FATAL *SYNGAMUS TRACHEA* INFECTION IN CHICKENS IN JOS, NORTH CENTRAL NIGERIA: A CASE REPORT

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ABSTRACT

Postmortem examination of chickens from a semi-intensive system was carried out following complaint of high mortality, loss of weight, sneezing and raising of heads and gaping. The farm had other types of birds which were also evaluated to ascertain their risk of transmission of Syngamus trachea. Lesions seen included anaemia, hyperemia of the trachea containing forked red warms (S. trachea), congested and haemorrhagic lungs and presence of Raillietina tetragona in the small intestine. Histologically, there was necrotizing trachiesis, pulmonary congestion and haemorrhages. To the best of the authors' knowledge, this is the first case report of S. trachea in Jos, North Central Nigeria.

Keywords: *Syngamus trachea*, Chicken, Case report, Pathology, Jos, Nigeria

INTRODUCTION

Poultry is the second most important income generating business for households in Nigeria and it has been estimated that more than 80 % of the poultry population of the world is found in traditional family-based poultry production system (Sonaiya *et al*., 1999; Alabi *et al*., 2006). In these traditional settings, semi intensive system is usually practiced, allowing the birds to scavenge around in the day time on earthworms, household refuse, insects, residues from the harvest but gather at night in prepared chicken barns, perch on trees, verandas or stores (Guèye, 2000; Ekue *et al*., 2002). Most of these rural family poultry production systems use the indigenous or local types of chicken and sometimes their crosses with exotic breeds and are therefore maintained with low inputs (Guèye, 2000).

Syngamus trachea (Montagu 1811) is a nematode affecting the respiratory system of birds. It is also called "red worm", "forked worms" or "gape worms" because of their obvious colour, males joined to the female in permanent copulation and clinical manifestation of gasping respectively (Saif *et al.,* 2008). Recovery of gapeworm, emaciation and pale

carcass, nodule, inflammation, congestion and bloody exudates in the trachea were documented as gross findings in syngamiasis (Clapham, 1935; Nevarez *et al*., 2002; Narayanan *et al*., 2014; Manjunatha *et al*., 2017; de Paula *et al*., 2018). Microscopically, marked inflammatory reactions with leucocytes infiltrations into the mucosa, occasionally giant cells, and fibrosis around nodular lesion had been reported in *S. trachea* infection in birds (Clapham, 1935; Narayanan *et al*., 2014). The type of housing system for birds has been reported to determine the level of infection by helminths; with semi intensive system providing a favourable environment for high worm infection resulting to high worm burden (Poulsen *et al.,* 2000; Phiri *et al*., 2007; Vieira *et al*., 2015). Many wild birds may act as reservoirs of the parasite and transmission of *S. trachea* between wild and domestic hosts has been demonstrated (Fernando and Barta, 2008).

CASE PRESENTATION

The study was carried out between July and October 2019 in a farm located within the University of Jos Senior Staff Quarters, Bauchi Road, Jos Plateau State. The birds were bought at day-old from commercial hatchery and brooded in a wooden cage during which they were vaccinated against Gumboro and Newcastle diseases. At six weeks old, the birds were allowed to scavenge within the compound which was fenced with wires. Within the compound, there were different species of birds, including geese, pigeons, guinea fowl and turkeys of different ages. These birds shared common feeders and drinkers and were usually fed with commercial feed, maize or even maize bran depending on what was available. There were about 120 birds apart from the pigeons, and they were treated against mites by dipping in acaricide solution several weeks earlier. The chickens were however observed to be losing weight, sneezing and raising heads up and gaping. Two of the chickens which were eight weeks old died four days following the observation of the aforementioned clinical signs. Three days later, four more chickens died and the six carcasses were all submitted for post mortem examination.

