A new report on the occurrence of clinico-histopathological diagnostic criteria for *Spinodiplotriaena*

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Abstract Parasitic diseases of wild birds follows its companion volume, infectious diseases of wild birds, both of which complement the third edition of infectious diseases of wild mammals and second edition of parasitic diseases of wild mammals. In October 2012, a mature black male mynah with lack of balance and ataxia was brought into the birds department of educational hospital in veterinary medicine faculty of Tehran University. Because of no cure in clinical signs after several days of empirical therapy euthanasia and clinical pathology studies were performed. There was no microscopic pathological lesions in brain, bone marrow, heart, lung, liver and the microscopic results were as following; bone marrow: hemophagocytosis reactive macrophages, liver: infiltration of inflammatory cells (hepatitis) and hemosiderin-laden macrophages. Lung: hemosiderin-laden macrophages and spleen findings: infiltration of inflammatory cells, heterophils with phagocytic bacteria. In abdominal cavity two male and one female parasite was detect. Three parasites

were cleared with lactophenol and investigated under the light microscopy and important morphological parts of them measured. Also these parasites in serum containing send to the department of parasitology. Based on all collecting data, *Spinodiplotriaena* (three parasites each by the length of 2/5, 1/7 and 1/5 cm were found) were diagnosed. Report of this case is important because of first report of this infection in a black mynah in Iran.

Keywords Mynah · *Spinodiplotriaena* · Pathology · Parasitology

Diplotriaena are nematodes in *Diplotriaenidae* family that infected thoracic and abdominal air sacs of different species (Anderson 1992; Macwhirtwr 1994). *Spinodiplotriaena* is one of Species in this family. *Spinodiplotriaena* has been reported in body cavity of the common mynah birds, *Acridotheres trisris*, in India (Gibbons 2010). Infections of *Diplotriaena* (*Diplotriaenidae* family) worms are reported in majority places of the world. The first emergence was reported in house sparrows, crows, thrushes, grackles, and Java sparrows in England and India (Keymer 1982). Different species are reported in North, Center and West of America (Canaris and Gardner 2002) and caused diseases in central nervous system, diarrhea, weight and appetite loss (Bockheim and Congdon 2001). *Diplotriaena* are very close to the species from *Filaria*, are found in abdominal area of different birds (Morgan and Waller 1940). Borji is reported first *Diplotriaena* of mynah in Mashad, Tehran (Hassan and Jamshid 2011). Richard et al's studies (Richard et al. 1980) showed that that is passing pulmonary vessel and entering air sacs. This takes place in host body 1 month after infection (Richard et al. 1980). The common Indian mynah (*Acridotherestrictis*), the members

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of starling family, is one of the aboriginal species in Asia. It is from Sturnidae family, *Acridotheres* kind and *Acridotheres tristis* species. They can better harmonize with the outside area and so called as Farmers Friend. This bird because of eating inserts intermediate host of helminth parasites is susceptible to helminthic infections including arthropod borne helminthic infections viz., cestodes and some nematodes. Emergence of *Diplotrriaena* infection was reported in Iran, India, Kazakhstan to Malaysia and China (Taipan 2010). The aim of study was to histopathological and cytopathological evaluation of *Spinodiplotrriaena Urmilii*.

Case presentation

Our case was a mature black male mynah with indefinite age that brought to birds department of educational hospital in veterinary medicine faculty of Tehran University in February 2012. That was alone and not kept with any birds. His owner had not awareness about any contact with wild birds and his food was mostly ready plate grain (Pars grain), fruits and vegetables. That was good until clinical signs included lack of balance and ataxia, wings vibration, periodic convulsions and periodic movement of feet were presented. According to these data first differential diagnosis was tuberculosis and that was rejected after some investigation, so mineral materials deficiency was proposed. For 1 week, it was treated with Enrofloxacin Antibiotic and for 3 weeks by multi-vitamin, vitamin E, D3 and A. After these empirical treatment and no changes clinical signs, euthanasia was performed and the bird was necropsied. In gross microscopic vision, in abdominal cavity, three parasites (two males and one female) each by the length of 2/5, 1/7 and 1/5 cm were found. These parasites in serum containing send to the department parasitology.

In the tissue samples taken from brain, bone marrow, heart, lung and liver, there were no pathological lesions except Hepatitis. Tuberculosis was less possible after negative result of while ziehl-neelsen staining. Blood sampling to evaluate Calcium, Iron, and other mineral materials was performed and there no abnormal parameter indicated. Glass slides related to clinical pathology studies were prepared by smear, touch and Giemsa staining method and results were as follows; bone marrow: hemophagocytosis reactive macrophages. Liver: infiltration of inflammatory cells (hepatitis) and hemosiderin-laden macrophages. Lung: hemosiderin-laden macrophages and spleen findings: infiltration of inflammatory cells and heterophils with phagocytic bacteria. Based on all collecting data, *Spinodiplotrriaena* were diagnosed. Report of this case

is important because of first report of this infection in a black-myna in Iran. Further work is necessary to identify the different species of *Diplotrriaenidae* family present in Iran.

Routine examinations were made of the entire alimentary tract, respiratory system, liver, heart, kidney and reproductive tract as follows. The nematodes, removed and washed by water and a number of nematodes, were cleared in lactophenol for identification and then stored in 70 % alcohol containing 5 % glycerin for parasitological examination. The nematodes that were collected in this case were identified as *Spinodiplotrriaena urmilii*, based on the trident, spines and characteristic features that is adopted from Gibbons (2010). In our specimens, cuticle of parasite covered in small spines. Chitinous trident was noted on each side of cephalic region. Mouth simple without lips. Oesophagus was long, not divided. Male: male nematode has caudal alae and five pairs papillae. Spicules were unequal, dissimilar. Left spicule was longer than right spicule. Left spicule was 1.8–2.5 mm long and right spicule measured 0.60–0.70 mm in length. Female: tail absent, vulva located at anterior part of body, lateral to head region uterus filled with eggs (Fig. 1).

After doing necropsy and clinical pathology studies, there was no macroscopic pathological lesion in brain, bone marrow, heart, lung, liver except hepatitis. The microscopic results were not specific for any diagnosis and some evidence in favor of inflammation was proposed. Studies on parasites under the light microscopy and investigation of important morphological parts of parasites demonstrated *Spinodiplotrriaena* as diagnose. *Diplotrriaena* life cycle is beginning from ovum containing larvae exchange from infected birds through faeces mites in soil. After releasing first stage larvae, it could infect locust by eating the larvae which is intermediate host. Larvae cause cavities in fatty tissue of insect and replaces in different organs. After 4 days again if molting cuticle of first stage larvae Tums to 2nd stage larvae. After 8 days sheds cuticle of 2nd stage larvae Tums to 3rd stage larvae which is infective to in intermediate host definitive host (tit) by eating infected locust contains 3rd stage larvae. When the birds eat the locust infected with larvae releases into the tits gut the third stage larvae invades intestine migrate to liver through the bile duct where molting 3rd stage cuticle and Tums to fourth stage larvae then larva migrates to heart through portal vena then goes to aerial sac through blood where worm become adult male and female after mating released ova through aerial sac goes to upper respiratory form where swallowed ova goes to digestive tract exchange by defecation of tit sin adult stage occurs in aerial sac causes respiration difficulty which might ends to death of host or early caught by predator (Moradi 1999).

Fig. 1 Micrograph of *Spinodiplotriaeana* (male and female, part terminal, body, head). Parasites each by the length of 2/5, 1/7 and 1/5 cm

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