Concurrent infections of *Ascaridia* and *Raillietina*-induced mortality in poultry chicken– a case report

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ABSTRACT

A dead poultry hen carcass with a history of decreased appetite with chronic loss of weight was presented for necropsy. During postmortem creamy-white cylindrical worms were found in the cluster which almost occluded the lumen of the small intestine. Few fine ribbon-like segmented organisms attached with the intestine mucosa were also observed. On the basis of morphological examination of these parasites it was found that the cylindrical parasites belonged to genus *Ascaridia* and the segmented organisms to genus *Raillietina*. Further microscopy-based examination of the intestinal content revealed the presence of characteristic eggs of *Ascaridia* sp. It was concluded that the co-infection with these parasites may cause serious fatality in poultry birds.

Keywords: Poultry; parasites, *Ascaridia*; *Raillietina*; infection; mortality

INTRODUCTION

Since the dawn of human civilization, man has been using various species of poultry birds for meat and eggs. Initially poultry birds were mainly reared as backyard farming practices. But now a days advance and intensive rearing methods not only fulfill the meat and egg demand but also contribute to the economy and livelihood of poor and marginal farmers. Among all the livestock sectors, the poultry sector is the fastest-growing sector and contributes 15.87 per cent share in GDP of India from the agricultural sector (http://statisticstimes.com/economy/sectorwise-gdp-contribution-of-india.php). So it is necessary to give more emphasis on modern poultry rearing practices for doubling the farmers' income.

Lack of proper and effective management is often the main constraint in developing the poultry sector. Particularly poor hygienic measures increase the incidence of parasitic diseases in any farm as parasitic diseases are mainly present in the clinical and subclinical infections (Belete et al 2016). These parasitic infections leach out the profit of the farm in a significant way through increased mortality and morbidity as well as result in poor productivity in terms of either decreased egg laying in layers or higher feed conversion ratios in meat birds (Puttalakshmamma et al 2008).

In subclinical infections of parasitic diseases generally poultry appears apparently healthy and usually the ongoing infection goes unnoticed by the farmers that eventually leads to poor growth performance, emaciation, weakness, poor feed conversion ratio, obstruction of the digestive tract etc (Katoch et al 2012, Belete et al 2016). The high parasitic burden in the intestine and with their usual attachment to the intestinal mucosa lead to pathological lesions in gastrointestinal tract (Brar et al 2016) and makes less surface area available for the digestion and absorption of feeds (Permin and Hansen 1998). Also competitive scavenging of nutrients by the parasites leads to great economic loss in terms of poor growth and productivity. Infections with *Ascaridia galli* can limit the ability to absorb and utilize nutrients in infected birds which then reduces the growth rates as reported by Das et al (2010).

Under a compromised immune system, the chronic subclinical infection often gets converted into clinical infection later and ultimately into the death of the host. In the present case report co-infection of genera *Ascaridia* and *Raillietina* was detected based on the morphological appearance of these parasites. Further routine microscopic examination of the intestinal content revealed the presence of *Ascaridia* sp eggs.

MATERIAL and METHODS

Live roundworms and tapeworms were collected from the small intestine of naturally infected chicken during postmortem. The specimens were flattened and fixed in 10 per cent buffered hot formalin for gross and microscopic studies. The identification of roundworms and tapeworms was based on the morphology as per the existing identification keys. The morphological characters used for distinguishing roundworm were typically cylindrical and elongated in shape with tapering end colourless or creamy white body with translucent cuticles and for tapeworm speciation included differences in the size and shape of the scolex, morphology of the rostellum (armed with either a single row or double rows of hooks), suckers (armed or unarmed), the position (unilateral or irregularly alternating), number of genital pores per segment and the number of the eggs within an egg capsule in gravid proglottids (Schmidt 1986, Yamaguti 1959, Khalil et al 2006). Also a routine microscopic examination was carried out for detecting the presence of parasitic eggs/ova from the recovered intestinal content.

RESULTS and DISCUSSION

A dead poultry hen carcass with a history of decreased appetite with chronic loss of weight was presented for necropsy to the Department of Veterinary Pathology, Faculty of Veterinary and Animal Sciences, Rajiv Gandhi South Campus, Banaras Hindu University, Mirzapur, Uttar Pradesh. External examination during postmortem revealed that the carcass of the poultry was emaciated with prominent keel bone and the visible mucous membrane was pale. The internal examination revealed the pale subcutaneous fascia and atrophied breast muscles with keel bone were prominent on the primary incision. After the opening of the abdominal cavity it was also noticed that liver parenchyma was mild congested but there were no significant pathological lesions on air sacs.

