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Case Report

# Pathology of Avian Cholera in an African fish Eagle (*Haliaeetus vocifer*): Case Report

**Michael A Ockiya[1], Theophilus A Jarikre[2]* and John O Ajayi[3]**

[1]Department of Animal Science, Faculty of Agriculture, Niger-Delta University, Bayelsa, NIGERIA
[2]Department of Veterinary Pathology, Faculty of Veterinary Medicine, University of Ibadan, NIGERIA
[3]Federal College of Animal Health and Production Technology, Ibadan, NIGERIA

*Corresponding Author: get2theo@yahoo.com

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## Abstract

*This report describes the pathology of avian cholera in an adult female fish eagle (Haliaeetus vocifer) from a group of raptors captured from the wetlands of Brass about 100km radius on the Atlantic flyway in Bayelsa State, Nigeria. The diagnosis of avian cholera considered the clinical history, gross and microscopic lesions, cultural isolation and characterisation of Pasteurella multocida. The impact of avian cholera and other infectious diseases on raptor and migratory birds populations needs to be well monitored primarily for conservation purposes, disease transmission pattern and for control measures to be properly implemented in the capital entrusted poultry industry.*

**Keywords:** *Haliaeetus vocifer*, Diagnosis, *Pasteurella multocida*, Raptor

## Introduction

Aviary birds and raptors are now forming integral aspects conservation medicine that needed to be studied for poultry disease control, especially with the emergence of numerous raptor observatories (Samanta and Bandyopadhyay, 2017). This environment supports efficient short-range transmission of pathogens (Harris and Sleeman, 2007), and evidence shows that aviary birds are natural reservoirs and asymptomatically carriers of infectious pathogens (Kocan *et al.*, 1977, Deem *et al.*, 1998, Wendell *et al.*, 2002).

Infectious diseases like Fowl cholera are important in aviary birds and poultry because of its economic implication (Faddoul *et al.*, 1987, Morishita *et al.*, 1997, Driscoll *et al.*, 2004). However, the pathology of the disease in raptors has remained scanty. Avian cholera is of great importance because of the severe economic losses recorded in poultry (Christensen and Bisgaard, 2000), and morbidity it may pose to aviary birds. This report describes the diagnosis of avian cholera in a fish-eating eagle (*Haliaeetus vocifer).*

## Materials and Method

### Case History

An adult female fish eagle (*Haliaeetus vocifer),* was from a group of six (6) raptors and waterfowls captured (Plate A) for screening purposes from the wetlands of Brass about 100km radius on the Atlantic flyway in Bayelsa State, Nigeria with coordinates $4^0$18'54"N $6^0$14'30" E/ 4.31500$^0$N 6.24167$^0$E. The bird weighed 1.2kg, and has a wingspan of 1.1m and a body length of 42cm.

### Clinical, Pathological and Microbiological Examination

The eagle was taken into captive cage (Plate A) and monitored for a few days before it was observed to be very dull and weak, underweight and unable to fly. Cloacal and tracheal swabs were collected ante mortem. The animal died before any treatment could be initiated. The carcass was immediately packaged and referred for necropsy in the diagnostic laboratory. Impression smears of the liver and heart blood were made on glass slides for cytological examination after staining with Giemsa. Tissues of the lung, liver, spleen, heart, kidney and intestine were fixed, dehydrated, cleared and thoroughly processed for microscopic examination. Liver and heart samples were taken aseptically for inoculation into 5% ovine-blood agar plates for incubation at 37$^o$C and 24 hours duration.

