

Original Research Article

Aspergillosis in Broilers: Reports of three cases from a commercial and two Broiler Breeder farms in Zaria, Nigeria

*Musa, I.W. Aliyu, G. and A.Ismail

Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria College of Agriculture,
Mokwa, Niger State
*Corresponding author

ABSTRACT

Keywords

Outbreak,
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These reports describe outbreaks of acute aspergillosis in a 2, 500 and 3,000 capacity broiler breeder, and a 5-week old commercial broiler flocks. Both flocks were intensively managed on deep litter and vaccinated against endemic poultry diseases. Similar clinical manifestations of the disease in the breeder flock included a 3-day onset of respiratory distress and neurologic derangement manifested by incoordination, torticollis and paralysis. Mortality was low grade (2%) in breeder flocks. Other clinical features observed in the commercial boilers included depression, ruffled feathers, gasping, whitish nodular lesions on the shank and abdomen. Gross lesions seen were cheesy granular lesions in the skin, air sacs, lungs trachea, heart, gizzard and pancreas. Affected organs were taken to the Microbiology and Histopathology laboratories for cultural isolation of the possible organism and histopathology. A farm visit indicated dusty and poor pen ventilation. Microbiology result first indicated fungal growths on sabroud dextrose agar (SDA) from which *Aspergillus fumigatus* was subsequently isolated. Histopathology revealed fungal hyphae in sectioned lung tissue. Damp environment, moldy feeds, dry and dusty litter must be avoided and adequate ventilation should always be provided in poultry farms to prevent aspergillosis.

Introduction

It seems this study reports for the first time outbreaks of Aspergillosis with disseminated lesions and neurologic derangements that were successfully treated using copper sulphate in Zaria, Nigeria. Aspergillosis is established to be an infectious but non-contagious fungal disease of all ages and species of birds caused mainly by *A.fumigatus* and rarely by *A.flavus* and *A.niger*. It is worldwide distributed,

ubiquitous in nature, thrives best in humid conditions while dry litter conditions facilitate Aspergillus spore aerosolisation (Barbale, 2002; Flammer, 2002). Fertile eggs contaminated with aspergillus spores may have explosive incidence of aspergillosis in chicks that are hatched from such eggs (David, 2000). Few reports of aspergillosis with higher incidences in exotic type birds, mainly in the rainy season,

with mainly respiratory lesions to which treatments were either not attempted or not successful were documented in the study area (Abdullahi et al., 1992; Abdu et al., 2002).

Materials and Methods

Case report 1

History: Three dead and two live 5-week old broilers from a backyard flock of 250 birds maintained on deep litter system were presented to the Poultry Clinic of the Veterinary Teaching Hospital, Ahmadu Bello University, Zaria on the 6th November, 2013 for clinical examination. The chief complaint was sudden onset of mortality a day prior to presentation during which 12 birds had died. The birds were vaccinated against gumboro disease at 14 days of age and Newcastle disease with intra-ocular at day one and laSota in drinking water at 21 days of age. Clinical manifestations of the disease included somnolence, depression, ruffled feathers, respiratory distress and death noticed first on the 4th November, 2012. Farm visit revealed the poultry house to be poorly ventilated with dusty litter; the birds were crowded and managed under poor hygienic conditions.

Gross lesions: At postmortem examination of the birds, the following lesions were seen, nodular caseous (cheesy) whitish lesions in the trachea, heart, lungs, air sacs, gizzard, intestine, pancreas, shank and abdomen (Plates I, II and III). There was mucous enteritis and sloughing of the intestinal mucosa.

Case reports 2 and 3

Four live and seven dead, 6 and 14-week-old broiler breeders from 2,500 and 3000 capacity flocks maintained on deep litter systems were presented to the Poultry Clinic

of the Veterinary Teaching Hospital, Ahmadu Bello University, Zaria on the 16th March and 12th April, 2013 respectively for clinical examination. In both cases the complaints were respiratory distress, incoordination, wing and leg paralysis, and mortality during which over 300 birds had died. The birds were vaccinated against gumboro disease at 14 days of age and Newcastle disease with intra-ocular at day one and laSota in drinking water at 21 days of age. Newcastle disease vaccine Komarov was administered at week six for the 14-week-old breeders. Other clinical manifestations included somnolence, depression and ruffled feathers. Various antibiotics and multivitamins were administered without any noticeable progress in both flocks. Farm visit revealed the poultry houses to be poorly ventilated with dusty litter made of wood shavings; the birds were crowded and managed under poor hygienic conditions.

