Therapeutic management of pigeon malaria with chloroquine: A case report

Meenu Manohar\textsuperscript{a}, Justin Davis. K.\textsuperscript{b*}, Shabana Sali\textsuperscript{a} and K. Vijayakumar\textsuperscript{d}

\textsuperscript{a}Research Scholar, Department of Veterinary Epidemiology and Preventive Medicine, College of Veterinary and animals Sciences, Mannuthy, Kerala Veterinary and Animal Sciences University
\textsuperscript{b}Assistant Professor, Department of Veterinary Epidemiology and Preventive Medicine, College of Veterinary and animals Sciences, Mannuthy, Kerala Veterinary and Animal Sciences University
\textsuperscript{c}Professor and Head, Department of Veterinary Epidemiology and Preventive Medicine, College of Veterinary and animals Sciences, Mannuthy, Kerala Veterinary and Animal Sciences University
\textsuperscript{d}Corresponding author: Justin Davis K. | email: justinpm@kvasu.ac.in

Co-authors: MM: meenusujatham@gmail.com ; SS: shabanasali96@gmail.com ; KV: vijayakumar@kvasu.ac.in

Received: 12-09-2020, Accepted: 23-09-2020, Published online: 18-10-2020

Abstract

An 8 month old Modena breed of pigeon presented to teaching veterinary clinical complex Mannuthy (TVCC) with the history of torticollis, anorexia, depression, inability to fly and two birds in the same flock were died due to same symptoms. On clinical examination bird appeared dull, depressed and circling of head showed. No visible ectoparasites could be detected on the detailed physical examination. Routine blood smear examination was done by taking blood from the peripheral wing vein and prepared thin blood smear. On blood smear examination characteristic halter shaped gametocytes were seen encircling the nucleus of erythrocytes. Faecal sample examination revealed the absence of intestinal parasites. Treatment was done with chloroquine @15mg per kg bodyweight in drinking water for two days along with the multivitamin supplementation. The whole flock in the house hold were treated with 2% permethrin spray by external application to control or eliminate the fly vector. After one week of the treatment reviewed the clinical condition of the bird. All signs suggesting of pigeon malaria were completely resolved, blood smear examination revealed no haemoparasites and the bird had an uneventful recovery. Pigeon malaria is considered as a fatal disease when there is a huge mortality occurred in a flock and hence the disease is getting less attention. Failure in the preventive measures to control the vector population or lack of better management practice in house kept pigeons leads to unnoticed cause of mortality due to pigeon malaria.

Keywords: Pigeon malaria, \textit{Haemoproteus columbae}, torticollis, chloroquine
Introduction

Pigeons are considered to be a major part of the Indian society and culture for several centuries. They are considered as the symbol of peace and love. Nowadays a wide variety of pigeon breeds are being reared as pet birds all over the world. Among the different diseases affecting the health of the pigeons, haemoparasitic infection plays a major role. The haemoprotozoan parasite, *Haemoproteus columbae*, is an important one that affects pigeons. The genus *Haemoproteus* includes a large number of intracellular protozoan parasites of birds distributed all over the world. It is the most common blood parasite that is commonly found birds.

The disease caused by *H. columbae* in pigeon is called as pigeon malaria or pseudo malaria that can become fatal in young pigeons. The vector responsible for the transmission of *H. columbae* is a haematophagous, Hippoboscid fly, *Pseudolynchia canariensis* (Bennett et al., 1993). Asexual development of the parasite occurs in the peripheral blood of birds and sexual development in the vector. This parasite is widely seen in the pigeons of tropical and subtropical regions. The disease can be diagnosed by blood smear examination and will be characterized by the presence of halter or crescent shaped gamonts in the erythrocytes partially encircling the nucleus of the host cell (Soulsby, 1982). The clinical signs of *H. columbae* infection include anorexia, lethargy, depression, dyspnoea, circling movement, and diarrhoea (Maharana and Kumar, 2016). The prevalence rate of *H. columbae* infection in pigeons is higher in Indian states like Kerala and Gujarat (Ravindran et al., 1999).

This current case report describes the clinical presentation of haemoproteus infection and successful therapeutic management in an 8-month-old Modena breed from a flock of pigeons.

History and Clinical Observations

An 8-month-old Modena female pigeon weighing 600g was presented to the Teaching Veterinary Clinical Complex (TVCC), Mannuthy, with the history of inappetence, dullness, torticollis, weakness, greenish diarrhoea (Figure 1) and inability to fly since one week. Two pigeons of the flock died few weeks ago with the same clinical symptoms. On clinical examination, frequent episodes of torticollis (Figure 2), ruffled feathers, and depressed behavior were observed. No ectoparasites could be seen on the entire body surface of the affected pigeon. From the history taken from the owner, presence of the fly vector *Pseudolynchia canariensis* in the cage was suspected. Thin blood smear was prepared from the blood sample collected from the peripheral wing vein. The prepared blood smear was stained with 1 in 10 dilution of Giemsa stain as per the standard protocol and examined for the presence of blood parasites (Soulsby, 1982). Feecal sample was collected for investigating the presence of intestinal parasites since the bird has greenish watery feaces.