Pathological lesions were significantly found in gastrointestinal system. The serosal surface of intestine was congested with slight bulging of the intestine and congested ova were recorded. Creamy white cylindrical worms which were present in cluster almost occluded the lumen of the small intestine when lumen was exposed (Brar et al 2016). Few ribbon-like segmented organisms were also observed.

Both the parasites as well as intestinal content were collected in 10 per cent buffered formalin for diagnosis of these suspected parasite species and for the presence of the parasitic eggs in the collected faeces respectively by microscopic examination. Based on the morphological examination of eggs and parasites under the binocular microscope with 4X and 10X objective piece it was found that cylindrical organism belonged to genus *Ascaridia* as shown in Plate 1(A) and the ribbon-like segmented organism belonged to genus *Raillietina* [Plates 1(B), 1(C)].

Adults of *Ascaridia galli* were found in the small intestine in a cluster. These can cause clinical signs like diarrhea, anaemia, marked emaciation and retarded growth (Bhatia et al 2018). *A galli* infection can lead to lower production of meat and eggs and a high degree of worm can cause intestinal haemorrhages, higher mortality and anaemia and may exacerbate other existing conditions (Norton and Ruff 2003). Direct losses in hens are observed when the intestinal tract is obstructed and damaged due to high worm loads (Sharma et al 2019). Similar studies in case of adult *Raillietina* spp reported their presence from the jejunum and ileum of the definitive host and the parasite may result in the reduced growth, emaciation, weakness and digestive tract obstruction (Permin and Hansen 1998). The larval stages (cysticercoids) of *Raillietina* spp were reported from various invertebrate intermediate hosts such as ants, beetles, small mini-wasps or termites (Holstad et al 1984, Alenyorege et al 2011). Compliance with strict biosecurity measures can help prevent parasite infections from being spread across the farms.

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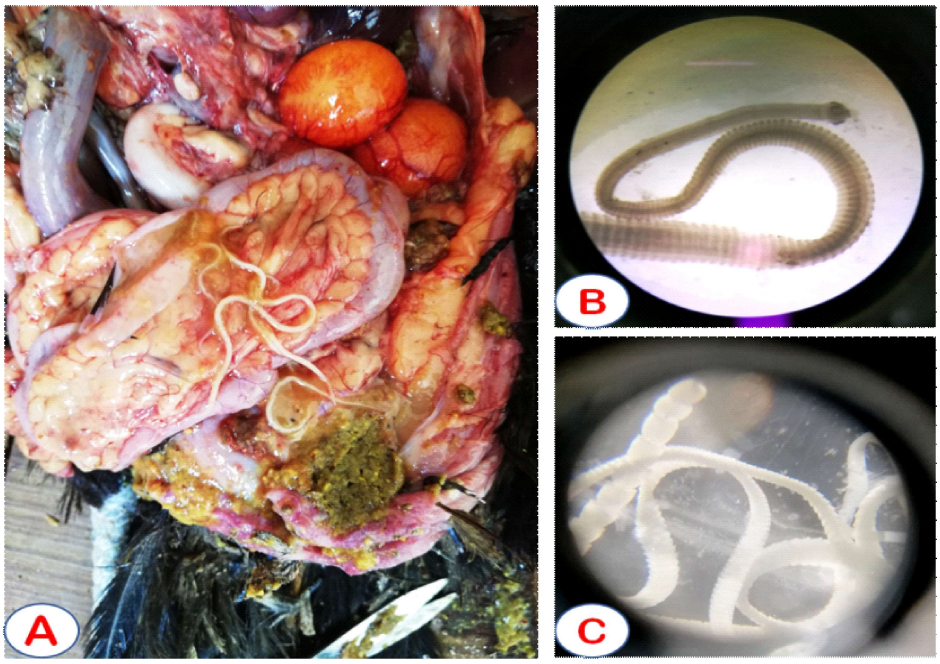

Plate 1. (A) Cylindrical organism *Ascaridia* sp, (B) Rostellum of *Raillietina* sp having four circular or broadly oval suckers, (C) Gravids proglottids separated in middle having small windows

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