Results and Discussion

Laboratory Investigations: Affected organs with the nodular lesions were aseptically collected and sent to Microbiology laboratory for culture and isolation of the organism. The samples were processed and cultured on sabaroud dextrose agar (SDA) at room temperature. The fungal growth obtained from the SDA was stained with lactophenol cotton blue and examined with X40 lens under the light microscope.

Microbiological finding: *Aspergillus fumigatus* was isolated.

Treatment: Treatment of the first case was not attempted for economic reasons and for the fact that the birds were to be sold shortly (within the next 2-3 weeks).

The second and third cases involving the breeder farms were treated using copper

sulphate (CuSO₄) in drinking water at 20 g per 100 liters fortnightly for two months.

Aspergillosis is endemic on some farms while in wild birds it occurs sporadically, frequently affecting only an individual bird. Chicks and poults may become infected during hatching as a result of inhaling large numbers of spores in heavily contaminated hatching machines or from contaminated litter. In older birds, infection is caused primarily by inhalation of spore-laden dust from contaminated litter or feed or dusty areas. Inadequate ventilation and dusty environment increase the risk of exposure (Arne, 2011).

The first case seemed not to be a flock problem since only one bird out of the five presented birds showed the classical aspergillosis lesions and a farm visit did not indicate any further sick birds, this may justify the opinion that aspergillosis is infectious but not contagious (Barbale, 2002; Kearns, 2003). However, birds in a group may be affected if exposed to same stressors, large number of spores or immunocompromised (Harold and John, 1997; Flammer, 2002; Kearns, 2014) as it appeared to be in the case.

Risk factors reported to facilitate aspergillosis include: Poor ventilation which increases the rate of contact to aspergillus spores, nutritional deficiency particularly avitaminosis A that leads to metaplasia of epithelial surfaces thereby interfering with host defense creating environment for fungal growth, corticosteroid treatment and prolonged tetracycline therapy have also been reported to influence susceptibility to aspergillus (Flammer, 2002). In these reports, poultry farm environment and hatchery must have been responsible for outbreaks

Aspergillus fumigatus has been reported to

rarely cause disease in broiler chicks (Harold and John, 1997). In this report however, *A. fumigatus* was responsible for a disseminated aspergillosis in this 5-week old broiler. In another development, cutaneous aspergillosis was reported to occur rarely in avian species (Harold and John, 1997). Also few reports of systemic aspergillosis, aspergillosis associated with necrotic granulomatous dermatitis lesions have been documented by Ghazikhanian in 1989, Yamada *et al* in 1997 and Lahaye (in pigeon) in 1997 as cited by Harold and John (1997). This may be true because out of all cases of avian aspergillosis reported in the study area this appears to be the first documented cutaneous form.

Furthermore, systemic aspergillosis has been characterized by spread of lesions to internal organs including the brain where nervous signs may be seen (John, 2002). In this report other organs like the heart, gizzard, lungs, intestine, kidneys and pancreas were seen to be affected indicating a systemic spread. In addition the breeder flock also manifested neurological signs highly suggesting brain involvement.

Clinical diagnosis of aspergillosis is difficult because signs exhibited are non-specific, however, endoscopy, advanced imaging (CT and MRI) scans are helpful diagnostic aids (Barbale, 2002; Flammer, 2002; John, 2002). These tests procedures may be more expensive than the value of the chicken or not readily available in most developing nations making them practically impossible to conduct.

Treatment of aspergillosis is ineffective in poultry (Arne, 2011) where tried it involves the use of one or more systemic antifungal agents (Kearns, 2003), it is not usually done because it is expensive, prolonged, frequently associated with relapses and the prognosis often guarded (John, 2002).

Fig.I Respiratory distress in a 16-week broiler breeder infected with aspergillus



Fig.II 16-week broiler breeder infected with aspergillus showing leg paralysis



Fig.III Skin lesions of Aspergillus infected broiler breeder.