Post Mortem Examination: Six fresh and severely emaciated carcasses were submitted at two different occasions from the same compound for post mortem examination. They all had severe mite infestation and moderately pale combs and wattles (anaemia). The tracheae were hyperemic (5/6) and they contained moderate amount of blood tinged mucus with forked red worms (Figure 1 a – d). The lungs were moderately congested (5/6), moderate fibrin exudation (4/6), locally extensive ecchymotic haemorrhages (4/6) and oedematous (6/6). There was presence of worms in the duodenum down to the ileum (4/6) which were identified as *Raillietina tetragona*.

Intestinal content from birds posted and feacal samples from different birds in the compound collected randomly were examined by modified floatation technique of Dryden *et al.* (2005) and the outcome presented on Table 1. Adult *S. trachea*, eggs of *S. trachea* and *Raillietina tetragon*a were identified (Permin and Hansen, 1998; Butboonchoo *et al.,* 2016) and presented in Figure 2 a – d.

Histopathological Findings: The lungs were severely oedematous and haemorrhagic (Figure 3 a – d). There were also marked infiltrations of inflammatory cells throughout the lung parenchyma. The tracheal mucosa had necrotic debris mixed with inflammatory cells. The epithelium showed necrotic cilia while the submucosa had numerous inflammatory cellular infiltrates.

DISCUSSION

The gross findings such as emaciation, anaemia, congestion of lungs, presence of red worms and hyperemic trachea observed in this study were similar to those reported by Stadler and Carpenter (1996) Fernando and Barta (2008) and Abraham *et al*. (2010).

Figure 1: Pictures taken at post mortem showing A: Severely cachexic chicken carcass. B: Congested, haemorrhagic and oedematous lungs with necrotic areas. C and D: presence of red forked worms within the trachea containing mucoid material

Table 1: Helminths from other sampled birds from the compound

Birds	Helminth eggs	Number of birds Infected
Guinea fowl	*Syngamus trachea*	3
Geese	*Raillietina tetragona*	2
	Ascaridia galli	1
Pigeon	*Capillaria columbae*	3
	Ascaridia galli	5
	Capillaria retusa	4
	Capillaria annulata	5
	Strongyle egg	1
Turkey	*S. trachea*	3
	Ascaridia galli	2
	Capillaria annulata	2
Duck	*Railietina tetragona*	3
Total		34

These were likely due to the irritation caused by the mechanical damage by worms in the trachea leading to stress and inflammatory associated response. Emaciation and paleness of the carcasses occasioned by syngamosis were partly adduced to the blood sucking ability of the worms (Moynihan and Musfeldt, 1950; Narayanan *et al*., 2014; de Paula *et al*., 2018). The severe decrease in weight of chickens may partly also be attributed to decrease in nutritional status of birds as a result of inappetence and or reduced feed consumption (Herbert *et al.,* 2009). The parasite mass in the trachea may lead to asphyxiation which may culminate into the death of the birds as observed in this study and this corroborates earlier findings on syngamosis (Clapham, 1935). Microscopically, necrosis of the respiratory epithelium of the trachea, necrotic debris mixed with inflammatory cells, severe inflammatory cells infiltration into the submucosa of the

