Occurrence of human sparganosis in Kerala

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Abstract Human sparganosis is a rare zoonotic disease caused by the larval stages of *Spirometra* sp. A seven cm worm recovered from a painful swelling in the right inguinal region of a 9 year old boy from Kunnampulam in Thrissur District, Kerala was identified as sparganum based on morphology. This is the first case report of the disease from Kerala state. Possible mode of infection and control measures are suggested. Increased public awareness about risks associated with drinking contaminated water is important to prevent further incidence in the locality.

Keywords Kerala · Sparganosis · *Spirometra* sp. · Occurrence

Introduction

Sparganum is the third stage larva (plerocercoid) of the pseudophyllidean tape worm of the genus *Spirometra*. Dogs and cats are the natural hosts of *Spirometra* sp. in which the adult worms occur in the small intestine. The eggs passed out along with feces contaminate water sources and the first stage larva (coracidium) enters in cyclops (copepods) to form proceroid. The third stage larva (plerocercoid-sparganum) develops in frogs, snakes and other animals on ingestion of copepods along with water. Man is an accidental host for sparganum (Sousby 1982). Human infection is

widely prevalent in many Asian countries including Japan, Korea and China due to certain peculiar habits and practices such as eating raw meat and application of frog flesh as poultice on sores especially in the eye (Duggal et al. 2011; Nithiuthai et al. 2004). Sparganosis in India has been rarely recorded (Nithiuthai et al. 2004; Sundaram et al. 2003). This is the first case reported from Kerala.

Materials and methods

A 9 year old boy suffering from a painful swelling of the right inguinal region and irregular fever since 3 weeks was admitted to Unity Hospital, Kunnampulam in Thrissur District in March 2013. Clinical examination revealed multiple nodular swellings on vertical and horizontal chain of inguinal lymph nodes, along with lymphadenopathy of iliac lymph nodes. Ultrasonography confirmed the presence of significantly enlarged right iliac and inguinal nodes, inflammatory changes of mesentery in right iliac fossa with enlarged mesenteric nodes. Surgical intervention revealed oedematous subcutaneous tissue with friable lymph nodes. An elongate, whitish, actively motile stage recovered (Fig. 1) from the tissue was carefully transferred to normal saline and sent to the Department of Veterinary Parasitology, College of Veterinary & Animal Sciences, Mannuthy, Thrissur for identification. The lymph nodes were removed and sent for histopathology. The patient made an uneventful recovery.

Results and discussion

The specimen measured seven cm in length and had a width of 2.5 mm. It was motile and consisted of an

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Fig. 1 Sparganum being recovered during surgery

invaginated head end and an elongated body comprising of pseudo segments. The specimen was placed in saline for a day and this resulted in digestion of much of the pseudo-segments and the embryo inside was oval (Fig. 2) measuring $250 \times 200 \mu\text{m}$ and exhibited slow movements. Based on morphology, the larva was identified as sparganum or the larva of *Spirometra* sp. (Souslby 1982). The description of the heart shaped embryo within the sparganum has not been reported by any previous authors. The lysis of pseudo segments enabled release of the embryo and hence it could be described in the present study.

Histopathological studies revealed eosinophilic lymphadenopathy, pericapsular fibrosis and chronic inflammation with lymphangiectasia and rich vascular channels which were consistent with that of a parasitic infection. Experimental studies in mice have shown that fibrous tissue and active inflammatory cells surround the spargana after 6 months of infection and that inflammation is more severe in the track left by worms rather than around the worms (Hong et al. 1989).

Sparganosis in man was described for the first time in China in the year 1882 by Sir Patrick Manson, a Scottish physician. The most common way to contract this condition is ingestion of infected cyclops through drinking contaminated water. The condition can also be caused by eating the flesh of an infected animal, usually a frog or snake (Li et al. 2011). Sparganosis manifests as skin sore or nodule due to the localization of the larvae in the soft subcutaneous tissue. The infected tissue then becomes

Fig. 2 Heart-shaped embryo $\times 100$

fibrous and results in inflammation. Ocular (Tansurat 1996), cerebral (Guo et al. 2008), testicular (Sakamoto et al. 2003) and pulmonary (Chung et al. 2012) sparganosis have also been reported worldwide.

Normally, removal of the parasite results in uneventful recovery as in the present case. Drinking water is suspected to have resulted in the occurrence sparganosis in this case. Although, pseudophyllidean tape worm infection due to *Diphylllobothrium latum* is quite common among carnivores in Kerala as revealed by postmortem and fecal sample examination (Jacob and Pillai 1991), specific identification is not routinely made as treatment does not warrant it. Moreover the morphological similarity between eggs makes it difficult to distinguish the species. In this background, it is essential to differentiate the species of pseudophyllidean tapeworms when encountered in animals. Many people of Kerala in country side often drink water from unprotected surface water sources such as ponds and open-wells. Enhanced population, lack of awareness and unhygienic water supply can all lead to contamination of water sources with animal excreta.

To prevent ingestion of cyclops or *Spirometra* larvae, water in endemic areas should be boiled or treated with disinfectants. Currently, no effective treatment for sparganosis is known. The only treatment is surgical excision of localized infection, although limited success has been reported with the use of praziquantel (Torres et al. 1981).

The potential threat of misdiagnosis along with the lack of knowledge of existence of the condition may pose a major challenge in accurate treatment of ailing patients. This report of human sparganosis in Kerala will not only contribute to the data base of reemerging zoonotic infections, but also will create an awareness among medical

surgeons who encounter helminths during surgical procedures. Although sparganosis is most often diagnosed by recovery of the parasite during surgery, detection of specific antisparganum IgG using ELISA along with relevant clinical history was found to be useful in early serodiagnosis of the condition (Cui et al. 2011). Improvement in public health strategies and provision of safe drinking water still remains as issues to be resolved, especially in areas where streams or ditches infected with copepods provide the source of drinking water.

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