A rare case of verminous pneumonia in domestic rabbit

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Abstract A 3-year-old female rabbit housed in 98 Mob Fd Vet Hospital/Farm at Charri, Himachal Pradesh, was found dead without showing any clinical signs. At necropsy, one foetus was recovered from the uterus of the animal. The histopathological examination showed presence of a very large number of ova and larvae of *Protostrongylus* sp. in the alveolar spaces in the lungs. Severe verminous pneumonia, a condition which is rarely reported in farm/domestic rabbit, led to the death of the animal.

Keywords *Protostrongylus* sp. · Verminous pneumonia · Farm rabbit

Round worm infections are rare in domestic rabbits but occasionally encountered in wild rabbits (Patton et al. 2008). Among round worms, pinworms are usually found but in rare cases lungworms of the genus *Protostrongylus* have been encountered in rabbits (Patton et al. 2008; Srivastava 1940). Many species of this genus are found to occur in bronchioles of rabbits and hares including *Protostrongylus boughtoni* and *Protostrongylus pulmonalis*. The life cycle of this parasite is indirect as require snail as an intermediate host and infection usually occurs by oral

ingestion of infective larvae. In some of the reports, lungworms were not found to infect rabbits even when they were grazed in common pastures with infected sheep (Saulai and Cabaret 1998). Infections caused by lungworms in rabbits are generally asymptomatic (Soulsby 1982).

A 3-year-old female rabbit housed in 98 Mob Fd Vet Hospital/Farm at Charri, Himachal Pradesh, was found dead without showing any clinical signs. The detailed post-mortem examination was carried out, and the representative tissue pieces of various internal organs like lungs, heart, liver and kidneys were collected in 10% neutral buffered formalin. After proper fixation, tissues were further processed for routine histopathological examination by protocol given by Luna (1968). The sections of 4–5 µm thickness were obtained by microtome and then stained with haematoxylin and eosin staining as per standard procedure (Luna 1968). The slides were examined under light microscope at a magnification of 10× and 40×. Then random fields from different sections were examined for evaluation of pathological changes.

The animal was found dead without showing any obvious clinical signs. The body condition of the carcass was good. The visible mucus membranes appeared cyanotic. The liver was congested and spleen appeared slightly enlarged. The stomach was partly filled with ingesta. The intestines showed congested mucosal capillaries. One foetus was also recovered from the uterus of the animal. On histopathological examination, the lungs showed presence of numerous ova (Fig. 1) and larvae (Fig. 2) of the parasite *Protostrongylus* sp. in the alveolar spaces. The adjacent lung parenchyma showed marked interstitial thickening along with infiltration of inflammatory exudate comprising mainly of mononuclear cells and fibrin at certain places. Similar kind of findings in lungs in *Protostrongylus* sp.

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Fig. 1 Lung: Completely packed alveolar spaces with *Protostrongylus* sp. ova and larvae (arrows). H & E $\times 40$

Fig. 2 Lung: Completely packed alveolar spaces with *Protostrongylus* sp. ova and larvae (arrows). H & E $\times 100$

infection was earlier reported in mountain and brown hares from Finland (Laakkonen et al. 2006).

In an experimental study, domestic rabbits (*Oryctolagus cuniculus domesticus*) were infected with 3rd stage larvae of lung worms and patent infection was found to occur 28 days post-infection (Kralka and Samuel 1984). Normally, the adults inhabit the bronchi of lagomorphs and found to produce eggs which hatch in lungs and release

first stage larvae. The larvae migrate in the bronchi and then are coughed up, swallowed and passed in faeces. The first stage larvae then enter the intermediate host (small land snails, e.g. *Vallonia pulchella*) and develop to infective third-stage larvae. Third-stage larvae enter lagomorphs via the ingestion of infected snails. Based upon histopathological findings, it can be concluded that the intense load of ova and larvae in lung tissue has compromised the gas exchange capacities of lung and might be the cause of death in rabbit. The present report puts on record a rare case of verminous pneumonia due to *Protostrongylus* sp. in a farm rabbit.

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Compliance with ethical standards

Conflict of interest All the authors do not have any conflict of interest.

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