

Laparoscopic Retrieval of Ectopic Adult Heartworms from the Abdominal Cavity of a Dog with Heartworm Infestation

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Abstract : A 5-year-old, intact male Beagle was presented with chronic abdominal pain. The dog was diagnosed with dirofilariasis by positive heartworm antigen detection via ELISA and concurrent microfilaria. Thoracic radiographs revealed cardiomegaly with dilation of the main pulmonary artery. Echocardiography revealed the adult worms in the main pulmonary arteries, but other abnormalities other than heartworm infection were not present. To find the cause of the abdominal pain, exploratory laparoscopy was performed. Ectopic migrating adult heart worms were visualized through exploratory laparoscopy and the clinical sign resolved after removing the heart worm. This report describes removing the ectopic migrating adult heartworms using exploratory laparoscopy in the abdominal cavity.

Key words : canine, heartworm, laparoscopy.

Introduction

Heartworm infestation in dogs is a common tropical parasitic disease caused by *Dirofilaria immitis* within the pulmonary arteries. In severe infections, the infestation is found in the right side of the heart and occasionally in the vena cava (9). Less frequently, ectopic migrations of the heartworm have been reported in locations such as the brain, spinal cord, cerebral artery, eye and abdominal cavity (1,4). In a human literature, heartworm disease of the abdominal cavity was also reported (11). Most common clinical signs of heartworm infestation in dogs include exercise intolerance and cough. A chronic right heart failure induces various clinical signs such as ascites hepatomegaly and syncope (4).

This case report describes a canine heartworm infection occurring in the abdominal cavity with unusual abdominal pain. To the author's knowledge, this case is a first report describing the removal of the ectopic migrating adult heartworm using exploratory laparoscopy.

Case

A 5-year-old, intact male Beagle was presented with chronic abdominal pain of unknown etiology. On admission, the dog showed an arched back. Physical examination revealed increased abdominal tension, but no other abnormalities were found. Laboratory data including a complete blood count,

serum biochemical analysis and urinalysis were within normal limits. Survey radiographs revealed cardiomegaly with dilation of the main pulmonary artery. The caudal lobar arteries and the right cranial lobar artery were also enlarged (Fig 1A). However, there were no remarkable abnormalities in the abdominal radiography. A canine heartworm antigen detection kit (SNAP test, IDEXX Laboratories, Westbrook, Maine, USA) was used according to the manufacturer's instructions and the test result showed a positive reaction for heartworm. On direct microscopic examination, microfilariae were found in the peripheral blood. Echocardiographic findings, the adult worms were detected in the main pulmonary arteries, but other abnormalities, such as dilation of the pulmonary artery, high-velocity tricuspid and pulmonic regurgitations, were not present (Fig 1B). The dog was definitely diagnosed with heart-

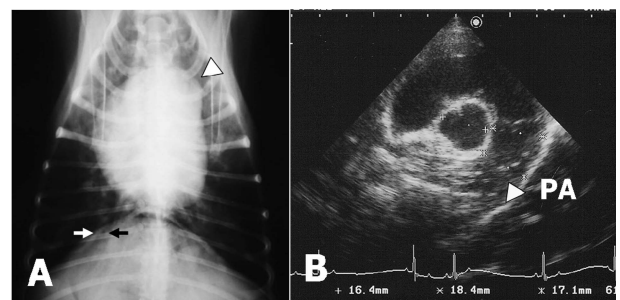


Fig 1. Thoracic radiograph and echocardiography from a heartworm infected dog. (A) The main pulmonary artery (arrowhead) and the caudal lobar arteries were enlarged (arrows) at the dorsoventral view. (B) Right parasternal short-axis view showed the echogenic worms within the pulmonary artery (yellow arrow head).

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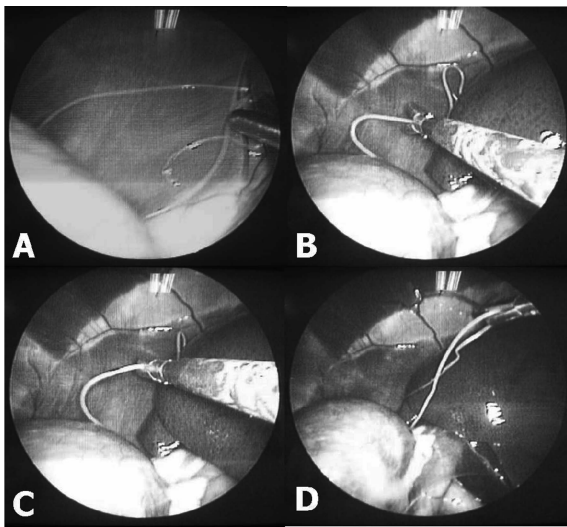


Fig 2. Laparoscopic detection and removal of heartworms in the abdominal cavity. (A) Two, round-long worms were detected around the liver and diaphragm. (B-D) The worms were removed by the grasping forcep of the laparoscope.

