

THE HEART OF THE MATTER

Because heartworm infection has serious consequences for a pet, owners should be educated about prevention.

HEARTWORM HOTLINE

The Hidden Characteristics of Heartworm Disease

*Stephen L. Jones, DVM, Immediate Past President, American Heartworm Society
Lakeside Animal Hospital, Moncks Corner, South Carolina*



The **Heartworm Hotline** column is presented in partnership between *Today's Veterinary Practice* and the **American Heartworm Society** (heartwormsociety.org). The goal of the column is to communicate practical and timely information on prevention, diagnosis, and treatment of heartworm disease, as well as highlight current topics related to heartworm research and findings in veterinary medicine.

Visualize the following scenario: A new client, Mrs. Scott, is in your exam room with Hamilton, a 4-year-old neutered Boston terrier. Before entering the exam room, you learn that Hamilton's parasite protection program is limited to a flea and tick preventive. Given that heartworms pose a serious threat in your practice, you have a few immediate tasks ahead of you: (1) inform Mrs. Scott of the need to test Hamilton for heartworms, (2) educate Mrs. Scott about heartworm disease, and, if Hamilton's heartworm test result is negative, (3) stress the need to give him year-round heartworm prevention.

Unfortunately, this scenario is all too common in veterinary practices today. Clients often don't understand what heartworms are—nor do they understand the consequences of infection. Unlike fleas and ticks, owners can't see heartworms, and they can't see heartworm disease developing inside their pets. Only now are veterinarians beginning to fully comprehend how quickly heartworms can cause disease, how the disease progresses, how severe and

lifelong the effects of infection can be, and how important it is to prevent infection.

In the above scenario, Hamilton appears to be a happy, healthy dog—on the outside. Beneath the surface, however, his body may be harboring an infection that is already causing serious clinical changes.

HEARTWORM DISEASE BEGINS SHORTLY AFTER INFECTION

It was once believed that pets could have heartworm infection but not have heartworm disease. However, a 2010 study¹ using computed tomography indicated that infections as early as 125 days old showed evidence of thickening, obstruction, and tortuosity of the smaller branches of the distal pulmonary arteries. Additional observations, based on necropsies of dogs infected for 153 days, showed dramatic changes in gross pathology reflected by vascular endarteritis and proliferation (**FIGURES 1 AND 2**).



These conclusions become more meaningful when we understand that it takes young adult heartworms 67 to 125 days to reach the pulmonary arteries. This would imply that the heartworms that caused the pathology shown in **FIGURE 2** had been in the pulmonary arteries for less than 3 months, which is too early for an antigen test to detect the infection. Given these findings, we can assume that by the time we are able to make a diagnosis, heartworm-infected pets will already have disease.

HEARTWORM DISEASE IS PROGRESSIVE

By 180 to 210 days of age, heartworms grow to 10 to

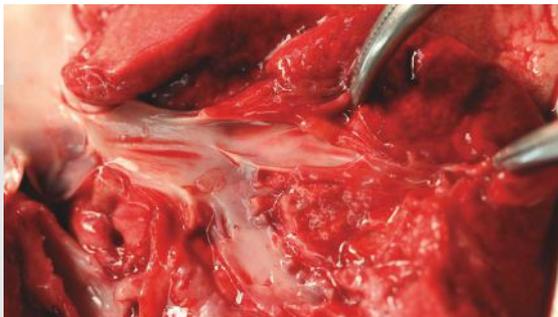


FIGURE 1. Normal distal pulmonary artery.



FIGURE 2. Distal pulmonary artery with 3 worms, 153 days after infection.

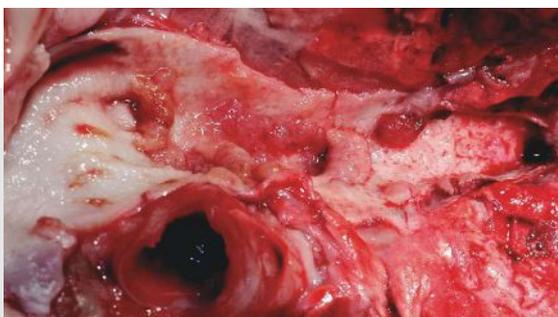


FIGURE 3. Right main pulmonary artery with significant endothelial proliferation and fibrosis due to heartworm infection.

12 inches in length and occupy the larger, more proximal pulmonary arteries, again causing endarteritis and villous proliferation. If left untreated, the arterial walls develop smooth muscle thickening and fibrosis (**FIGURE 3**), the smaller capillaries and arterioles become obstructed, and perivascular inflammation ensues. These changes are compounded in infections with large numbers of worms and continue to progress as long as live heartworms remain.

