Occurrence of *Gnathostoma spinigerum* in a leopard cat from Wayanad Wildlife Sanctuary, Kerala

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Abstract The post-mortem examination of a leopard cat from Wayanad Wildlife Sanctuary, Kerala, died in a road accident, revealed presence of gastric tumours containing worms which were identified as *Gnathostoma spinigerum* based on morphological characteristics.

Keywords *Gnathostoma spinigerum* · Leopard cat · Kerala

Introduction

Gnathostoma spinigerum Owen 1836, a spiruroid nematode, occurs in the stomach of cat, dog and various wild carnivores which feed on a variety of mammals, reptiles, amphibians and aquatic prey that serve as second intermediate and/or paratenic hosts. In a latest survey conducted on parasitic infection of the wild animals in Kerala by Easwaran et al. (2003), the presence of *Toxocara canis*, *Echinococcus granulosus* and *Taenia* spp. was reported in leopard cat. However, they did not come across *G. spinigerum*. In this communication the occurrence of *G. spinigerum* in a free ranging leopard cat from Wayanad Wildlife Sanctuary of Kerala state is reported.

Materials and methods

During the month of December, 2012 a pre-adult leopard cat, died in a road accident, was presented for post-mortem at the Centre for Wildlife Studies, Kerala Veterinary and Animal Science University, Pookode, Wayanad. On post-mortem examination, three creamy white thick walled tumours of four centimetres diameter were found on the serosal surface of fundic region of stomach (Fig. 1). Diaphragm and left kidney were found ruptured. There was no other post-mortem lesion. Two tumours were incised and the worms were collected, processed in ascending grades of alcohol, cleared with creosote and identified (Soulsby 1982). The third tumour was preserved as such in 10 % formalin for display in the laboratory.

Results and discussion

Three adult worms were obtained from one tumour and four from the other. On microscopic examination, male worms showed two large raised lips, a prominent head bulb having seven transverse rows of backwardly directed hooklets and four submedian cavities or ballonets (Fig. 2). The male worm measured 19.4 mm in length. The width at the junction of oesophagus-intestine was 1.2 mm. Large spines were present in the anterior two-third of the body and small spines in the posterior end of the male worm. The posterior end of the male worm showed two unequal spicules and four pairs of large papillae (Fig. 3). The left spicule was longer measuring 1.3 mm in length than the right spicule (0.49 mm). Based on the various morphological features, the worms were identified as *Gnathostoma spinigerum* Owen 1836.

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Fig. 1 Stomach of leopard cat, serosal surface showing tumours (arrows)

Fig. 2 Anterior end of *G. spinigerum* showing head bulb and lips (arrows)

It has been found that wild animals are adapted to parasites so that diseases do not occur under natural condition unless they are stressed (Gairola 1986). The occurrence of gnathostomosis in captive wild animals including tiger (*Panthera tigris*) from tiger reserve or zoological parks of Assam, Madhya Pradesh and Chennai was previously reported (Arora and Prasad 1989; Nashiruddullah and Chakraborty 2001; Jeya Thilakan et al. 2007; Shrivastav et al. 2011). Based on the available literature, the present communication forms the first report of the occurrence of *G. spinigerum* in leopard cat from Kerala.

Infection due to this parasite shows clinical signs of digestive disorders like gastritis, diarrhoea and later results in gastric tumours in carnivores. However, in heavy

Fig. 3 Posterior end of *G. spinigerum* (male worm) showing spicules and papillae (arrows)

infections the rupture of tumour may lead to fatal peritonitis (Soulsby 1982). Histopathological study of the lesions in stomach wall of cat and dog infected with *G. spinigerum* showed granulomatous reaction and coagulative necrosis (Nayak and Rao 1972; Ramachandraan et al. 1985). Borthakur et al. (2012) observed the evidence of a malignant fibrous mesothelioma, a hitherto unrecorded condition. In the present case, the rupture of diaphragm and kidney was responsible for the death of the animal.

Usually the number of tumours in stomach is restricted to one and rarely two or more (Miyazaki 1960). Accordingly three tumours recorded in the present report can be considered as a rare occurrence. As per the available information, one *Gnathostoma* tumour might bear up to nine worms while in the present study only 3–4 worms were recovered from larger tumours of 4 cm diameter. Even smaller nodules of 1 and 2 cm diameter in a tigress and a dog accommodating four and five worms were reported by Jeya Thilakan et al. (2007) and Borthakur et al. (2012) respectively. Such variation in tumour size and number of parasites present in them was reported earlier in different animals. But Shrivastav et al. (2011) revealed numerous nodules in the pyloric part of the stomach packed with worms in a free-range tigress, quite contrary to the present case. It is presumed from the present observation that even a few parasites in their early stage congregated at the selected site of attachment can cause intense irritation with the help of lips with tooth-like armatures, powerful hooklets on head bulb and the extensive cuticular spines on the body which might have induced the formation of tumour as protective cover to the worms.

Gnathostomosis is a zoonotic disease as it causes larva migrans in humans and has recently been recognised as an emerging cause of eosinophilic encephalomyelitis in man (Diaz 2010). Moreover, ocular gnathostomosis was reported from different states of India like Meghalaya and Assam (Barua et al. 2007), Maharashtra (Sujata and Renu 2013), West Bengal (Basak et al. 2004), Odisha (Tiwari et al. 2009), Tamil Nadu (Sucilathangam et al. 2013), Pondicherry (Rao et al. 1999) as well as Kerala (Mathews et al. 2011; Pillai et al. 2012). In addition, the first case of cutaneous manifestation of *Gnathostoma* sp. was recently reported in a lady from Manipur (Mukherjee et al. 2012). Hence the present report of occurrence of *G. spinigerum* in leopard cat from Kerala is of great importance in the backdrop of the occurrence human ocular gnathostomosis from the same state. More attention is needed towards the study on the epidemiology of this infection in man and animals for instituting preventive measures.

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