materials and feeds, and stress of confinement and antibiotics added in feeds may also have been a contributing factor as in other cases described[1,2].

The histopathological findings is generally similar to the case of chicken aspergillosis[1,2,7]. The present case is assumed to be an air sac type because the lesions were localized in air sacs, not in other organs and in the lungs. To our knowledge this is the first report on *Aspergillus fumigatus* infection of wild goose (*Branta bernicla*).

Conclusion

Aspergillosis in a wild goose(Branta bernicla) is reported for the first time in Korea. At necropsy, white to yellow fragile nodule were present at multiple sites on the inner surface of pulmonary and abdominal air sacs. Histological examination revealed branched hyphae were seen around necrotic lesions and vesicle of aspergillus were also found on the lesion. The fungus cultured from the air sac was identified as *Aspergillus fumigatus*.

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