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Outbreak of Aspergillosis in Indigenous Birds Raised Under Deep Litter System

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ABSTRACT

Aspergillus is an ubiquitous organism amd among livestock, fowl is the most susceptible species to mycotic pneumonia. The spores of the fungus are found in the poultry litter and mouldy grains. The present communication records the spontaneous outbreak of Aspergillosis in indigenous birds raised in deep litter system. Aspergillosis in indigenous birds was characterized by yellowish white nodular growths of various sizes in lungs, abdominal cavity and intercostals areas with thickened air sacs. Histopathologically, lungs showed multiple foci of granulomatous fungal elements like conidia and septate hyphae along with mononuclear and heterophilic infiltration. Microbiological study revealed infection due to Aspergillus fumigatus.

KEYWORDS Aspergillosis, deep litter system, mycotic pneumonia and pathology.

Introduction:

The indigenous birds have contributed to village economics for centuries. They live mostly as scavengers with minimal care. They are adapted to local environment conditions and hence value for developing stocks for rural or backyard poultry production [15]. People mostly rural and tribal masses have been keeping poultry by tradition for their livelihood and nutritional requirements. Majority of the farmers are still keeping 10-15 numbers of low input indigenous fowls at their backyard for both egg and meat production[9]. For small holder farmers in developing countries, poultry represents one of the few opportunities for saving, investment and security against risk. Poultry are the smallest livestock investment a village household can make. Eggs can provide a regular, small income while the sale of live birds provides a more flexible source of cash.

Deep litter system is an intensive housing system of poultry, where birds are kept in large pens up to 250 birds each, on floor covered with litters like straw, saw dust or leaves up to the depth of 8-12 inches which are easily available and thus proves to be cost effective. Well managed deep litter kept in dry condition with not wet spots reduces the chances of diseases like Coccidiosis and worm infestation. With correct conditions observed with well managed litter there is no need to clean a pen out for a whole year leading to reduction of expenses in cleaning the pen. The level of nitrogen in well built-up deep litters may be around 3% while that of fresh manure is 1% which also makes it suitable manure for farming. It also contains about 2% phosphorus and 2% potash. Its value is about 3 times higher that of cattle manure. The litter also helps in maintaining body temperature[3].

Infection with *Aspergillus fumigatus* is common occurrences in birds[8,10] Aspergillosis is caused by different species of Aspergillus (chiefly *A fumigatus* and *A flavus*) a disease primarily of respiratory tract, producing characteristic granulomatous lesions. Aspergillosis is an infectious, non-contagious disease fungal disease caused by species belonging to genus Aspergillus, in particular *Aspergillus fumigatus*. It can be considered as a major cause of mortality in captive birds. Inhalation of a considerable amount of spores is an important cause, leading to clinical manifestation of the disease ranging from acute to chronic infection. *Aspergillus fumigatus* spores are too small to be trapped in the nasal cavity or trachea, some are able to reach the lungs and airsacs. The spores after entering the terminal bronchioles and alveoli grow by budding and formation of septate hyphae leading to a local inflammatory reaction, a nodular bronchopneumonia with infiltration by polymorph and macrophages. This may lead to development of loosely attached plaques in the respiratory tract and leads to obstruction of the trachea or brochi and fills up the air sac[4]. This affection is very common in brooder houses and hence it is called Brooder Pneumonia[14]. The present communication records the spontaneous outbreak of Aspergillosis in indigenous birds raised in deep litter system.

MATERIALS AND METHODS

The study area of the present study was in Assam, India. The All India Co-ordinated Research Project on Poultry Breeding, department of Poultry Science, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati locally procured 120 apparently healthy indigenous birds, 3-26 weeks old. Out of these 5 dead birds and two live sick birds were brought to the Department of Pathology, College of Veterinary Science, Khanapara-22 for postmortem examination.

Examination of the live birds

The live birds were examined for the presence of clinical signs and while a thorough postmortem examination was performed on the dead birds, during which the gross lesions were recorded accordingly.

