Case Report—

Dual Mycotic Infection in a Chicken

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SUMMARY

A double mycotic infection, caused by *Aspergillus fumigatus* and a zygomycete-like organism, was histopathologically demonstrated in the lungs of a 12-week-old chicken. *A. fumigatus* was isolated, but the zygomycete was not.

RESUMEN

Se demostró histopatológicamente una doble infección micótica causada por *Aspergillus fumigatus* e hifas gruesas semejantes al grupo de los zigomicetes en el pulmón de un pollo de 12 semanas de edad. *A. fumigatus* fué aislado, pero no se observó el crecimiento de zigomicetes.

INTRODUCTION

The spores of zygomycetes and aspergilli are amply distributed throughout nature, and humans and animals exposed to these spores may develop allergies or pulmonary and systemic infections (5). In the primary stage, newborn chickens and turkeys can contract this disease in an incubator that is poorly disinfected or contains contaminated eggs (incubator pneumonia) (5). This disease is characterized by evident respiratory problems, open-beak dyspnea, aqueous diarrhea, and a high mortality rate. At necropsy, granulomatous lesions of diverse sizes are observed in the pulmonary tissues and air sacs (5).

In chronic aspergillosis, respiratory signs are less evident, but affected birds are anorexic and cachectic (7). Occasionally, nervous system disorders are observed when the disease has disseminated to the central nervous system. Depending on how chronic the disease is, tumoral masses can be found in lungs and other organs. The most

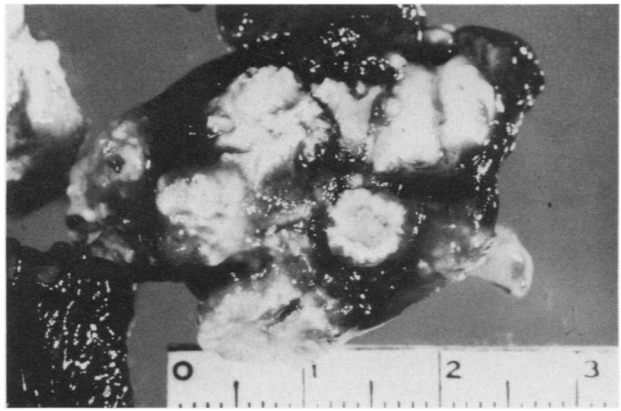

Fig. 1. Chicken lungs with evident congestion and several tumoral masses.

Fig. 2. Hyphae with dichotomous division characteristic of the aspergilli, found in lungs, air sacs, and intestines. Gomori methanamine silver. 400×.

prevalent species isolated are *Aspergillus fumigatus* and *A. flavus* (5,7,9).

Aspergillosis has been reported in flamingos, penguins, ostriches, parakeets, canaries, Andean condors, and other birds (7,9).

Zygomycotic infections are less frequent in fowl than in other animals (8), but diseases caused by zygomycetes have been reported in parakeets, parrots, penguins, flamingos, pigeons, and chickens (1,2,3,4,6,7,8,10,11,12,13,14).

The present report deals with histopathological findings in a chicken with pulmonary aspergillosis and zygomycosis.

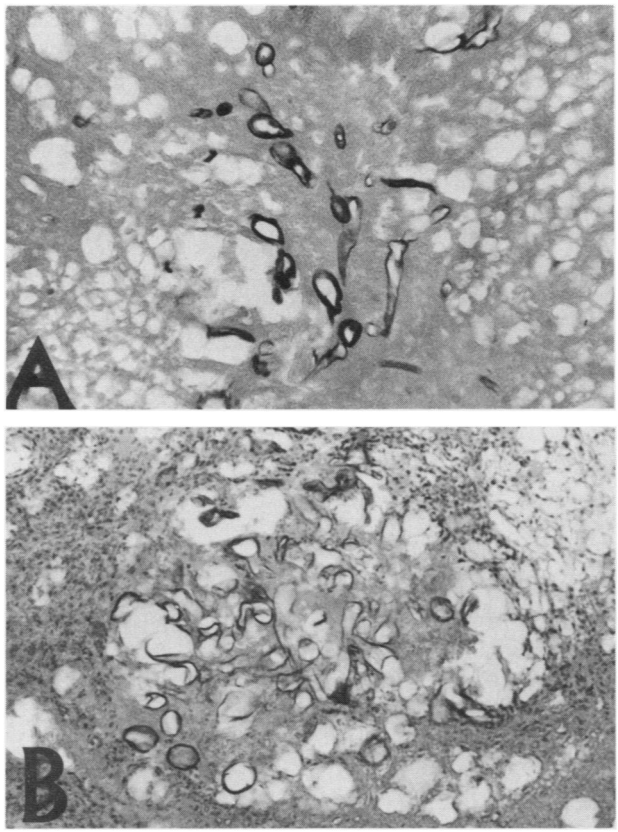

Fig. 3. Wide aseptate hyphae characteristic of a zygomycetes, detected in one pulmonary granulomatous mass. Gomori methenamine silver. 250×.

