Direct RESEARCH JOURNALS
Vol.2 (2), pp. 14-19, March 2017
International Standard Journal Number ISJN: A4372-2601
Article Number: DRJA110933087

Direct Research Journal of Veterinary Medicine and Animal Science (DRJVMAS)
http://directresearchpublisher.org/journal/drjvmas

Research Paper

A case of chronic Aspergillosis in a flock of commercial pullets, at Bado Quarters, Sokoto Nigeria

Muhammad, S.,[*1] Bello, M. R[2]., Adamu, Y.A.[3], Mera, U. M.,[3] Bello, A.[4], Shehu, Z., [1]Baki, A. S.,[5] and Mungadi, H. U.[1]

[1]Veterinary Teaching Hospital, Usmanu Danfodiyo University Sokoto,Nigeria.
[2]Department of Animal Health, Umaru Ali Shinkafi Polytechnic Sokoto,Nigeria.
[3]Department of Veterinary Medicine, Usmanu Danfodiyo University Sokoto,Nigeria.
[4]Department of Veterinary Anatomy Usmanu Danfodiyo University Sokoto,Nigeria.
[5]Department of Microbiology, Faculty of Science, Usmanu Danfodiyo University Sokoto,Nigeria.
*Corresponding author E-mail: shehuraba@gmail.com.

Received 3 February 2017; Accepted 3 March, 2017

A case of increasing mortality, progressive emaciation, blindness and chronic respiratory distress was reported to Veterinary Teaching Hospital, Usmanu Danfodiyo University Sokoto Nigeria, in a flock of 600 pullets, at Bado Qts Area Sokoto. The condition was refractory to conventional chemotherapy and regular vaccination schedule was adhered to. A total of 325 birds from a flock of 600 pullets representing 54.2% mortality were recorded over a 4 month's period. Occasional respiratory distress, coughing, severe emaciation, and blindness were common findings prior to death. Birds were raised on commercial grower's mash, which was stored for over 3 months in the farm. Postmortem findings revealed periocular oedematous lesions and blindness, grossly emaciated carcases, anemia, with numerous diffused grayish granulomatous lesions in most of the viscera. Some bags of stored feed were moldy. Laboratory findings revealed low hematocrit values, leucocytosis and elaborate growth of Aspergillus fumigatus, from the nodular lesions and sampled feed. Mycobacterial infection and Merek's disease were ruled out, as confirmation of Chronic Aspergillosis was made.

Key words: Pullets, Blindness, Moldy feeds, Chronic Aspergillosis, Sokoto

INTRODUCTION

Aspergillosis is a non contagious but highly infectious fungal disease of birds (Beernaert *et al*., 2010), with fatal consequences in chicks, hence referred to as brooder pneumonia (Pascal *et al.,* 2011). It is associated with inhalation of tiny fungal conidia in contaminated feeds or litter (Musa *et al*., 2014), under warm, humid and poorly ventilated environments (Phalen, 2000; Oglesbee, 1997). Several species of Aspergillus organisms are associated with the condition, notably *A. fumigaatus*, *A. flavos, A. nigar, A.glacus* and *A. nidulaus* (Pascal *et al.,* 2011). These organisms are ubiquitous, found in commercial livestock feeds (Habib *et al.,* 2015), and known for the production of potent mycotoxins, responsible for respiratory diseases in man and animals (CAST, 2003).Various isolates of *A. fumigates* produce highly immunosuppressive mycotoxin (gliotoxin) in body tissues and moldy feeds (Pascal *et al.,* 2011). Aspergillosis is primarily a disease of respiratory system, though

systemic Nervous and cutaneous forms are reported (Musa *et al.,* 2014). It occurs in acute or chronic form, with no specific signs, and hence difficult to diagnose (Dahlhausen *et al.,* 2004). Common clinical manifestations include Mycotic keratitis, periorbital swelling (Beckman *et al.,* 1994, Hoppes *et al.,* 2000), severe conjunctivitis (Pascal *et al.,* 2011), blindness (Mehmet *at al.* 2002) and non regenerative anemia (Vanderheyden,1993). Others include: Marked Leucocytosis-monocytosis, and lymphopenia (Forbes, 1992). According to CAST (2003), mycotoxins associated with moldy feeds, resulted in decreased productivity and have carcinogenic effects. Though illnesses due to mycotoxins are difficult to diagnose and treat (CAST, 2003), a combination of history, clinical signs, hematology, biochemistry, serology, radiology, endoscopy and fungal culture are relevant for effective diagnosis (Jones and Orosz, 2000).