HEARTWORM DISEASE IS LIFELONG

While heartworms can live 5 to 7 years, they can also die as young adults or at any age in between. This is another complicating factor that affects the progression of heartworm disease. As adult worms die, the dead worms are forced into the distal pulmonary arteries, causing thrombosis and obstruction (**FIGURE 4**). Unfortunately, dead worms don't simply decompose; they can leave behind chronic obstructive disease along with associated perivascular, peribronchiolar, and alveolar disease (**FIGURE 5**). The longer heartworm infection persists, the more likely it is for clinical disease to result.

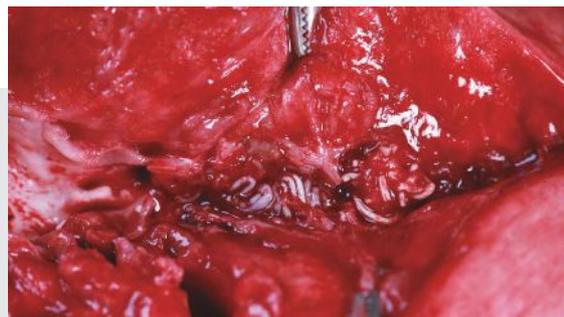


FIGURE 4. Crumpled heartworm and thrombosis in a distal pulmonary artery.



FIGURE 5. Dilated distal pulmonary artery with mummified adult worm remnants causing permanent obstruction of blood flow.

Admittedly, the majority of dogs diagnosed with heartworms are clinically normal, and most veterinarians would be hard-pressed to know a dog has infection without diagnostic testing. Nevertheless, clinical normalcy does not mean patients are disease-free. Over the years, I have conducted numerous

Stephen L. Jones

Stephen L. Jones, DVM, is the past president of the American Heartworm Society and a general practitioner/practice partner at Lakeside Animal Hospital, Moncks Corner, South Carolina. He received his DVM from the University of Georgia in 1985. Dr. Jones grew up in Summerville, South Carolina, and attended Clemson University where he graduated with a BS in Animal Science in 1981. He is also a member of the Trident Veterinary Medical Association, South Carolina Veterinary Medical Association, American Veterinary Medical Association, and the Veterinary Political Action Committee. Read more about Dr. Jones at lahmc.com/veterinarians.php.



necropsies on dogs infected with heartworms and have learned the following:

- If a dog has heartworms, it has heartworm disease.
- Disease pathology continues to progress until all heartworms are eliminated.
- If a dog had heartworms earlier in life, some permanent disease remains.

One of the most important jobs we do as veterinarians is prevent disease. If we understand that every dog with heartworm infection has disease and will have some disease for life, we should be more likely to emphasize the need for annual testing and prompt treatment to clients. And, if we stress the progressive nature of heartworm disease to our clients, they may be more disposed to listen to our recommendations for year-round heartworm prevention. **TVP**

Reference

1. Seiler GS, Nolan TJ, Withnall E, Reynolds C, et al. Computed tomographic changes associated with the prepatent and early patent phase of dirofilariasis in an experimentally infected dog. *Vet Radiol Ultrasound* 2010;51(2):136-140.

Staff Pets Deserve Pet Insurance Too

Your staff works hard for your clients' pets, now is your chance to offer them a benefit that'll really get their tails wagging.

Why Embrace?

- ✓ 20% staff discount*
- ✓ Ensures tax compliance
- ✓ Reduces unpredictable expenses
- ✓ No contracts to sign & no cost to your practice

Ready to "embrace" staff benefits?

Visit EmbracePetInsurance.com/vets/staff-benefit

Visit us at **VMX!** Booth #2600

*The veterinary staff discount varies by state. Please contact us to learn more.

Pet health insurance is administered by Embrace Pet Insurance Agency, LLC and underwritten by one of the licensed insurers of American Modern Insurance Group, Inc., including American Modern Home Insurance Company d/b/a in CA as American Modern Insurance Company (Lic. No. 2222-8), and American Southern Home Insurance Company. Coverage is subject to policy terms, conditions, limitations, exclusions, underwriting review, and approval, and may not be available for all risks or in all states. Rates and discounts vary, are determined by many factors, and are subject to change. Wellness Rewards is offered as a supplementary, non-insurance benefit administered by Embrace Pet Insurance Agency in the United States. © 2016 American Modern Insurance Group, Inc.

