

Case reports

Tongue worm (*Pentastomida*) infection in ball pythons (*Python regius*) – a case report

Remigiusz Gałęcki¹, Rajmund Sokół¹, Agnieszka Dudek²

¹Department of Parasitology and Invasive Diseases, Faculty of Veterinary Medicine, University of Warmia and Mazury, ul. Oczapowskiego 13, 10-719 Olsztyn, Poland

²Department of Animal Anatomy, Faculty of Veterinary Medicine, University of Warmia and Mazury, ul. Oczapowskiego 13, 10-719 Olsztyn, Poland

Corresponding Author: Rajmund Sokół; e-mail: rajmund.sokol@uwm.edu.pl

ABSTRACT. Tongue worms (*Pentastomida*) are endoparasites causing pentastomiasis, an invasive disease representing a threat to exotic animals and humans. Animals acquire infection via the alimentary tract. In reptiles, the parasite is present in the lungs, resulting in symptoms from the respiratory system. Pentastomiasis may be asymptomatic, but non-specific symptoms may occur at high parasite concentrations. Due to the harmful effects of many antiparasitic substances, tongue worm invasion in reptiles remains not fully treatable. Although pentastomiasis is rarely diagnosed in Poland, pentastomids were diagnosed in two ball pythons, who were patients of the “Poliklinika Weterynaryjna” veterinary clinic. They demonstrated problems with the respiratory system and a significant deterioration of health. Fenbendazole at a dose of 100 mg/kg b.w., repeated after 7 days was shown to be effective.

Key words: *Pentastomida*, pentastomiasis, reptiles, zoonosis, treatment

Introduction

Tongue worms are members of the Crustacea subphylum and the *Pentastomida* subclass, and are obligatory endoparasites of carnivorous reptiles, comprising 90% of all pentastomid species, as well as fish, amphibians, birds and mammals. Although pentastomids commonly occur on all continents, they are most problematic in the tropical zones. In veterinary medicine, *Armilifer* spp., *Linguatula* spp., *Porocephalus* spp., *Raillietiella* spp. play the greatest role. The typically parasitize the lungs and liver, with infection occurring after the consumption of intermediate hosts, which are mammals or insects. The parasites represent a serious threat in both wild animals and exotic animals kept in terrariums [1,2]. *Pentastomida* cause pentastomiasis, a zoonotic disease hazardous to humans [3,4].

They have a distinctive tongue/conical-shaped body measuring 2–13mm, which is constructed from ring-form segments, the number of which is used to classify the organism into a species. A

sucking-type mouth is surrounded by four attachment organs composed of pockets, hooks and specialized locomotory muscles; again, differences in the structure of the mouth and adhesive organs allow the individual organism to be assigned to a species [5]. The cuticle of some species is covered with a dense network of chitinous spikes. At the end of the body is an anus [6]. Pentastomids feed on blood and mucus, and can survive for up to two years in a host.

Clinical signs of pentastomiasis are not observed at low tongue worm concentrations unless the health of the host is compromised. A number of non-specific symptoms may occur: coughing up mucus or blood, increased body temperature, pain in the chest, rapid breathing and lung inflammation. In humans, sneezing, itching in the throat and ears have also been observed, and a significant threat is posed by wandering invasive forms reaching unusual localizations, such as the eyes. Suitable diagnostic methods for identifying pentastomiasis is by direct laryngeal smear, in which *Pentastomida*

eggs may be detected, or by the use of X-rays. In asymptomatic carriers, the parasite may be detected in the course of autopsy.

Tongue worms are dioecious, with females being larger than males. During coughing, developmental forms of pentastomids pass with the mucus through the trachea to the throat, and enter the alimentary tract. Eggs are excreted in faeces to the environment and enter the intermediate hosts such as small mammals, via the fecal-oral route. The shells of the eggs are digested in the stomach, causing the release of the larval stage (nymph).

After passing through the pylorus, the larvae perforate the wall of the small intestine. The nymph has two or three pairs of legs, allowing movement around the host body. Eventually, it arrives in the lungs, liver and muscles and undergoes encystation. In the cyst, the parasite molts several times, finally emerging in its adult form. The final host becomes infected with tongue worms after eating the intermediate host. In the stomach, the cyst is digested and the adult form crawls to the lungs [6,7].

Case presentation

Two ball pythons (*Python regius*) aged five months were admitted to the Poliklinika Weterynaryjna veterinary clinic at the Faculty of Veterinary Medicine in Olsztyn. Snakes were purchased from professional breeders, and they were in good health. Before purchase, the snakes had been fed with mice originating directly from a breeder; however, the feed was changed to rats intended for feeding reptiles after purchase. The temperature in the terrarium was 33°C, relative humidity 75%, the ground was coconut fiber.

In both snakes, respiratory failure and severe inflammation of the respiratory system were observed. Further examination revealed substantial anemia and decreased breath rate, the reptiles were apathetic and reluctant to eat. A mucopurulent outflow was observed from the upper respiratory tract and thick, stretching mucus in the mouth. One patient presented phlegm the color of blood. Swabs were collected from the mouth, upper respiratory tract and cloaca; smears were then made on glass slides and analyzed under a light microscope at $\times 200$ magnification. In both cases, morphotic elements of blood and eggs sized $119.54\mu\text{m} \times 113.71\mu\text{m}$ were detected in the swabs from the mouths and larynx, which were identified as developmental forms of tongue worms [8]. In

addition, single oocysts were identified in a cloacal swab from one of the snakes.

The clinic was recommended to isolate the infected individuals, and to follow hygiene practices in handling reptiles. All equipment to operate the terrarium was disinfected with 10% formalin solution. For treatment of pentastomiasis, fenbendazole was applied *per os* in a dose of 100mg/kg b.w., repeated after seven days. A diagnostic mouth swab was taken one week after the first administration of the drug, wherein only lymphocytes were found. Following treatment, the patient's condition improved, the symptoms from respiratory system subsided and no developmental forms of the parasite were found in the swabs.

Discussion

Pentastomida spp. pose a serious threat to people and exotic animals held in captivity. Animals may be asymptomatic carriers of endoparasites which can cause an uncontrolled spread of tongue worms. During intense invasion, pentastomiasis is a threat to the health and life of animals [9]. Exotic animals imported from abroad and animals kept in zoos should be screened the presence of pentastomids. Reptiles are potential vectors of tongue worms into new environments.

Few reports exist regarding the efficacy of treating pentastomiasis [10,11]. Although it has been reported that ivermectin is an effective means of controlling pentastomids, the drug can lead to shock and death in reptiles [12]. After parasite death, the surrounding tissue becomes inflamed by the host immune response and further inflammatory processes lead to calcification of the affected area [13]. For the period of pentastomiasis treatment, anti-inflammatory drugs should not be given, as they may interfere with the process of calcification of parasites in the lungs. In addition to treating the animal to destroy any invasive forms, the vivarium should also be disinfected. An epidemiological investigation should be performed to determine whether the animal became infected while breeding or due to the supplied feed.

All food provided for the animal should be obtained from a safe source. Treatment of reptile pentastomiasis and other parasitoses should be managed by veterinarians with experience in working with exotic animals. In Poland, cases of reptile pentastomiasis are rarely reported and its occurrence in the natural environment has not been

studied. Correct hygiene and preventive measures should always be observed when working with infected animals. As pentastomiasis is considered a zoonosis, sick animals should be kept apart from humans and other animals [14,15]. The faeces of infected animals should be considered infectious material and destroyed as medical waste. The veterinarian has a duty to make breeders aware of the possible hazards and to ensure the safety of humans and animals.

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