MATERIALS AND METHODS

Case report

A poultry farmer reported a case of increasing mortality and respiratory distress within an initial flock of 600 pullets, from a commercial poultry farm at Bado Qts. Sokoto, Nigeria. The birds were raised on intensive deep litter system of management, and fed commercial growers mash procured from a reputable feed mill. 3 dead birds were submitted for post mortem examination, to Veterinary Teaching Hospital, UDUS. For effective diagnosis, series of farm visits were arranged, with the following observations: Two batches of 600 layer and 300 broiler chicks were initially stocked in the same farm and fed commercial chick and broiler starter mash respectively, that was procured from the same source. Broilers recorded poor growth rate, with the mean weight of 720 g/bird at 9^{th} week of age, and 35% mortality was observed prior to culling the birds. The farmer concentrated on the second batch of 600 pullets, to which high morbidity and mortality was recorded, with loss of 325/600 spread over a period of 4 months. The following observations were made on repeated farm visits: Birds raised on deep litter system with poor ventilation, exhibited uneven growth rate within the same flock, gross emaciation and stunted growth, pale combs and wattles, respiratory distress, coughing, unilateral periorbital oedematous swelling and apparent blindness (15 pullets). The birds were immunized against New Castle Disease, Infectious Bursal Disease (Gumboro), Merek's Disease and Fowl typhoid at appropriate ages, while the feed was fortified with vitamins /mineral supplements. The condition was refractory to broad spectrum antibiotic therapy. On closer inspection of farm premises, the stocked feed, showed evidence of deterioration, with flakes and mold formation. Blood, feed and fecal samples were collected and dispatched to Veterinary Teaching Hospital, Usmanu Danfodiyo University Sokoto for diagnostic purpose.

Postmortem lesions

Three carcasses were presented for postmortem examination at UDUS Pathology Laboratory. The following notable lesions were observed: Unilateral conjunctivitis and periorbital edema (Plate A). Emaciated carcasses, with severe breast and thigh muscle atrophy (Plates B), diffused grayish granulomatous lesions ranging from few millimeters to several centimeters within the lungs, peritoneum, on the proventriculus, gizzard, liver, spleen, and along the mesentery of small and large intestines (Plates C and D).

Microbiology

Samples from granulomatous lesions and stored feed were dispatched to microbiology for bacterial and fungal isolation. The culture yielded an elaborate growth of greenish brown colonies on Sabouraund Dextrose Agar after 48 h at 37° C incubation temperature. From the colonies a smear was made and stained with lactophenol cotton blue, where *A. fumigates* was identified (Plate E). Impression smear and acid fast test could not reveal *Mycobacterial organisms.*

Differential diagnosis

Avian Tuberculosis, Mereks disease, Aspergillosis and Chronic Respiratory Diseases were earlier suggested, but ruled out following clinical manifestation of blindness, past history of stunted broilers, moldy feed, severe emaciation, anemia and diffused granulomatous lesions at postmortem. Plates Photograph of pullet bird showing periorbital oedema; x 25. B. Photomicrograph of pullet bird showing severe Atrophy of pectoralis muscles (green arrow with congested abdomino pelvic muscle (red arrow): × 25 C. Photograph of pullet bird showing granulomatous lesion on the lungs (red arrow) and abdominal viscera. ×25.

Tentative diagnosis

Based on the history of stale feed, gross emaciation, ophthalmic involvement, and postmortem lesions, Aspergillosis was suggested.

Confirmatory diagnosis

Aspergillosis, after culture and isolation of *A. fumugatus*.

Plate A. Photograph of pullet bird showing swelling at the head region, blindness and peri-orbital edema × 25.

