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Concomitant occurrence of *Histomonas meleagridis* and *Heterakis gallinarum* infection in backyard chicken

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Abstract
A native chicken carcass was presented with the history of diarrhoea, wing paralysis, emaciation, dull and depression followed by death. At necropsy, the bird revealed enlargement, congestion and diffused greenish yellow necrotic foci on liver. Haemorrhages were noticed in the follicles of proventriculus. Gizzard revealed erosion and congestion. Caecal core consisting necrotic debris and diphtheritic materials covered with thickened wall was noticed. Raised, congested and diffused pale or white necrotic foci were noticed on the kidney and spleen. Parasitological examination of intestinal contents revealed *Heterakis gallinarum* and *Raillietina sps*. Caecal mucosal scrapings and liver impressions showed the presence of amoeboid form of *Histomonas meleagridis.* High mortality in poultry due to diseases causing severe economic loss to the farmers but early diagnosis and use of proper therapeutic measures with improved managemental cares can save the birds.

Keywords: *Histomonas meleagridis*, *Heterakis gallinarum*, backyard chicken, clinical signs, gross lesion

Introduction
Histomoniasis is an important parasitic infection in poultry caused by a flagellated protozoan *Histomonas meleagridis*. It has been widely reported in European countries and Asia in chicken. Histomoniasis was reported in broilers in Malaysia (Ganapathy *et al*., 2000) [8] and broiler breeders in India (Banerjee *et al.*, 2006; Patra *et al*., 2013) [2, 14]. Histomoniasis also called as blackhead disease, infectious enterohepatitis and typhlohepatitis (Clarke, 2017) [4]. Blackhead disease is a misnomer for cyanotic head, but actually this lesion is neither pathognomonic nor common. So, the preferred terminology used as histomoniasis according to standardized nomenclature of animal parasitic diseases.

H. meleagridis infectionis frequently noticed in turkeys, but other gallinaceous birds such as chickens, pheasants and peafowls are also equally susceptible (Clarke *et al.*, 2017) [4]. This disease can be minimized by preventing the spread of parasite in chickens. Though the fatal form of histomoniasis occurs in chickens (Eveleth, 1943) [7], the benign form seen more frequently and recovered after infestation. But, the lesions are similar to lesions in turkeys dying due to histomoniasis. Chickens are readily infected with blackhead disease and suffer severe caecal lesions and morbidity (McDougald, 2005) [13]. Histomoniasis did not cause high mortality in poultry, but results high morbidity, reduced performance and more economic losses (Esquenet *et al*., 2003) [6].

The histomoniasis commonly occurs in chickens, especially in breeders and free-range flocks (Dolka *et al*., 2015; Hess *et al*., 2015) [5, 10]. The recovered birds can act as carriers for the disease. The chicken, guinea fowl, chukar partridges and pheasants affected with cecal worms may act as reservoir for histomonad infections (Bleyen *et al*., 2010; Lund and Chute, 1972) [3, 12]. *H. meleagridis* can be diagnosed by examination of caecal mucosal scrapings or liver impressions (McDougald, 2005) [13]. *Raillietina* spp. typically inhabits the small intestine of poultry, causing reduced growth, emaciation, weakness, digestive tract obstruction, mucoid diarrhoea, and significant production losses (Latif, 2001) [11].

Very few reports are available on the co-occurrence of *H. meleagridis*, *H. gallinarum* and *Raillietina* spp. infection in chickens, hence the case is reported.

Materials and Methods

A backyard female chicken of about 8 months old was brought with a history of diarrhoea, wing paralysis, emaciation, dull and depression followed by death. There are about 24 birds out of 100 birds died within two weeks of period. The backyard chicken carcass was referred for post mortem examination. After thorough examination, samples like intestinal contents, caecal mucosal scrapings and liver impressions were collected for parasitological examination.

Results and Discussion

Externally, the carcass revealed emaciation and vent pasting with faecal material is agreed to the findings of earlier workers (Dolka *et al*., 2015) [5]. The liver showed enlargement, congestion and diffused greenish yellow necrotic foci of about 1 cm size (Figure 1). Presence of multiple necrotic foci in the liver indicates progress of massive damage. The lungs revealed moderate congestion. Haemorrhages in the follicles of proventriculus observed in this case are in agreement with earlier reports **(**Welter, 1960) [16]. This proventriculus lesion attributed to direct migration of histomonads. The gizzard revealed moderate congestion and erosion. The caeca were distended and its lumen contained necrotic debris and diphtheritic materials with thickening of walls. The gross lesions noticed in the liver and caeca of this study is in agreement with previous reports (Stokholm *et al.*, 2010; Patra *et al.*, 2013) [15, 14]. Kidney and spleen showed enlargement, congestion and diffused pale or white necrotic foci of the current study is similar to the findings of Dolka *et al.* (2015) [5]. The intestinal contents revealed the presence of *Raillietina* spp. characterized by scolex and gravid segments in this study corroborated with the earlier reports (Latif, 2001) [11]. The caecal contents revealed the presence of *Heterakis gallinarum* with features of small, white colour and cylindrical shape as reported earlier (Abdullah *et al*., 2021) [1]. Caecal mucosal scrapings and liver impressions showed the presence of amoeboid form of *H. meleagridis* with clear outer ectoplasm and inner granular endoplasm as described by previous workers (Grafl *et al.*, 2015) [9].

Fig 1: The liver showing enlargement, congestion and diffuse greenish yellow multiple necrotic foci on the surfaces

Conclusion

Prevalence of parasitic infection in backyard chicken is mainly due to poor management, malnutrition and lack of deworming practices. The chickens, turkeys and game birds can be protected against histomoniasis by adopting better management, prophylaxis and therapeutic strategies. The warmth and moisture environment favours greater transmission of parasitic infestation. High mortality in poultry due to diseases posing severe economic loss to the farmers could be mitigated by early diagnosis and subsequent use of proper therapeutic measures.

Conflict of Interest

Not available

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