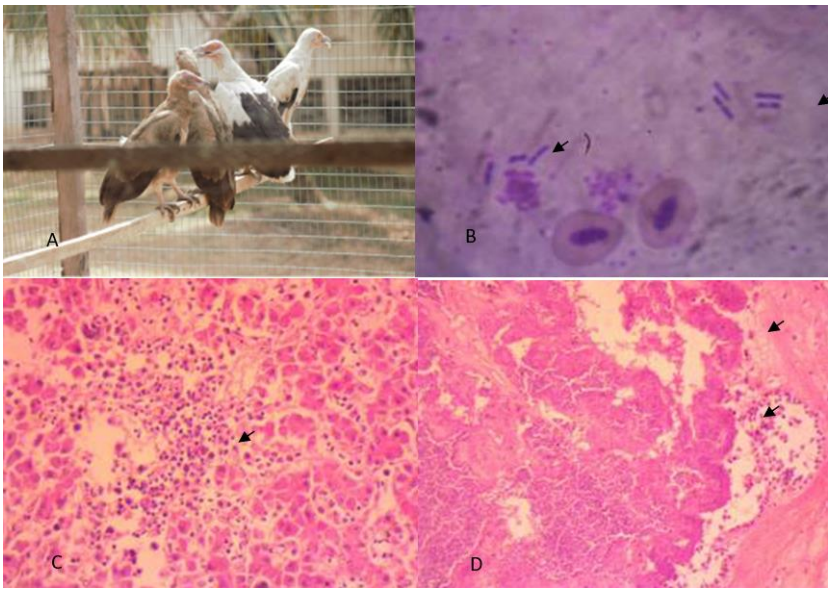
## Results and Discussion

Clinically, the bird showed neurologic signs including nystagmus and muscle tremors. Grossly, the eagle was emaciated, had prominent keel bones with loss of body and visceral fat at necropsy. The lungs were haemorrhagic, and the caudate lobes were firm and consolidated. The air sac (thoracic) was thickened and cloudy with deposits of fibrinous exudate. The liver was markedly enlarged with multiple pale to greyish foci and ecchymotic hemorrhages. The spleen was enlarged and congested. The pericardial cavity contained blood-tinged fluid, and there were a few pale foci on the myocardium. The endocardium was also haemorrhagic and there was vegetative growth on the heart valve. The kidneys were mottled with petechiae. There was a healing, penetrating wound on the distal left shank. The signs and lesions observed in this eagle are similar to those previously reported in birds that die acutely including waterfowl, cormorants, and penguins (Samanta and Bandyopadhyay, 2017). Cytologically, impression smears of the liver and heart blood revealed short bi-polar rods (Plate B) and numerous inflammatory cells comprising predominant population of heterophils, macrophages, and a few lymphocytes.

Histologically, the lung showed diffuse congestion of air capillaries, haemorrhage and inflammatory infiltrate in air spaces. There was multifocal coagulative hepatocellular necrosis, bacterial colonies, Kupffer cell hyperplasia and marked heterophilic infiltration (Plate C). The kidney showed patchy renal tubular epithelial necrosis, tubulorrhexis and foci of bacteria colonies. There was villi atrophy, loss of epithelium, cryptal necrosis and a few cellular infiltrates in propia and mucosa, with colonies of bacteria in the intestine. The spleen showed diffuse hyperplasia of macrophages and lymphocytes with bacteria emboli. There was massive heterophilic infiltrate in the heart valve, bacteria colonies and myofiber necrosis (Plate D). The lesions were also corroborated by findings of Christensen and Bisgaard (2000). The neural signs observed may be as a result of lesions in the brain. Morishita *et al.* (1997)

described hemorrhagic meningitis in an American Crow. Culturally, there was growth of bacterial colonies, non-hemolytic and gram-negative cocco-bacilli when stained with Grams stain (Holt *et al.*, 1994, Shivachandra *et al.*, 2006). The isolates reacted with indole, catalase, oxidase, nitrate, and fermented simple sugars. The biochemical characteristics of the bacteria was consistent with *Pasteurella multocida*, serotype A:1 (Rimler and Glisson 1997). Thus, confirmation of the agent was required for concise diagnosis of avian cholera (Rimler *et al.*, 1998, Shivachandra *et al.*, 2006), especially in poor resource setting. Nonetheless, genomic based methods are fast becoming reliable and quick for diagnosis (Blackall and Miflin, 2000; Townsend *et al.*, 2001, Shivachandra *et al.*, 2006). *P multocida* may also cause a variety of localized inflammatory lesions, involving the sinuses, joints, oviduct, middle ear, and other tissues (Morishita *et al.*, 1997).

This is an interesting report of avian cholera in a group of raptors captured from the wetlands for screening purposes. *P. multocida* is pathogenic to avian species (Wobeser, 1981) and mortality often involves multiple species of birds (Rimler and Glisson, 1997). The transmission pattern is typically horizontal (Okoh, 1980), and the spread of the pathogen in clinically ill birds has been considered an important source (Sehgal, 2010, Elmberg *et al.*, 2017, Khan *et al.*, 2019). However, their roles as potential carriers and spread of the pathogen cannot be overlooked.




**Plates - A)** The African fish eagle in cages. **B)** Impression smears of bacteria rods in heart blood (black arrows). Giemsa stain x1000. **C)** Liver- hepatocellular degeneration and necrosis, with heterophilic infiltrate (black arrow). **D)** Heart valve- endocardial necrosis, heterophilic cellular infiltrate and bacteria colonies (black arrows). HE x400

## Conclusion

In conclusion, the impact of avian cholera and other infectious diseases on raptor and migratory birds populations needs to be well monitored primarily for conservation purposes, disease transmission pattern and for control measures to be properly implemented in the capital entrusted poultry industry.

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## Conflict of Interests

There is no conflict of interest.

## Publisher Disclaimer

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