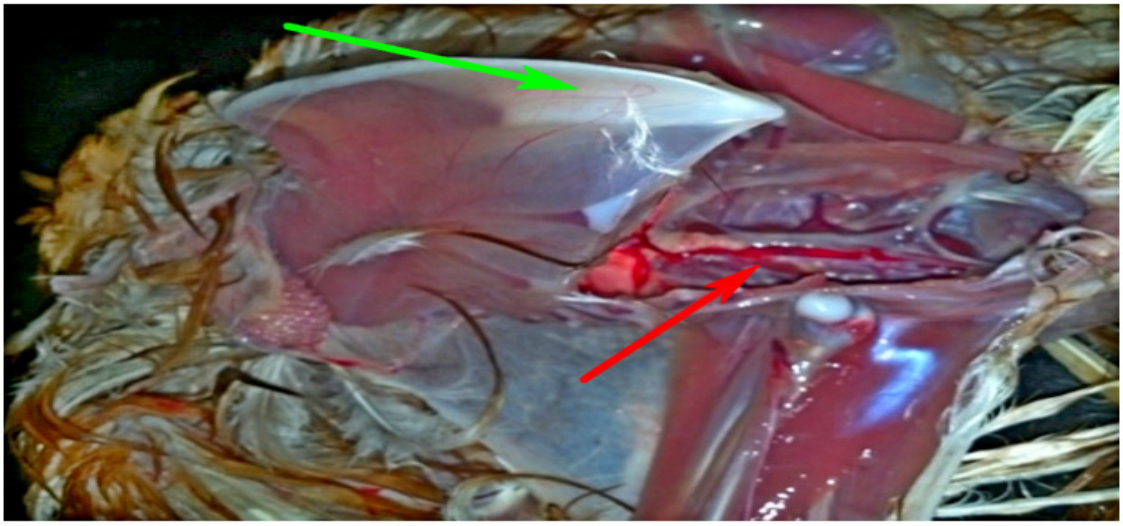

Plate B. Photograph of pullet bird showing Severe Atrophy of pectoralis muscle (green arrow) with congested abdomino-pelvic muscle (red arrow) × 25.

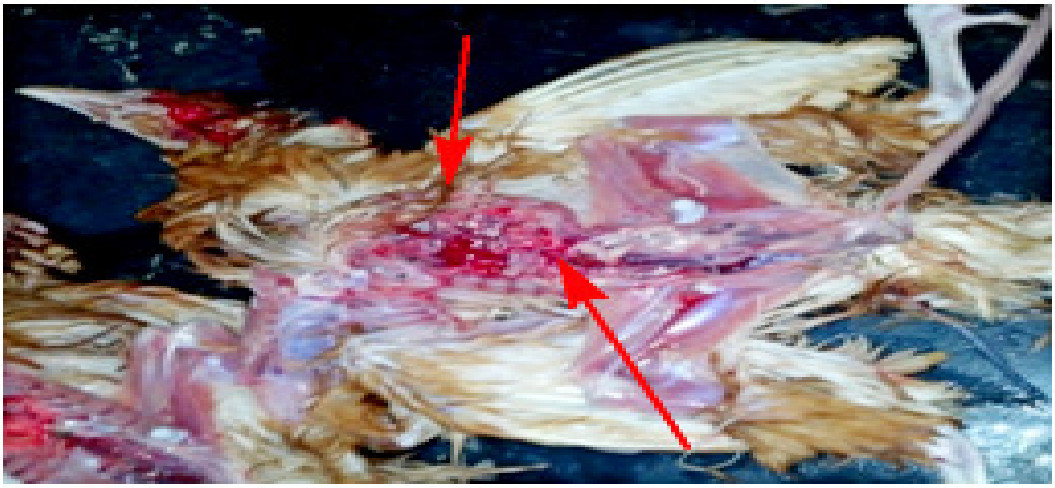

Plate C. Photograph of pullet bird showing granulomatous lesion on the lung (red arrow) and abdominal viscera x25.

