Degenerative Myelopathy

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As a neurologist, I knew all too well the beginning signs of spinal cord dysfunction in my oldest girl and first show Irish setter. I wanted to believe the slippage of her back feet on the tile and linoleum floors was because of arthritis in the hips, but she never appeared stiff or in pain. Her symptoms progressed rapidly after a harrowing episode of gastric bloat on an unusual blizzard-like wintery night in northeast Missouri this February. I later came to read about anesthesia hastening the effects of degenerative myelopathy. As she began to stumble more frequently, I recalled a notice in the AKC Gazette about genetic testing at the University of Missouri. We went for an evaluation, the MRI and spinal tap much scarier than any of the countless procedures I have done on my human patients. Unfortunately, there was no herniated disc and the diagnosis of presumptive degenerative myelopathy was uttered. Even though I knew this was likely all along, the news was devasting. A few weeks later the genetic test confirmed two mutated copies of the suspected gene.

Degenerative myelopathy is a progressive disease of the spinal cord in older dogs. It was first described in veterinary literature in 1973. The disease has an insidious onset typically between 8 and 14 years of age. It begins with ataxia (loss of coordination) in the hind limbs. The affected dog will wobble when walking, knuckle over or drag the feet. This can first occur in one hind limb and then affects the other. As the disease progresses, the limbs become weak and the dog begins to buckle and has difficulty standing. The weakness gets progressively worse until the dog is unable to walk. The clinical course can range from 6 months to 1 year before dogs become paraplegic. If signs progress for a longer period of time, loss of urinary and fecal continence may occur and eventually weakness will develop in the front limbs. Another key feature of DM is that it not a painful disease.

DM begins in the spinal cord in the thoracic (chest) region. Microscopic evaluation of spinal cords of affected dogs reveals degeneration of the white matter. The white matter consists of fibers that transmit movement commands from the brain to the limbs and sensory information from the limbs to the brain. The degeneration consists of both demyelination (stripping away the insulation of these fibers) and axonal loss (loss of the actual fibers) and interferes with the communication between the brain and limbs. Recent research has identified a mutation in a gene that confers a greatly increased risk of developing the disease.

DM is a diagnosis of exclusion. Other causes for the weakness must be eliminated using diagnostic tests such as MRI, myelopathy, and spinal fluid analysis. Once other possibilities are excluded, the diagnosis is presumptive DM. The only way to confirm the diagnosis is to examine the spinal cord under the microscope when a necropsy is performed. Other disorders which may mimic DM include herniated intervertebral discs, tumors, cysts, infections, injuries, and strokes.

Unfortunately, there are no treatments that have been clearly shown to stop or slow progression of DM. A number of approaches have been tried and recommended on the internet without scientific evidence that they work. The outlook for a dog with DM is grave. The discovery of a gene that identifies dogs at risk for developing degenerative myelopathy could pave the way for therapeutic trials to prevent the disease from developing. Meanwhile, the quality of life of an affected dog can be improved by measures such as good nursing care, physical rehabilitation, pressure sore prevention, monitoring for urinary infections, and ways to increase mobility through use of harnesses and carts.

Dr. Gary Johnson at the Animal Molecular Genetics Laboratory and Dr Joan Coates at the Comparative Neurology Program of the University of Missouri and Drs. Claire Wade and Kerstin Lindblad-Toh at the Broad Institute of MIT/Harvard and their colleagues have identified a DNA mutation that is a major risk factor for development of DM in dogs. The genetic test is available through the OFA. The test clearly identifies dogs that are clear (have 2 normal copies of the gene), those who are carriers (have one normal copy and one mutated copy), and those who are at high risk for developing DM (have 2 mutated copies). However, having 2 mutated copies does not necessarily result in disease. Dr Coates will perform testing on any Irish setter with presumptive DM free of charge.

