CASE REPORT
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DIAGNOSIS AND THERAPEUTIC MANAGEMENT OF TRICHOMONOSIS IN AN AUSTRALIAN WHITE PIGEON

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ABSTRACT

Avian trichomonosis, caused by *Trichomonas gallinae*, a single-celled, pear-shaped protozoan, is often known as canker in doves and pigeons, and as frounce in raptors. A two-year-old Australian white pigeon presented to University Veterinary Hospital, Kokkala with a history of open mouth breathing, watery eyes, difficulty in maintaining balance for past one week. The case was diagnosed as trichomonosis based on the history, clinical signs, lesions, and identification of the organism on wet-mount preparation and stained smears of samples. The bird was successfully treated with metronidazole at the dose rate of 50 mg per kg body weight orally, twice daily for seven days.

Keywords: Trichomonosis, Canker, Australian white pigeon, *Trichomonas gallinae,* metronidazole

INTRODUCTION

Avian trichomonosis is an emerging disease of wild passerine birds, caused by *Trichomonas gallinae* (Speer and Powers, 2016). It is a flagellate protozoan with four anterior flagella and an undulating membrane on one side without posterior flagellum (Najem *et al.,* 2024). The disease in pigeons is commonly called trich, canker, avian oropharyngeal trichomonosis, trichomoniasis, roup and frounce in raptors (Gomez-Munoz *et al.,* 2018). Other birds such as domestic and wild turkeys, chickens, hawks, golden eagle, etc. may also become infected (Amin *et al.,* 2014). Trichomonosis is endemic to pigeon and dove species, with feral pigeon (*Columba livia domestica*) acting as the chief reservoir host (Doyle *et al.,* 2022) and regarded as the main cause for the global distribution of this protozoal infection (Peters *et al.,* 2020).

Trichomonosis has been documented to cause mortality in several species of raptors, especially in young birds that may be less immunologically competent (Willette *et al.,* 2009). It is primarily a disease of the upper digestive and respiratory tracts of columbiforms, raptors, psittaciforms, and a few other birds (Forrester and Foster, 2008). Clinical signs associated with avian trichomonosis are weight loss, ruffled feathers, loss of appetite, pendulous crop, vomiting, diarrhoea, dysphagia, increased thirst, inability to stand or to maintain balance, open-mouthed breathing, drooling, repeated swallowing movements and occasionally watery eyes (Clancy, 2019; Najem *et al.,* 2024). Nitroimidazole drugs such as metronidazole, carnidazole, and ronidazole are most commonly used to treat trichomonosis in birds (Tamileniyan *et al.,* 2023). The control of avian trichomonosis in wild as well as in captive birds are focused mainly on preventive measures (Collantes-Fernandez *et al.,* 2018).

CASE HISTORY AND OBSERVATIONS

A two-year-old Australian white pigeon was presented to University Veterinary Hospital, Kokkala with a history of open mouth breathing, watery eyes, difficulty in maintaining balance for past one week (Fig. 1. a. and b).

Fig. 1. a. Australian white pigeon presented with open mouth breathing, watery eyes and difficulty in maintaining balance

After proper restraining of the bird, physical examination revealed whitish spots on the left eye. Oral cavity examination revealed the presence of white flakes on the upper beak with foul odour (Fig. 2). Throat swabs were collected from the lesions using sterile moistened swab and checked for motile trophozoites within 30 minutes under a light microscope at 10x and 40x magnifications. Under light microscopy of freshly processed samples,

the trichomonads appeared as single, rapidly moving, translucent small flagellates (Fig. 3).

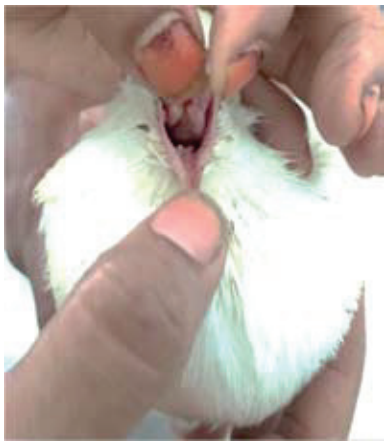

Fig. 2. Presence of white flakes on the upper beak with foul odour

Fig. 3. Trichomonads on wet mount preparation appeared as single, rapidly moving, translucent small flagellates on light microscopy (40x)

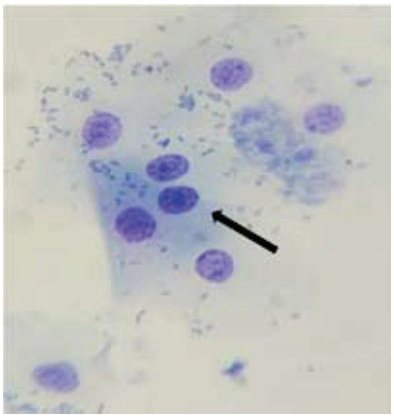

Fig. 4. *Trichomonas gallinae* appeared as pear-shaped bodies on field-stained smear (100x)

TREATMENT AND DISCUSSION

The differential diagnoses for trichomonosis, included fungal infections (candidiasis, aspergillosis), vitamin A deficiency, avian pox, and pseudomonas stomatitis (Willette *et al.,* 2009; Speer and Powers, 2016). In this case, avian trichomonosis was diagnosed based on history, clinical signs, lesions, and identification of the organism on wet-mount preparation and stained smears of samples. The bird was successfully treated with metronidazole at the dose rate of 50 mg per kg body weight orally, twice daily for seven days as described by Carpenter (2005). After seven days of treatment, the bird showed an uneventful recovery.