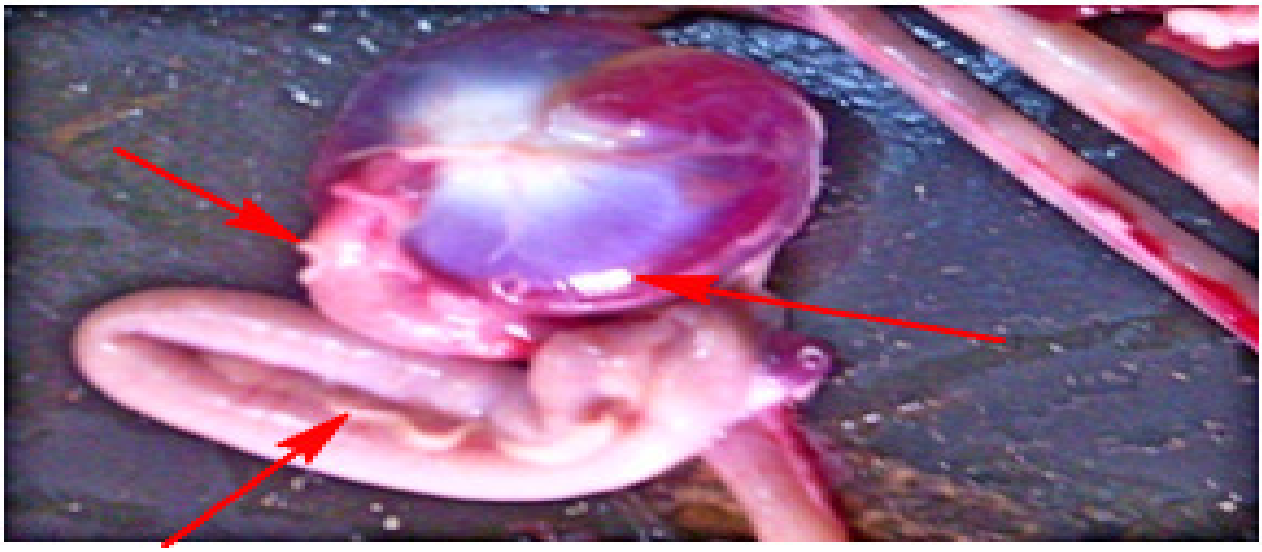

Plate D. Photograph of the proventriculus, ventriculus and duodenal region of the bird showing granulomatous lesion in the area (red arrow).

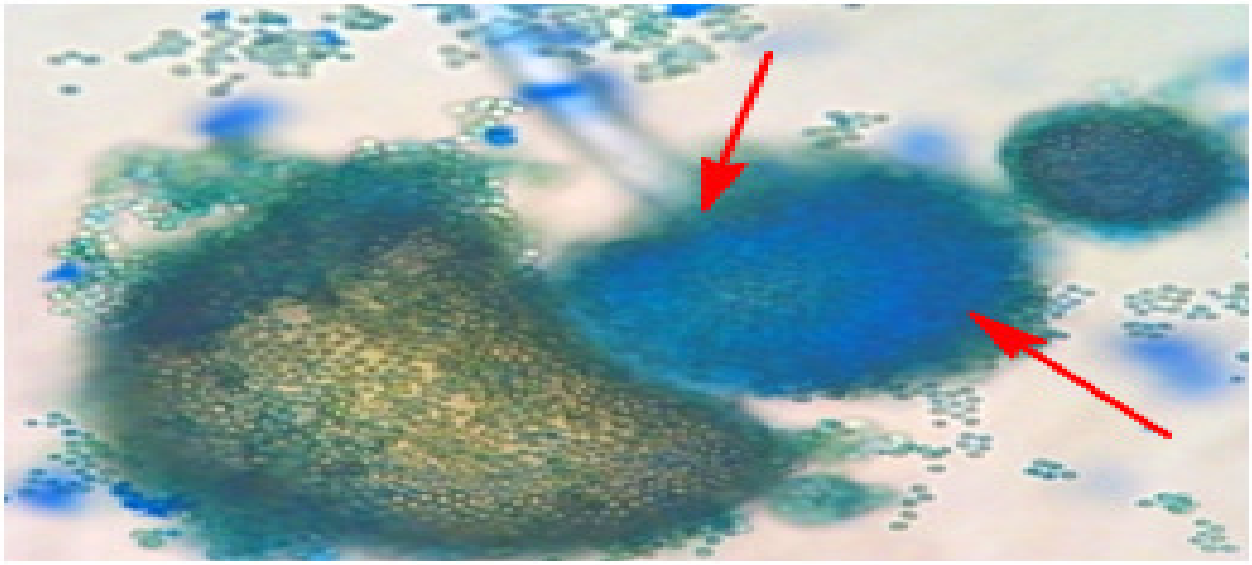

Plate E: Photomicrograph showing spores of *Aspergillus fumigates (red arrow).*

Treatment

Not attempted due to chronic status and economic considerations, hence the farmer advised to dispose all the birds, and improve on bio security measures.

DISCUSSIONS

Severe muscular dystrophy, respiratory distress and indeed anemia, coupled with the refractory nature to chemotherapy, suggested a chronic wasting condition. While the lesions were typical of Mycobacterial and Merek's disease, in Avian tuberculosis, the granulomatous lesions are restricted to abdominal viscera and bone marrow without lung involvement, which is rarely seen (Kuldeep *et al.,* 2011), and negative result for *Mycobacterium,* ruled out the disease. Similarly the characteristic enlargement of sciatic nerve associated with Merek's Disease, was apparently not observed in all the carcasses presented. The gross prominence of the keel bone, signified severe muscular dystrophy, common

