

A Harbor Seal Infection with *Dirofilaria*

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Abstract : A male harbor seal (*Phoca vitulina*) about 10 years of age died. The seal was presented for necropsy in the Veterinary Teaching Hospital, Chungbuk National University in August 2001. The seal had been a concrete pool in zoo for 4 years. The exact duration of captivity was unknown. The carcass was weighed about 90 kg and was about 140 cm length. At necropsy, 2 adult filarioid worms were found in the right and left ventricles. The filaroid worms weren't found in the other organs. The parasites were slender white nematodes. A male nematode in the right ventricle was 14 cm long, and a female nematode in the left ventricle was 26 cm long in length. The parasites were identified as *Dirofilaria immitis*.

Key words : Harbor seal, Heartworm, *Dirofilaria immitis*

Introduction

Dirofilaria immitis is a filarial parasite that, in the adult stage, inhabits the right ventricle and pulmonary arteries of dogs and other animals. The distribution of parasite is considered to be world wide in temperate and tropical climates, which provide a good ecological environment for development of the intermediate host - mosquito.

In general, it appears that *Dirofilaria immitis* is continuing to spread in the United States, Canada, and Australia¹⁶. Some investigations revealed the presence of *Dirofilaria immitis* in canine populations in Spain¹⁰, France, Italy, Argentina, and Brazil⁴. In another study, cat¹³, ferret^{9,11} and harbor seal¹ were infected with *Dirofilaria immitis*.

The present paper reports the distribution of *Dirofilaria immitis* in a harbor seal in Korea.

Case Report

A male harbor seal (*Phoca vitulina*) about 10 years of age died. The seal presented for necropsy in the Veterinary Teaching Hospital, Chungbuk National University in August 2001. The seal had been a concrete pool in zoo for 4 years. The exact duration of captivity was unknown. The pool water was pumped from an underground cellar and circulated through the pool. The carcass weighed about 90 kg and was about 140 cm long. There was a 5 cm thickness of subcutaneous fat. At necropsy, 2 adult filarioid worms were found in right and left ventricles. The filaroid worms weren't found in the other organs. The parasites were slender white nematodes. A male nematode in the right ventricle was 14 cm long, and a female nematode in the left ventricle was 26 cm long in length, respectively (Fig 1 and Fig 2). The parasites were identified as *Dirofilaria immitis*.

Discussion

Dirofilaria immitis infection is recognized as variably endemic within reasonably finite geographic area. Korea, as a geographic region, illustrated a widely variant collection of

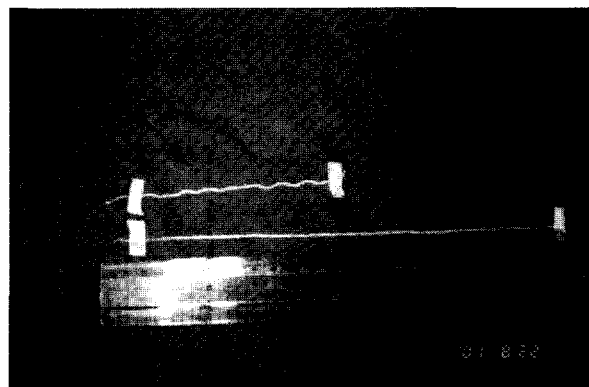


Fig 1. This photograph shows two adult (male, arrow) heartworms (*Dirofilaria immitis*) in a harbor seal.



Fig 2. This photograph shows two adult (female, arrow) heartworms in the heart of a harbor seal.

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ecosystems potentially suited for the transmission of heartworm infection¹⁴. Also distributed throughout Korea are species of mosquitoes known to be vector of *Dirofilaria immitis*, including *Culex salinarius*.

Filaroid worms were found frequently in the hearts of pinnipeds at necropsy^{2,5,6}. The confusion that exists in the literature is whether they were found in seals (Phocids) or sea lions (Otarids). In as much as most have been found at necropsy, the presence or absence of microfilariae in blood is not known. The exact identification of the adult worms is also questionable in some cases⁸. Filaroid worms, identified as *Dipetalonema spirocauda*⁷, were found in right atrium, right ventricle, and pulmonary artery of a young harbor seal (*Phoca vitulina*). *Dipetalonema* spp were found in 2 of 13 harbor seals examined¹⁵. Reportedly, adult *D. spirocauda* are a common finding at necropsy of the common harbor seal⁸.

In 1973, a report on sea lions on the American East Coast questioned reports of *D. immitis* in the harbor seal³. *Dirofilaria immitis* adults and microfilariae are found in sea lions kept on the East Coast⁸. The American West Coast, a nonenzootic area for *Dirofilaria immitis*, is believed to be relatively free of heartworms in sea lion; however, they commonly have a subcutaneous filaroid, *Dipetalonema odendhali*¹². This filaroid also sheds microfilariae into the blood.

In another report from the West Coast, blood from 9 sea lions was examined; all but 1 had microfilariae thought by measurements to be *D. immitis*¹⁷. Adult worms, if any, were not available for examination, as all were living animals. Sea lions brought from the West Coast to the East Coast become infected readily with *D. immitis*, as most of the East Coast is enzootic for this parasite dogs.

The present case notified the ability of *D. immitis* to infect the harbor seal. The lack of microfilariae, albeit a finding based on only one examination may indicate that the seal is unnatural host or that the subject might developed sufficient immunity to inhibit the development of microfilariae.

The epidemiology of *D. immitis* infection in harbor seal was still unclear. The infection of *D. immitis* had some risk factors such as residence in endemic regions, outside habits and lack of prophylaxis. The ubiquitous presence of one or more species of vector competent mosquitoes makes transmission possible. In this case, because the harbor seal had been resident for 4 years in the zoo, it had high possibility to be transmitted by mosquitoes.

Conclusions

A male harbor seal (*Phoca vitulina*) about 10 years of age was presented in the Veterinary Teaching Hospital, Chungbuk National University in August 2001. At necropsy, 2 adult filarioid worms were found in right and left ventricles in a harbor seal. The filaroid worm wasnt found in the other

organs. A male worm in the right ventricle was 14 cm long, and a female worm in the left ventricle was 26 cm long in length, respectively. The worms were identified as *Dirofilaria immitis*.

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잔점박이 물범의 심장사상충 감염

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요약 : 천연기념물 제331호인 식육목 바다표범과의 포유류인 수컷 잔점박이 물범 (harbor seal, *Phoca vitulina*) 1마리가 폐사되어 부검을 의뢰하였다. 포획시기는 불명확하지만 연령은 10세로 추정되는 물범은 체중이 약 90 kg이고 체장 140 cm이며, 4여년 동안 동물원에서 전시되었다가 폐사하였다. 부검시 심장에서는 선충 2마리가 발견되었다. 이 선충 2마리중 길이가 14 cm인 수컷 1마리는 우심방에서 발견되었고, 좌심방에서는 길이가 28 cm인 암컷 1마리가 발견되었다. 검사결과 본 선충은 심장 사상충 (*Dirofilaria immitis*)으로 판명되었고, 동물원 풀장에서 서식하는 동안 감염된 것으로 생각되었다.