CASE REPORT

A 12-week-old chicken was brought to the Veterinary School, National University, in a cachectic state. It demonstrated uncoordinated movements and suffered from anorexia and diarrhea. The necropsy showed a marked generalized congestion, and there were whitish foci with a tumoral appearance, each measuring between 10 and 20 mm, in the lungs (Fig. 1), air sacs, and digestive tract.

Histological sections of these tissues stained with hematoxylin and eosin showed an inflammatory reaction, with heterophils and giant cells; thromboses in small arteries of lung tissues surrounded by necrosis of adjacent tissues were also found. Periodic acid-Schiff (PAS) and Gomori methenamine silver (Grocott) stains revealed

hyphae with dichotomous divisions characteristic of aspergilli (Fig. 2). Wide aseptate hyphae were detected in one pulmonary granulomatous mass (Fig. 3). Invasion of thromboses by wide hyphae was not found.

Cultures of the lungs, air sacs, and intestines were made on Sabouraud's medium with chloramphenicol. These were incubated at 25 and 37 C. After 5 days, green colonies developed, which later were identified as due to *A. fumigatus*. Growth of zygomycetes did not occur.

In Costa Rica, aspergillosis in fowl is frequently reported by the department of Avian Pathology at the Veterinary School (5). To date, no dual mycotic infections or cases of fowl zygomycosis have been reported.

Although isolation of the etiologic zygomycete would have given greater support to our finding, the histological studies of the chicken lung enabled us to conclude that the wide invasive hyphae are elements of a zygomycete. The wide aseptate hyphae, together with the dichotomous narrow septate hyphae, are sufficient evidence to diagnose a double mycotic infection.

This finding indicates that in fowl with chronic aspergillosis, other mycotic infections may coexist.

REFERENCES

1. Baros, S. S., and A. T. Londero. Cardiac zygomycosis in an Australian parakeet. Sabouraudia 10:189–190. 1972.
2. Bigland, C. H., F. E. Graesser, and K. S. Pennifold. An osteolytic mucor mycosis in a penguin. Avian Dis. 5:367–370. 1961.
3. Caretta, G., and E. Piontiela. Pulmonary avian mycosis due to Mucor racemosus. Atti. Isr. Bot. Univ. Lab. Crittogam Pavia 7:33–39. 1971.
4. Dawson, C. O., E. B. Wheeldon, and P. E. McNeil. Air sac and renal mucormycosis in an African gray parrot (Psittacus erithacus). Avian Dis. 20:593–600. 1976.
5. Fonseca, E., and L. Mendoza. Clinica y patologia de la aspergillosis aguda y cronica en aves de corral. Resumenes del IV Congreso Nacional de Microbiologia, Parasitologia y Patologia Clinica. San Jose, Costa Rica. p. 22. 1980.
6. Hanssen, I. Pulmonary phycomycosis in captive rock ptarmigan and willow ptarmigan chicks. Acta Vet. Scand. 16:134–136. 1975.
7. Kin, V. M., and A. H. Limton. Mucormycotic infection of birds. Vet. Rec. 73:1008. 1961.
8. Konig, H., J. Nicolat, S. Lindt, and W. Raaflaub. Einige mucormykosen bei rind, schein, katze, reh und flamingo. Schweiz. Arch. Tierheilkd. 109:260–268. 1967.
9. Loke, L. N., G. E. Bagley, D. N. Frickie, and L. T. Young. Lead poisoning and aspergillosis in an Andean condor. J. Am. Vet. Med. Assoc. 155:1052–1056. 1969.
10. Migaki, G., K. A. Langheinrich, and F. M. Garner. Pulmonary mucormycosis (phycomycosis) in a chicken. Avian Dis. 14:179–183. 1970.
11. Panigrahy, B., S. A. Naqi, L. C. Grumbles, and C. F. Hall. Candidiasis in cockatiel nestlings and mucormycosis in a pigeon. Avian Dis. 23:757–760. 1979.
12. Riddell, C., and R. Topp. Mycotic spondylitis involving the first thoracic vertebra in chickens. Avian Dis. 16:1118–1122. 1972.
13. Szecsenyi, I., and B. Sas. Mucormycosis magyuzemi csibeallomanvokban. Magy. Allotorv. Veterinarius 23:613–615. 1968.
14. West, J. L. Mycotic aortitis in a chicken. Avian Dis. 18:251–254. 1974.