Table 1. Haematology

Values	PCV %	RBC 10^6	WBC 10^3	Heter %	Lymp %	Mono %	Eosin %	Basop %	Band %
Pullet1	20	1.98	16.63	64	31	5	0	0	0
Pullet2	21	2.19	13.45	69	23	8	0	0	0
Pullet3	11	1.53	17.40	75	24	1	0	0	0
Pullet 4	29	2.64	18.75	36	61	4	0	0	0
Pullet 5	22	2.06	22.03	40	46	4	0	0	0

to mycobacterial and *A. fumigates*, the accompanying periorbital lesions, an age of the birds, still ruled out tuberculosis, whose chronic lesions seen in older birds. The low Packed Cell Volume (PCV) recorded in the entire five samples, suggested anemia (Table 1). Though level of insecurity in the farm was low, farm records confirmed compliance to immunization schedule against common endemic poultry diseases in the State. Signs of respiratory distress, low hematocrit values, dehydration, emaciation coupled with periorbital lesions, moldy feeds and elaborate growth of *A. fumigates* from granulomatous lesions and sample feed, further confirmed a case of Chronic Aspergillosis in conformity to Mehmet *et al*., (2002), Musa *et al.,* (2014), and Pascal *et al*., (2011).

CONCLUSION

The history of moldy feed, clinical signs postmortem lesions, culture and isolation of A. *fumigatus* confirmed a case of Chronic Aspergillosis. While treatment is often unsuccessful and uneconomical, preventive measures should be taken to avoid moldy feeds, and maintenance of adequate ventilation within the deep litter units emphasized.

REFERENCES

Beckman BJ, Howe CW, Trampel DW, DeBey MC, Richard JL Niyo Y (1994). *Aspergillus fumigatus keratitis* with intraocular invasion in 15-day-old chicks*. Avian Diseases, 38: 660-665.*

Beernaert L, Pasmans AF, Van Waeyenberghe L, Haesebrouck F, Martel A (2010) Aspergillus infections in birds: a review, *Avian Pathology*, 39:(5)325-331, DOI: 10.1080/03079457.2010.506210:

CAST (2003).Council for Agricultural Science and Technology. Mycotoxins: risk in plant, animal, and human systems. *CAST, Ames, Iowa, USA. Task Force Report no*. PP.139-199.

Dahlhausen B, Abbott R, VanOverloop P (2004). Rapid detection of pathogenic Aspergillus species in avian samples by real-time PCR assay: A preliminary report. In E. Bergman (Ed.). *Proceedings of the 25th Annual Conference & Expo of the Association of Avian Veterinarians* (p. 37). New Orleans, LA, USA

Forbes NA (1992). Diagnosis of avian aspergillosis and treatment with itraconazole. *The Veterinary Record*. 130, 519520.

Habib MA, Abdu P, Kwanashie CN, Kabir J, Negedu A (2015). Isolation and identification of Aspergillus species from poultry feeds in Kaduna State, Nigeria. *Microbiology Research International* Vol. 3(2):27-32.

Hoppes S, Gurfield N, Flammer K., Colitz C Fisher P (2000). Mycotic keratitis in a blue-fronted Amazon parrot (Amazona aestiva). *Journal of Avian Medicine and Surgery*, 14: 185-189.

Jones MP, Orosz SE (2000).The diagnosis of aspergillosis in birds. Seminars in *Avian and Exotic Pet Medicine*, 9:52-58.

Kuldeep D, Mahesh M, Ruchi T, Shambhu DS, Deepak K, Shoorvir S, Prodeep MS (2011). Tuberculosis in Birds: Insights into *Mycobacterium avium* Infections; *Veterinary Medicine International.* Vol. 2011, Article ID 712369.

Mehmet A, Rifki H, Ziya I, Bans S and Racal T(2002). A case of *Aspergillosis* in Broiler Breeder flock. *Avian Diseases*. 46(2): 497 – 501.

Musa IW, Aliyu G, Ismail A (2014). *Aspergillosis* in broilers: Reports of 3 cases from a commercial and 2 Broiler Breeder farms in Zaria Nigeria. *International Journal of Current Microbiology and Applied Sc.* 3(6):932 – 938.

Oglesbee BL (1997). Mycotic diseases. In R.B. Altman (Ed.). *Avian Medicine and Surgery, 1st edi.* (pp. 323361). Philadelphia, PA: W.B. Saunders Company.

Pascal A, Simon T, Dongying W, Manjulla D, Guillaine L, Anais D, Francoise F, Adelaible N, Weiyittaung RC, Jacques G(2011). *Aspergillus fumigates* in Poultry. *International Journal of Microbiology.* Vol. 2011, Article ID 746356.

Phalen D.N. (2000). Respiratory medicine of cage and aviary birds. *Veterinary Clinics of North America: Exotic Animal Practice.* 3: 423-452

Vanderheyden N (1993). Aspergillosis in psittacine chicks In G. Jackson (Ed.). *Proceedings of the Annual Conference of the Association of Avian Veterinarians* (p. 207). Nashville, TN, US.