Examination of the dead birds

The tissue samples from lungs, liver, kidneys, heart, brain and

intestine were collected during the course of necropsy and preserved in 10% formalin solution, processed, embedded in paraffin, sectioned and stained routinely with Haematoxylin and Eosin (H&E)[11]

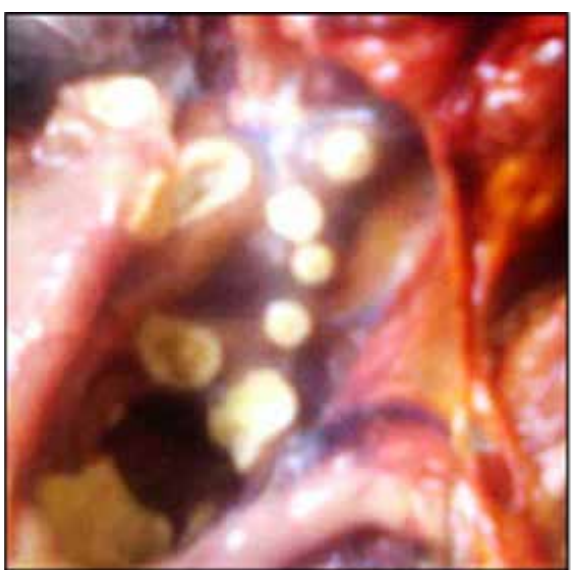
Isolation of organism
For isolation of organism samplesoflung nodules and airsac were inoculated on Sabouraud's Dextrose Agar (SDA) and incubated aerobically at 37°C for 5 days.

Microscopic examination
Microscopic examination of fungi was performed using Lacto-Phenol cotton blue staining.

RESULTS
Clinical signs in live birds
The clinical signs observed were difficulty in breathing, in-coordination, trembling and somnolence.

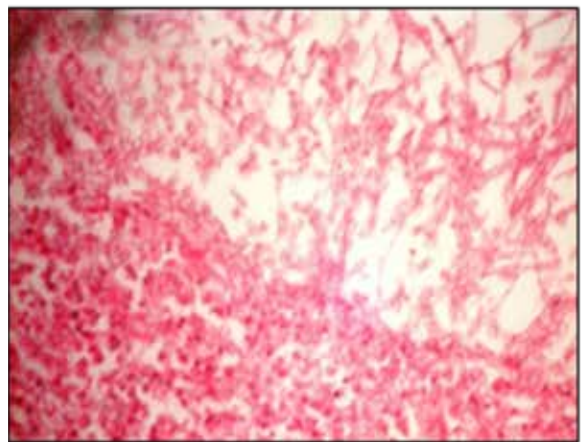
Gross lesions at post mortem
At necropsy, numerous various sized grayish white nodules and circular discs on the air sacs, lungs and abdominal cavity were observed (Fig 1). Air sacs were thickened and contained few yellowish white nodules.

Fig.1. Aspergillosis:Yellowish white circular disc on the air sacs



Histopathological examination
Histopathological examination of lung nodules revealed central caseated necrotic mass surrounded by a wide zone of epithelioid cells, lymphocytes, fibroblast and giant cells revealing presence of short slender septate hyphae (Fig 2). Sections of liver, kidneys and heart showed severe congestion with focal haemorrhages. Brain section showed severe congestion and mononuclear cells infiltration in the meninges only in 2 cases.

Fig.2. Section of Lung showing fungal hyphae in Aspergillosiss



Isolation and microscopic examination of the organism

After five days of incubation, velvety bluish green colonies developed on SDA not unlike those of*Aspergillus fumigatus* having chain of pigmented conidia with Lacto phenol cotton blue staining of the culture revealed chain of pigmented conidia.

DISCUSSION
Gross and histopathological lesion ofmycotic pneumonia is in agreement with the findings of earlier workers [7].

Presence of fibrinoheterophilic and granulomatous air sacculitis with infiltration of macrophages, heterophils conforms to the observations of earlier workers[2,12,16].

In the present study the live birds showed lack of equilibrium, dyspnea, blindness and torticollis , which was also common[1].