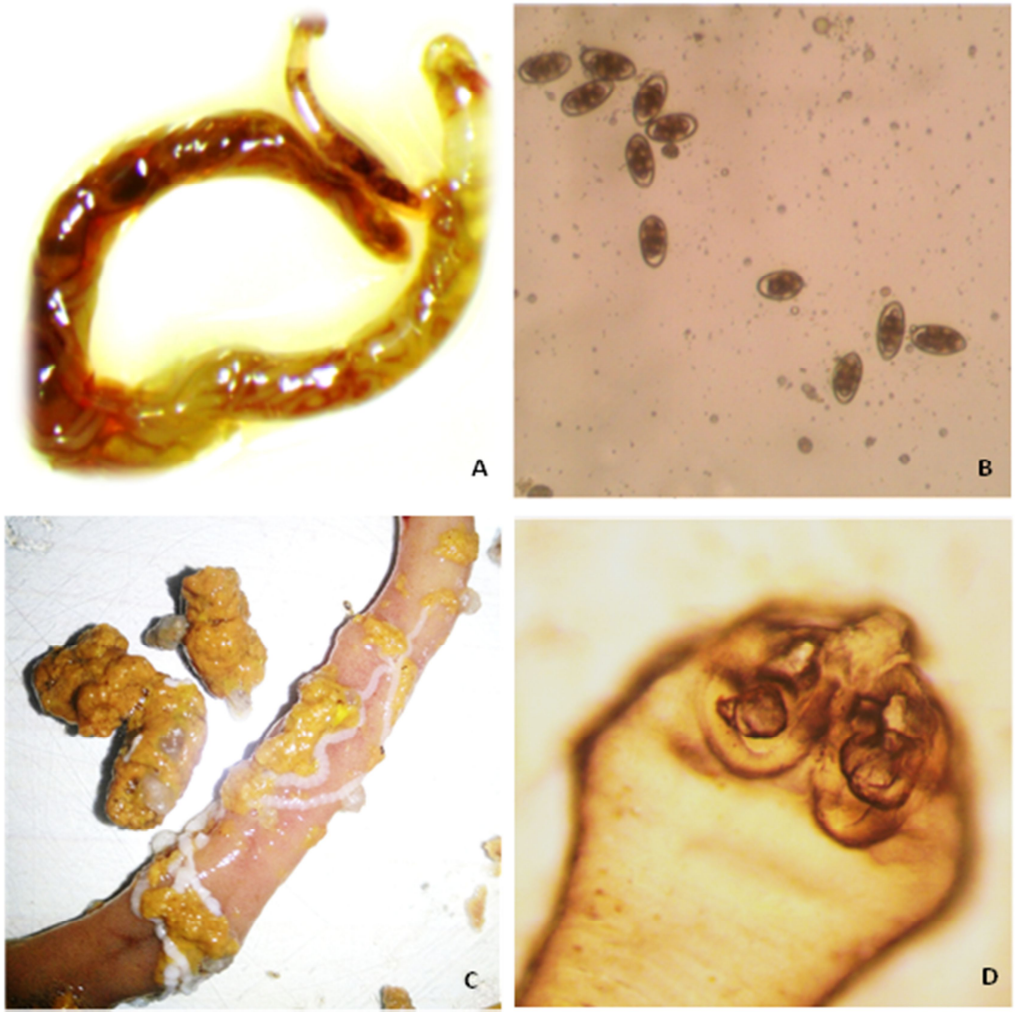

Figure 2: A: Adult *S. trachea,* B: Eggs of *S. trachea.* C and D: *Raillietina tetragona.* Mag. x 400

trachea, and severe vascular congestion in the lungs observed in this study are in tandem with the reports of Narayanan *et al*. (2014). The recorded lesions in the trachea may be as a result of the irritation caused by the parasites presence as earlier documented (de Paula *et al*., 2018). The reduced feed consumption by the birds may have led to compromised immune system, consequently resulting in the increased lodgments of the parasites on the tracheal wall (Fernando and Barta, 2008). The examination of fecal samples from the other birds in the compound was to establish the likely risk of transmission of *S. trachea* between the birds and domestic chickens. However, all the pigeons sampled did not reveal the presence of *S. trachea* eggs, indicating low risk of serving as carriers of the parasite. Doneley (2006) indicated that the common worms found in pigeons are *Ascaridia* spp. *and Capillaria* spp. and these were similar to the findings of this study. Only the turkeys and guinea fowl had *S. trachea* eggs but did not show clinical manifestations (implying they could be reservoir of the parasite and possible source of infection to the chickens). A survey by Fatunmbi and Olufemi (1982) identified helminth eggs/or oocyst of *Heterakis* spp*., Capillaria* spp*., Dispharynx (Acuria)* spp*., Prostogonimus* spp. and *Hymenolepis* spp. in the gastro-intestine of guinea fowls in Ibadan, Nigeria, while Fabiyi and Offiong (1979), reported a clinical disease of *S. trachea* in the same species of birds.