Diagnosis and Treatment

On blood smear examination, intraerythrocytic gametocytes of *Haemoproteus columbae* could be detected (Figure 3). The organism appeared as elongated, ‘halter’ shape with light blue in colour and circumnuclear position in RBC. However, no parasitic ova could be detected.

---

*Figure 1*: Greenish Diarrhea in Pigeon  
*Figure 2*: Torticollis in affected pigeon  
*Figure 3*: A halter shaped gamonts of *H. Columbae*
from the faecal sample examination. From the history, clinical signs, and blood smear examination the disease was diagnosed as pigeon malaria caused by *Haemoproteus columbae*. The affected bird was treated with Chloroquine (Bayer Pharmaceuticals Pvt Ltd, India, Resochin 250mg Tablet) at the dose rate of 15 mg per kg bodyweight in drinking water for two days (Chloroquine) along with multivitamin supplements (Virbact Animal Health India Pvt Ltd, Vimeral Syrup 500ml (Vitamin A Palmitate 12,000 IU, Vitamin D3 6,000 IU, Vitamin E 48 mg, Vitamin B12 20 mcg)). Advised the owner to use, Flickout 100 ml spray (Beaphar, permethrin 2%) as external application in the whole flock and pigeons cage to control the vector. After one week of the therapy, blood smear was rechecked and confirmed the absence of organism. The pigeon recovered from all clinical illness and no more mortality occurred in the flock.

**Discussion**

Several species of parasites occur in pigeons throughout the globe (Paperna and Smallridge, 2002). *Haemoproteus columbae* is a haematozoan closely resembling the classical malarial parasite – Plasmodium, which causes pigeon malaria in domestic and wild pigeons. In columbids, seven species of Haemoproteus, *H.columbae*, *H. Sacharovi*, *H. maccallumi*, *H. melopeliae*, *H. turtur*, *H.perise*, and *H. palumbs* were identified. Most *H. columbae* infections in pigeons are asymptomatic and non-pathogenic, but young and immune-compromised pigeons might get seriously affected with the disease. Treatment is considered during fatal outbreak in a flock with high level of parasitaemia (Raval et al., 2016). Antimalarial drugs such as Chloroquine are useful in treating *Haemoproteus spp*. Infection. However, medications are not generally followed as the parasite is usually non-pathogenic (Ritchie, 1999).

Chand et al., (2018) conducted a study in two different flock of pigeons with chloroquine. They found the drug to be effective in the treatment of the pigeon malaria and helped in reducing the mortality in the flock without any recurrence. For the successful management of pigeon malaria in flocks, preventive measures should be strictly followed to control the fly vector. Application of the pesticides like 0.25% permethrin solution or 0.5% spray or 2% lotion externally, around the habitat of pigeon, and breeding sites of the vector helps in the elimination of the vector, thereby reducing the possibility of spreading the disease from one pigeon to another. Since the disease is found to be more fatal in young, immune-compromised, and stressed birds, care should be given in the feeding management and shelter which provide adequate balanced diet and peaceful, clean habitat, respectively.

The present study concludes that the early detection of the disease in a flock can reduce the mortality rate. In addition to that, the preventive measures that are adopted in a proper manner will help to control the occurrence of the disease.

**Authorship contribution statement**

**Meenu Manohar, Justin Davis, K., Shabana Sali and K. Vijayakumar**: Conceptualization, Methodology, Investigation, Writing - original draft, Writing - review & editing.

**Meenu Manohar.**, **Justin Davis. K.**, **Shabana Sali** and **K. Vijayakumar** - Conceptualization, Methodology, Investigation, Writing - original draft, Writing - review & editing.

**Acknowledgments**

We acknowledge KVASU for giving an opportunity to work in University veterinary hospital.

**Funding**

There is no substantial funding to be stated.

**Declaration of Competing Interest**

All authors declare that there exist no commercial or financial relationships that could, in any way, lead to a potential conflict of interest.

**Reference**

Bennett, G. F., Pierce M. A., Ashford, R. W. 1993. Avian haematozoa: mortality and pathogenicity. *J Nat Hist*. 27:993–100

Maharana, B. R and Kumar, B.2016. Pseudomalaria in a domestic pigeon: a case report. *J Parasitic Dis*. 1–3

N. Chand., Singh, H and Kumar, A.2018. Successful therapeutic management of pigeon (*Columba livia domestica*) malaria with Chloroquine. *Indian. J. Anim. Res.* 52: 326-327

Paperna, I and C. Smallridge. 2002. *Haemoproteus Columbae* Infection of Feral Pigeons in Singapore and Israel. *Raffles. Bull. Zool.* 50: 281-286.

Raval, S. H, Singh, R. D and Joshi, D. V. 2016. Management of *Haemoproteus columbae* infestation in White Fantail Pigeons. *Intas Polivet*.17:214–215

Ravindran R., Baby, P. G., Thachil, J. A and Varghese, C. G. 1999. A note on an outbreak of fatal pigeon malaria and its control. *Indian. J. Poult. Sci.* 34:403–404.

Ritchie, B. W. 1999. Avian Medicine: Principles and Application. HBD International.Inc. Delray Beach FL.

Soulsby, E. J. L. 1982. Helminths, arthropods and protozoa of domesticated animals. London: ELBS and Bellaire Tindall and Casaeld Ltd.; pp. 256–259.