The genetic mutation for DM involves either a “G” or good allele or an “A” or affected allele, one from sire and one from dam. Dogs in breeds studied with G/G and A/G alleles never have the disorder. All have had the A/A mutation. It is possible to have A/A and not have the clinical disorder. Current research is focusing on how many dogs with A/A will survive without the disorder and why. Breeders should take into consideration the DM test results as they plan their breeding programs; however, they should not over-emphasize this test result. Instead, the test result is one factor among many in a balanced breeding program

Several breeds have a relatively high percentage of the predisposing mutation including Boxers, Pembroke Welsh Corgis, Chesapeake Bay Retrievers, and Rhodesian Ridgebacks. Several breeds have known DM and the frequency of the mutation needs to be determined. Wise use of the test can reduce the incidence of dogs at risk for DM in the long term; however it is likely to take many generations to reduce the frequency of this disease in breeds with higher frequency of mutation.

Irish Setters are not on the list of known or high percentage of carriers of the predisposing mutation although this is likely under reported. In review of the ISCA latest health survey from 2003 no dogs were reported to be affected, although 7 dogs had “other” neurological disorders and 11 had nerve degeneration. In my short campaign to bring awareness to this terrible disorder, I have met and discussed with several fanciers who have had personal experiences. In research the Veterinary Medical Database form Jan 1 1990 to Dec 31, 1999 reported to Dr Roy Berhaus, DVM, MS of the Department of Population Health and Reproduction in the College of Veterinary Medicine at the University of California-Davis, Irish Setter breed prevalence of 0.68% similar to the Boxer at 0.59%.

I urge anyone with a preemptive diagnosis of degeneration myelopathy to participate in the ongoing research in the eventual hope this devasting disorder can be eradicated by informed breeding decisions. Contributions to the AKC CHF specific to this research will be matched. An application to the ISCA Health Committee is also in progress. This disorder is similar to human ALS or Lou Gehrig disease with painless loss of motor function and intact cognition, devasting in human and canine alike. Although my first show girl will not be cured of this cruel disorder, I hope this makes a difference in the future of our beloved breed.

Specifics on testing can be found at www.caninegeneticdiseases.net

Experience with Degenerative Myelopathy

"Becky" was about 6 years old when I first noticed difficulty in stacking her right rear leg in the show ring. She had been returned to me (her breeder) as a 4 year old hence the late start in the show ring. Becky's symptoms progressed over the next several months to an uncoordinated "drunk – like" gait. I took her to a veterinary neurologist who gave me a list of things her problem could be, but no real answers or treatment. He did mention that the symptoms seemed an awful lot like DM in German Shepherds, but assured me that Irish Setters did not get that disease.

In the following months, Becky would fall over if she moved suddenly. Only her rear legs were affected. A friend built a cart for her.

A veterinarian that I work with recommended a different neurologist and I made an appointment. This neurologist felt sure Becky's problem was Degenerative Myelopathy. She had recently diagnosed an Irish Setter (on post mortem) with the disease. No treatment would help Becky, her disease would progress. The decision was made to keep Becky as comfortable as possible for as long as she had good quality of life, at the point her quality of life was no longer good, she would be euthanized and posted. An MRI, spinal tap, and a variety of other tests wee done to rule out other problems – all were negative.

These decisions are never easy. Becky lived for about 2 years after the onset of DM. PM examination did reveal the disease.

About a year after Becky died, her sister "Baby" started exhibiting the same symptoms. The neurologist felt she was also affected by DM. We decided to forego the MRI. Baby seemed to lose function quicker, but then she was older also. Her post mortem examination revealed that she had a lipoma on her spinal cord and did not have DM.

A litter brother also had the same symptoms. He was owned by friends. I saw him a few months before his death and he was almost completely paralyzed, could only move his head & neck. His owners carried him from room to room in the house so he could be with them. Thy got up several times each night to move him so he wouldn't get pressure sores. I've never seen such devoted owners. We talked about the need for a pm neuro exam and they agreed. Unfortunately, Casey developed severe pain and it was determined that he had osteosarcoma in his one front leg. He was euthanized with no pm.

Jan Ziech