

## Laboratory and Epidemiology Communications

### A Red Fox, *Vulpes vulpes shrencki*, Infected with *Echinococcus multilocularis* was Introduced from Hokkaido Island, Where *E. multilocularis* is Endemic, to Aomori, Northern Part of the Mainland Japan

Haruo Kamiya\*, Takashi Inaba<sup>1</sup>, Hiroshi Sato and Arihiro Osanai

*Department of Parasitology, Hirosaki University School of Medicine, Hirosaki 036-8562 and*

*<sup>1</sup>Department of Medical Technology, Hirosaki University School of Health Sciences, Hirosaki 036-8564*

Communicated by Hiroshi Yoshikura

(Accepted September 2, 2003)

*Echinococcus multilocularis*, a causative agent of alveolar hydatidosis, is becoming a serious problem in Hokkaido, the northernmost island of Japan (1,2). *E. multilocularis* is maintained among its definitive hosts, such as red foxes, *Vulpes vulpes shrencki*, and dogs, and its intermediate host, wild voles such as *Clethrionomys rufocanus bedfordiae*, in Hokkaido. The average infection rate of *E. multilocularis* in the red foxes of Hokkaido has gradually increased by nearly 40% (1). This situation has made the people in the endemic areas anxious and raised the possibility of the spread of *E. multilocularis* from Hokkaido to Honshu, mainland Japan. Extensive epidemiological surveys have been conducted on definitive and intermediate wild or domestic hosts for years in Aomori Prefecture in Honshu directly connected to Hokkaido and in its neighbors. However, no convincing evidence of the infection among wild animals was obtained (3). Though three pigs raised in Aomori were found infected during meat inspection in 1999 (3,4), it is not obvious where and how those pigs were infected (4).

A red fox from Hokkaido was brought to a taxidermist in Hirosaki, Aomori, in Honshu on November 23, 2000. This fox was shot at Nemuro, eastern Hokkaido, one of the most endemic areas of the disease. The hunters brought the fox to a taxidermist who skinned it and sent the rest of the body to our laboratory for the examination of parasites. Having been informed that the fox was introduced from Hokkaido, we handled the specimens under conditions avoiding the spread

of *E. multilocularis* eggs. We found approximately 8,000 mature *E. multilocularis* in the intestine. Trematode species, *Alaria alata*, was also found.

The taxidermist and the hunters involved in the hunting who had a long history of deer hunting in Hokkaido were examined for antibody against alveolar hydatid by ELISA. All were negative in the test.

Hokkaido Island and Aomori are separated by a sea strait, the Tsugaru Channel. Fifteen years ago, however, a tunnel of approximately 50 km long connecting both land areas was constructed. Recently, wild foxes, *Vulpes vulpes*, similar to the red fox of Hokkaido, were observed around the tunnel's exit on the Honshu side. This issue makes us to speculate on the possibility that the red fox might have passed through the tunnel from Hokkaido to Aomori. Furthermore, infected dogs were once introduced to Honshu from Hokkaido (5). Therefore, the present case showed high possibility of the dissemination of *E. multilocularis* by the movement of definitive hosts, dead or alive (6). A network of hunters, taxidermists, and the public health department may help prevent the spread of *E. multilocularis* from Hokkaido to mainland Japan.

This work was supported by grant-in-aid for "The Control of Emerging and Reemerging Diseases in Japan" from the Ministry of Health, Labour and Welfare, Japan.

## REFERENCES

1. Kamiya, M. and Oku, Y. (1999): *Echinococcus* (1) Biology. *Progress of Parasitology in Japan*, 7, 275-295.
2. Kimura, H., Furuya, K., Kawase, S., Sato, C., Yamano,

\*Corresponding author: Mailing address: Department of Parasitology, Hirosaki University School of Medicine, Zaihu-cho 5, Hirosaki 036-8562, Japan. Tel: +81-172-39-5043, Fax: +81-172-39-5045, E-mail: hkamiya@cc.hirosaki-u.ac.jp

- K., Takahashi, K., Uruguchi, K., Ito, T., Yagi, K. and Sato, N. (1999): Recent epidemiologic trends in alveolar echinococcosis prevalence in humans and animals in Hokkaido. *Jpn. J. Infect. Dis.*, 52, 117-120.
3. Kamiya, H. (2001): Recent situation and control of alveolar echinococcosis in Japan, with special reference to animal concern. *J. Miyagi Vet. Ass.*, 54, 5-10.
  4. Kamiya, H (2003): Present situation and its control measure of echinococcosis in Aomori, with the consideration of its transmission from Hokkaido to mainland Japan. *Jpn. Med. J.*, 4129, 25-29 (in Japanese).
  5. Kamiya, M., Morishima, Y., Nonaka, N. and Oku, Y. (2001): Epidemiological survey for companion animals as the definitive hosts of *Echinococcus multilocularis* by coproantigen detection. p. 85. Proceedings of 70th Annual Meeting of Japanese Society of Parasitology.
  6. Doi, R., Matsuda, H., Uchida, A., Kanda, E., Kamiya, H., Konno, K., Tamashiro, H., Nonaka, N., Oku, Y. and Kamiya, M. (2003): Possibility of invasion of *Echinococcus* into Honshu with pet dogs from Hokkaido and overseas. *Jpn. J. Public Health.*, 50, 639-649.