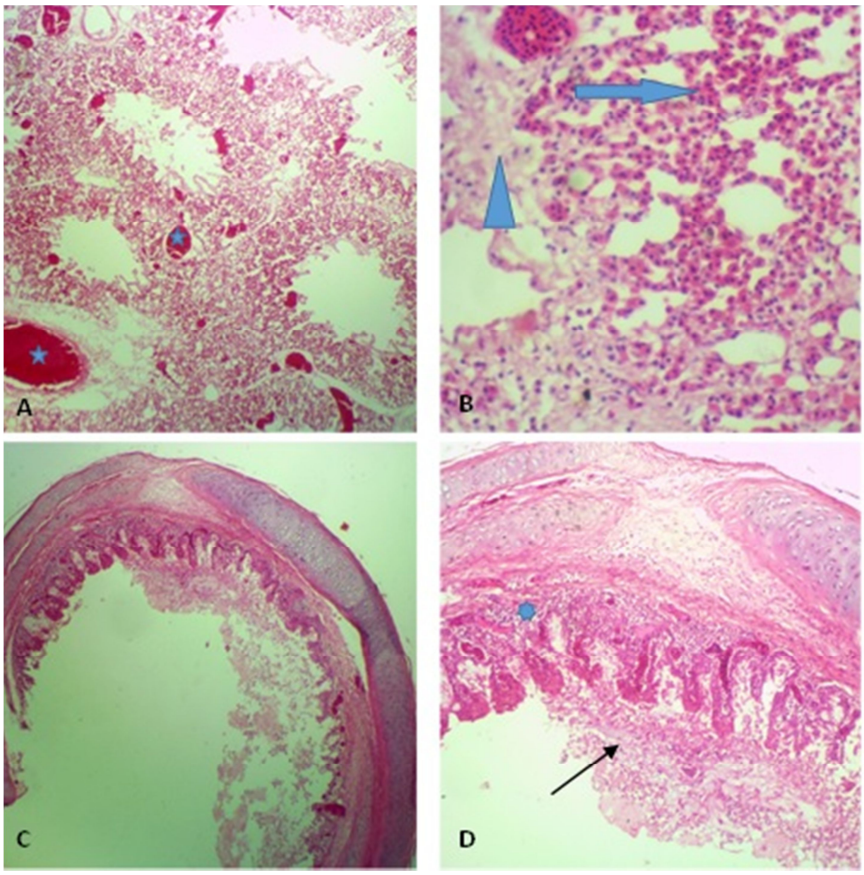

Figure 3: Representative photomicrograph of chicken: A and B: Lungs showing severely congested blood vessels (star), haemorrhages (arrow) and edema (arrow head) [×4 and ×10 objective lens respectively]. C and B: Trachea showing epithelial necrosis (black arrow) and inflammatory cellular infiltrates (asterisk) in the submucosa (×4 and ×10 objective lens respectively). H & E Mag. x 400

This shows that chickens are more susceptible to *S. trachea* infection than turkeys and guinea fowl. Although birds in the compound fed from the same feeding troughs, pigeons, ducks and geese did not seem to harbor *S. trachea.*

Conclusion: This study described for the very first time, cases of fatal *S. trachea* in local Nigerian chickens kept together with other birds in Jos, North Central Nigeria. We also found that *S. trachea* is more pathogenic to local chickens compared to other birds. High mortality recorded in the flock may be as a result of asphyxia occasioned by the mass of the parasite in the trachea of the affected birds. Based on these findings, it was concluded that raring local chickens together with other birds may increase the risk for *S. trachea* infection, especially where the birds are infected with no clinical signs.

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