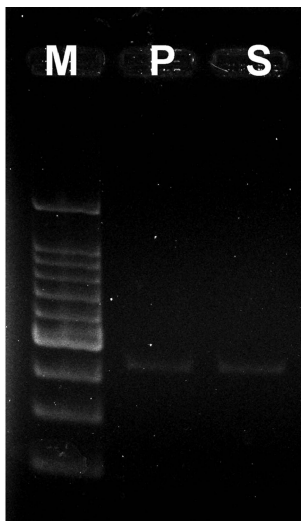


Fig 3. Agarose gel electrophoresis with ethidium bromide of PCR products of nematodes found in this dog. Lane M; molecular weight marker (100 bp ladder), Lane P; *Dirofilaria immitis* positive control, Lane S; clinical sample.

worm infection. However, the cause of chronic abdominal pain was not apparent. Abdominal ultrasonography was not remarkable. Therefore, exploratory laparoscopy was performed with the owner's approval. Through the exploratory laparoscopy, no morphological abnormalities in free stomach, intestine, liver, gall bladder, spleen, peritoneum and omentum were observed. However, two long nematodes were found on the diaphragmatic area and removed by a grasping forcep during the procedure (Fig 2). The nematodes were confirmed as *Dirofilaria immitis* by polymerase chain reaction (Fig 3) and careful gross examination revealed one female and one male heartworm.

Treatment was initiated with doxycycline (10 mg/kg, PO, BID) and aspirin (5 mg/kg, PO, SID) for prophylactic therapy. The abdominal pain completely resolved 2 days after laparoscopy. After the dog returned to normal condition, additional treatments for adulticide therapy and microfilaricidal therapy were conducted. No recurrence was noticed one year later.

Discussion

Abdominal pain in the dog is commonly accompanied with gastrointestinal system, urogenital system, hepatobiliary system, pancreas, spleen and other miscellaneous reasons (6). Clinical symptoms were non-specific and associated with several underlying disease, thus diagnosis for the abdominal pain was challenging (12). Through various diagnostic tests, the reason for the pain was uncertain in this case.

Chronic or recurrent abdominal pain was also a common complaint in human pediatric medicine, and diagnostic and therapeutic approach using exploratory laparoscopy had positive outcomes (5). Laparoscopy is a less invasive examination technique for the abdominal cavity with a high diagnostic accuracy. Recently, diagnostic and therapeutic use of laparoscopy in small animal practice has increased in importance (8,10). Laparoscopy provided less painful and less invasive procedures, thus which was used in many fields of the veterinary clinic (3,7,13). Diagnostic approach using laparoscopy in this case was safe and very effective. Abdominal pain due to ectopic heartworm migration into the abdominal cavity was apparently a rare and unusual clinical sign. However, no specific cause of the abdominal pain was revealed and removing the heartworm resolved the clinical symptom.

The exact process of ectopic heartworm migration into the abdominal cavity of dogs is still not fully understood (2). However, it is considered to be a possible cause of abdominal pain and the diagnostic approach through exploratory laparoscopy was very useful for diagnosis and therapy in this case. Therefore, this case demonstrates that exploratory laparoscopy can be utilized to visualize and remove adult worms ectopically migrated into the abdominal cavity of a dog.

In conclusion, this case shows that abdominal pain in the heartworm infected dog could be a sign of ectopic heartworm infestation in the abdominal cavity, although the exact mechanism of the canine heartworm migration into the abdominal cavity was not clear. To our knowledge, abdominal pain concurrent with ectopic abdominal heartworm migration and removing the adult heartworm in the abdominal cavity using exploratory laparoscopy had not been reported.

Acknowledgments

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심장사상충 복강내 이소기생 개에서 복강경적 치료 1예

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요 약 : 5년령의 수컷 비글견이 복통을 주증으로 내원하였다. 환자는 ELISA를 통한 심장사상충 항원 검사 및 자충검사에 양성결과를 보여, 심장사상충 감염증이 확인되었다. 흉부 방사선 검사에서 심비대 및 폐동맥 확장증 소견이 관찰되었으며, 심초음파를 통하여 주 폐동맥 내의 심장사상충이 확인 되었다. 심초음파상 사상충 감염 이외의 다른 이상은 발견되지 않았다. 복통에 대한 정확한 원인 규명을 위하여 탐색적 복강경 시술이 시행되었으며, 환측에서 복강으로 이소기생한 심장사상충이 관찰되었다. 복강내 심장사상충의 제거 이후 환측의 임상증상은 사라졌다. 본 증례는 탐색적 복강경을 통하여 복강내 이소기생한 심장사상충을 제거한 증례 보고이다.

주요어 : 개, 심장사상충, 복강경