Trichomonas gallinae (previously known as *Cercomonas gallinae*) was the only trichomonad species pathogenic to birds, which was firstly reported by Rivolta in the year 1878. Flagellates found in a pigeon liver associated with caseous hepatitis was also called *Cercomonas hepaticum*. Later, both these species of Cercomonas were recognized as *T. gallinae* and were considered synonyms by Stabler in 1938 (Amin *et al.,* 2014). Taxonomically, *T. gallinae* is in the family *Trichomonadidae* (phylum Parabasalia, order Trichomonadida) and is closely related to several other parasitic flagellates of veterinary and medical importance,

including *Tritrichomonas foetus* in cattle, *Trichomonas phasiani* in game-farm pheasants, and *Trichomonas vaginalis* in humans (Forrester and Foster, 2008).

The transmission of infection in adult pigeons occur during courtship while raptors can be infected by consuming prey animals carrying the parasite. A wet environment seems to be generally required by trichomonad flagellates to persist in their motile form, so persistent drying of buildings and housing facilities following washing will enhance the control of a trichomonad infection (Amin *et al.,* 2014). The morbidity of the disease may be high with low to high mortality due to variable pathogenicity of the organisms. The most virulent strains are Jones' Barn (JB) strain followed by Kupferberg (TG) strain, and Lahore (YG) strain) (Abraham and Honigberg, 1964; Bulbul *et al.,* 2018). Only one trophozoite of the Jones' Barn strain is enough to develop the disease and cause death in pigeons in less than 15 days post-infection (Gomez-Munoz *et al.,* 2018). Recently, a novel mechanism of host cell damage known as trogocytosis (Greek: '*to nibble*') has been discovered in *T. gallinae* by Xiang *et al.* (2023). It's a cell-to-cell contact mechanism in the pathogenesis of protozoan parasites, involves a dynamic process dependent on actin polymerization, which can be impeded by inhibiting phosphoinositide-3-kinase (PI3K) pathway (Lis *et al.,* 2010).

The parasite inhabits the upper digestive tract, mainly the crop and oesophagus, but it may also infect the liver, lungs, air sacs, internal lining of the body, pancreas and bones and sinuses of the skull. Transmission of the disease occurs via oral secretions in feed and water, and crop milk (Forzan, 2010; Martinez *et al.,* 2024). The caseous accumulation in the throat and loss of body weight is the common characteristic of the disease. Lesions of avian trichomonosis are usually restricted to upper digestive system, including oropharyngeal cavity, oesophagus and crop (Gomez-Munoz *et al.,* 2018). The classical lesions are ulcerations of the oropharynx and upper gastrointestinal system (crop canker) and the infection is typically asymptomatic in pigeons and doves (Willette *et al.,* 2009). Wang *et al.* (2023) reported a characteristic pale yellow, cheese-like change in the oropharynx as the primary diagnostic indicator of avian trichomonosis. From the beak cavity, they may emit a foul to fishy smell (Brunthaler *et al.,* 2022). Anderson *et al.* (2010) reported ocular lesions such as periocular swelling, chemosis, oculonasal discharge, and respiratory compromise in birds with trichomonosis. In this case, our findings were in par with Anderson *et al.* (2010), Gomez-Munoz *et al.* (2018), Brunthaler *et al.* (2022) and Najem *et al.* (2024).

Direct microscopic observation of motile protozoa by wet mount preparation of fresh oropharyngeal or crop swabs is a reliable method of diagnosis (Redig and Cruz-Martinez, 2009; Mohamed *et al.,* 2023). Sample material can be obtained via swabbing the oral cavity for *T. gallinae*. Trichomonads appear as elongated, oval shapes, which move briskly (Amin *et al.,* 2014). Redig and Cruz-Martinez (2009) reviewed that, depending on the severity, trichomonads were very sensitive to metronidazole at the dose of 30-50 mg/kg daily for 3–5 days. Samour and Naldo (2003) recommended oral metronidazole at a higher dose of 100 mg/kg every 24 hours for 3 days. Gerhold (2019) reported that the drugs like carnidazole (10 mg/kg BW), metronidazole and dimetridazole (50 mg/kg BW, PO) for five to six days can be used successfully for trichomonosis in poultry. Strict sanitary compliance can greatly help in preventing the spread of infectious diseases in the flocks of pigeons (Santos *et al.,* 2020). If an outbreak of trichomonosis is documented or suspected, feeders and waterers should be removed for nearly two weeks and cleaned with a 10 per cent bleach solution (Gerhold, 2019).

SUMMARY

A two-year-old Australian white pigeon presented with a history of open mouth breathing, watery eyes, difficulty in maintaining balance for past one week was diagnosed with trichomonosis and was successfully treated with metronidazole at the dose rate of 50 mg per kg body weight orally, twice daily for seven days. Prompt diagnosis, treatment and eliminating the sources of infection is one of the methods to control trichomonosis in captive birds.

Conflict of interest

The authors declare that they have no conflict of interest.

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