Conformation of the organism by isolation Sabourauds dextrose agar and the presence of septate hyphae was in agreement with the earlier workers[13,18,19] .

Microscopic changes in lungs and other organs were in line with the observations of earlier workers [5,6,17].

In conclusion it can be said that Aspergillosis leads to development of granulomatous lesion leading to grave consequences of the affected bird.

REFERENCES

1. Akan M, Haziroglu M, Jlham Z, Sareyyupoxglu B and Tutnca R. 2002.A case of Aspergillosis in a broiler breeder flock. Avian Dis.,46:497-501. 2. Arne P, Thierry S, Wang D, Deville M, Loc'h G L, A.Desoutter,F.Femenia, A.Nieguitsila, Huang W, Chermette R and Guillot J.2011. Aspergillusfumigatus in poultry.International Journal of Microbiology. 3. Banerjee G C.2009.A Textbook of Animal Husbandry.8thEdn.Oxford & IBH Publishing Co.Pvt.Ltd.New Delhi. 4. Beernaert L A, Passmans F, Waeyenberghe L V, Haesebrouck F and Martel A.2010.Aspergillus infection in birds: a review. Avian Pathology.39(5):325-331. 5. Borah MK, Jangir BL, Raut S s, Gogoi R and Sharma G D.2010. Aspergillosis in Japanese quail (CoturnixCoturnix japonica). Indian j.Vet.Pathol, 34(2): 203-204. 6. Chaudhary S K, Sadama JR and Prithi A K. 1988. Sequential pathological studies in Japanese quails infected experimentally with Aspergillusfumigatus. Myco.Patholgia, 13:156-166. 7. Cork C S, Alley M R, Johnstone A C and Stockdale P.1999. Aspergillosis and other causes of mortality in the stitchbird in New Zealand.Journal of Wildlife Disease.35(3):481-486. 8. Cortes P L, Shivaprasad H L, Kiupel M and Senties-Cue G. 2005.Qmphalitis associated with Aspergillusfumigatus in Poults. Avian Dis., 49,304-308. 9. Islam R, Kalita N and Nath P.2014.Comparative performance of ofVanaraja and Indigenous chicken under backyard system of rearing.Journal of Poultry Science & Technology.2:22-25. 10. Jordan F T W and Pattison M. 1996.Fungal diseases. In: Poultry Diseases, 4thedn. W.B.Saunders Company Ltd.London, PP.247-249. 11. Luna L G 1968.Manual of Histologic Staining Methods of the Armed Forces Institute of Pathology Animals, 3rded. McGraw-Hill Book Company, New York. 12. Orosz S E. 2000. Overview of Aspergillosis:Pathogenesis and treat options.Seminars in Avian and Exotic Pet Medicine.9(2):59-65. 13. Reissig.C.E, Uzal F A, Schettno A and Robles CA. 2002.Pulmonary Aspergillosis in a great rhea (Rhea Americana) Avian. Dis.46: 754-756. 14. Sastry G A,andRao P R. Veterinary Pathology. 2007.7thEdn.CBS Publishers &Distributors.New Delhi. 15. Sharma R P, Rao S V,Chatterjee R N and Sharma S R.2008. Poultry production in India.Indian council of Agricultural Research. New Delhi. 16. Sonaiya E B and Swan S E J.2004.Small-scale poultry production.TechnicalGuide.Food and Agricultural organization of the United Nations, Rome. 17. Timurkaan N, Neskin O, Yilasy F and Cimtay I.2005.Aspergillus outbreak in an ostrich flock.Medycyne Vet, 61:765-766. 18. TokarzewskiS, Ziolkowska G, Lopuszynski Wand Nozdryn-Plotnicki Z.2007.Aspergillusfumigatus infection in a pigeon flock.Bull Vet InstPulawy 51:563-567. 19. Yakota T, Shibahara T, Wada Y, Hiraki R, Ishikawa Y, and KadotaK.2004.J.Vet.Med.Sci.66(2):201-204.