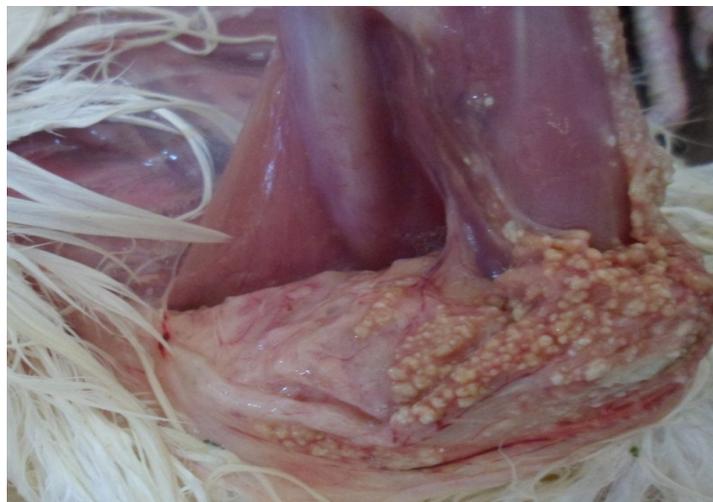


Fig.IV Granulomatous lesions in lungs of aspergillus infected broiler breeders.



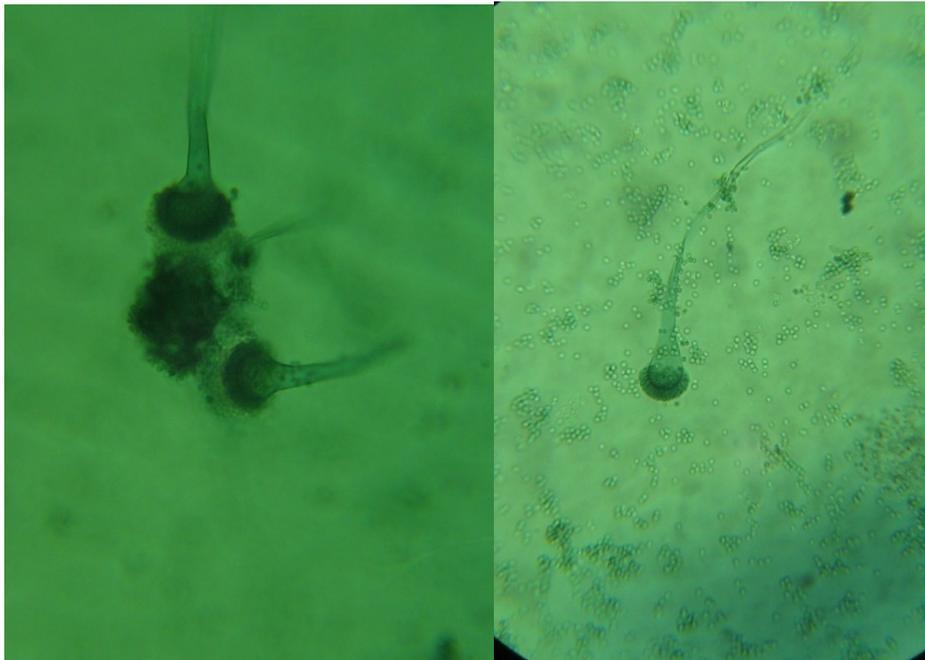
Plate.V Whitish nodular lesions (arrows) on the pectoral and abdominal regions of *Aspergillus* infected 5-week old broiler.



Plate.VI Whitish caseous nodular lesions (arrows) on the heart, gizzard and liver of a 5-week *Aspergillus* infected broiler.



Plate.VII Microscopic appearance (X 40) of *Aspergillus fumigatus*



Also the organism is usually walled off by the hosts' inflammatory/immune response making systemic drugs inaccessible through blood stream (Barbale, 2002). In this case of broiler flock intended to be sold off shortly, treatment was unnecessary. However drugs like copper sulphate, clotrimazole & itraconazole at 10mg/kg, amphotericin B have been successfully used in valued birds (Barbale, 2002; Flammer, 2002; John, 2002; Kearns, 2003). Copper was used in two of the cases because of availability and cost effectiveness compared to other system antifungal drugs in the study area. The time of the report of this case (December) agreed with earlier observation by Abdu *et al.*, 1992 that aspergillosis was commonly seen to cause mortality during the pre-dry season (October to December) in Zaria, Nigeria.

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