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Nasal hirudiniasis caused by *Tyranobdella rex* leeches in mithun *(Bos frontalis)* from northeast India: First case report in literature

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Abstract

Leech is a hematophagous external parasite that in rare circumstances, may invade the nasal cavities (nasal hirudiniasis) and extend into the nearby structures leading to airway obstruction and serious morbidity. Mithun *(Bos frontalis)* is a rare bovine species of northeast India and aquatic leeches frequently gain entrance into the mouth or nasal cavity of mithun when it drinks contaminated water in the forests. In the past, cases of hirudiniasis have been encountered in mithun but published reports on identification of leeches are not available. In this report, we represented a case of nasal hirudiniasis in a farmed mithun from Nagaland state of northeast India, caused by bilateral infestation of eight live leeches. All the leeches were dark brown in color, segmented and 4-6 inches long. Molecular identification, based on analysis of mitochondrial cytochrome c oxidase sub-unit I (COI), showed that they belonged to aquatic leech *Tyranobdella rex* with 87.46% homology. To the authors' knowledge, this is the first confirmed report of nasal hirudiniasis of mithun due to *Tyranobdella rex* in literature.

Key words: Mithun; Nasal hirudiniasis; *Tyranobdella rex*

Leech is a fearsome external parasite that often invades the skin (external hirudiniasis) but in rare circumstances, may attach to mucous membranes of the nasal cavity, vagina and rectum (internal hirudiniasis) (Narayan *et al.*, 2017; Bahmani *et al.,* 2013). It is a hematophagous and segmented hermaphrodite with anterior and posterior suckers that belongs to the phylum Annelida and class Hirudinea (Rajaei *et al.,* 2014). Leech is mainly found in freshwaters (aquatic leech) while few species live on land (terrestrial leech). The most important species of aquatic leeches include *Limnatis, Tyrannobdella, Dinobdella, Myxobdella, Praobdella* and *Pintobdella*. *Tyrannobdella rex* is unique in possessing only one jaw with eight large teeth (Phillips *et al.,* 2010). Though leech infestation is not common in animals, the toxic species of leeches could infest all livestock animals such as cattle, buffalo, goat, sheep, pig and horse (Bahmani *et al.,* 2014).

Mithun *(Bos frontalis)* is an endangered bovid from northeast (NE) India which is often reared as a semi-domesticated animal in rain forests of hilly areas at 1000-3000 metres under free-range system (Mukherjee *et al.,* 2019). Besides northeastern states of India such as Nagaland, Arunachal Pradesh, Mizoram and Manipur, this meat animal is also found in China, Bangladesh, Myanmar and Bhutan (Shisode *et al.,* 2009). Like other domestic and wild animals, mithun is also at a high risk for internal hirudiniasis when they drink from leech-infested water bodies in the forests and it is one of the major health problems for mithun in the hills of NE India (Bam *et al.*, 2015). To the authors' knowledge, this is the first report of naturally occurring intranasal *Tyranobdella rex* leech infestation in mithun.

Case History and Clinical Observations

A 3-year old male mithun from Mithun Farm of ICAR-National Research Centre on Mithun in Medziphema (25.76°N, 93.87°E; 360 m above sea level), Nagaland state of NE India province, was found to be dull (Fig. 1) with difficulty in drinking water. History revealed recent introduction of mithun in farm stock, normal rectal temperature (101.2 °F), pink conjunctiva, occasional epistaxis with no gross abnormalities of nostrils and protrusion of a dark fleshy mass out of left nostril each time mithun attempted to drink water. It was, therefore, suspected to be a case of nasal hirudiniasis, however after initial examination of the nasal cavity, no intranasal leeches could be observed. Finally, wait-and-watch approach was followed where repeated nasal irrigation confirmed bilateral presence of live leeches, as their anterior ends began to protrude through the nostrils. The mithun was resuscitated by injecting normal

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Fig. 1. Dull and depressed leech-infested mithun

Fig. 2. Freshly detached live leeches (8 in number) from nasal cavities of mithun

Fig. 3. Detached nasal leeches fixed in 70 % ethanol (8 in number)

saline solution in 5 ml aliquots into the nasal cavity and pulling and removing the leeches by thumb forceps. The procedure was repeated until all eight live leeches were removed (Fig. 2).

Morphological and molecular description of leeches

Morphological identification of leech is often difficult due to changes in its shape and surface structure. In the present case, all the leeches were segmented and dark brown in color measuring about 4-6 inches in length (Fig. 3). For molecular identification, the leech samples were submitted to Zoological Survey of India, Kolkata where based on nucleotides sequence of mitochondrial cytochrome c oxidase sub-unit I (COI), they were identified as aquatic leeches *Tyranobdella rex* (87.46% homology; accession number MT1362a).

Discussion

Leech infestation is not commonly reported as a cause of many problems in animals and humans; however, sporadic reports of hirudiniasis are available in humans and animals (Bahmani *et al.*, 2012). Mithun is a unique bovine species which forms an integral part

of the indigenous tribes of NE India. From ancient times, mithuns are reared in the hilly forests under traditional free-range system and thus, mithuns travel long distances in the forests in search of feed and water (Vikram *et al.*, 2021). The leeches may infest mithun while grazing or drinking water and this system of rearing mithun in the forest ecosystem may be attributed to high susceptibility of mithun to aquatic leech infestation, especially nasal hirudiniasis. Most often nasal leech infestation in livestock species occurs due to drinking contaminated water from ponds, springs, streams, etc. (Shisode *et al.*, 2009; Bahmani *et al.*, 2014). In the present case, investigations revealed that before its introduction in the farm, this mithun was a free-range animal which used to drink water from a pond that had leeches.

This report and previous reports clearly suggest that contaminated water with leeches is the main source of nasal hirudiniasis. Leeches have a potent chemical receiver that helps them to invade the nasal and oral cavities as soon as the animal attempts to drink water (Bahmani *et al.*, 2014). Therefore, a prudent way to prevent nasal hirudiniasis in mithuns is by bringing them under semi-intensive system and adopting scientific practices of rearing.

Tyrannobdella rex (known species) is a newly identified parasitic leech from mithun tracts of NE India and it has not been reported earlier. These results clearly demonstrate that the new species belongs to a global family of aquatic leeches, all of which feed on the mucous membranes and thus, pose a great threat to mithun health in NE India.

Conflict of interest

The authors declare that they have no conflict of interest.

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